City of New Meadows Transportation Plan

APRIL 2007

PREPARED BY J-U-B ENGINEERS, INC.

Acronyms

AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
BST	bituminous surface treatment
CIP	Capital Improvement Plan
ITD	Idaho Transportation Department
LHTAC	Local Highway Technical Assistance Council
LOS	level(s) of service
mph	miles per hour
MUTCD	*Manual on Uniform Traffic Control Devices* (published by the Federal Highway Administration)
SH	State Highway

Acknowledgments

Special recognition goes to the following, who represented and supported the City of New Meadows in the transportation planning efforts.

Mayor, City of New Meadows

President and members, City Council

Chief of Police

Administrator and members, Planning and Zoning Commission

Public Works Department

Consultants
J-U-B ENGINEERS, Inc.
Gateway Mapping, Inc.
The Langdon Group

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City of New Meadows Project Overview

Introduction

The City of New Meadows is a residential community set in the picturesque Meadows Valley. Originally a mining area, the town has maintained itself as a timber, ranching, and trading center since its formation around 1910. Population growth has been sporadic in the City of New Meadows but the recent real estate boom experienced throughout the United States is now becoming evident in this area as well.

The goal of this transportation plan is to provide guidance to the city about how to improve and maintain the transportation infrastructure to accommodate area growth and improve the residents' quality of life.

About the City of New Meadows

The City of New Meadows is located in the northeastern part of Adams County on the bank of the Little Salmon River. (See **Exhibit 1** for an aerial map.) The principal north-south routes for the State of Idaho, U.S. Highway 95 (US-95) North and State Highway 55 (SH-55), intersect in the north-central part of the city. With an elevation of approximately 3,868 feet, the community enjoys a favorable summer climate and often a long and sometimes harsh winter season.

The Meadows Valley provides a broad and fertile setting for the City of New Meadows. The city is a residential community that also serves as a trading, social, and economic center for the surrounding countryside. In addition, the City of New Meadows sits in the center of the Heartland area, which has a rich historical and cultural heritage and a strong sense of local identity. The city's location also provides accessibility to the numerous nearby mountains, lakes, and recreational areas.

History

The first settlers in the City of New Meadows area were trappers and prospectors, who came to the area in the early 1800s. Settlers first came to what is now Adams County in 1873. By 1884, there were settlers in each of the three major valleys of the area. In 1890, the county received a boost in population from mining activities in the Cuprum area. Mining declined in the early 1900s and copper production ceased in 1951. The mining produced approximately $1,000,000 in copper, lead, gold, silver, and tungsten.

Adams County was created by an act of the State Legislature on March 11, 1911. The county had previously been a part of Washington and Ada Counties. It borders Idaho County on the north, Valley County on the east, and Washington County on the south; it is bordered on the west by the State of Oregon. Adams County is one of the smallest counties in Idaho, having an area of only 873,408 acres.

The City of New Meadows was founded around 1910, when the Pacific and Idaho Northern Railroad arrived in the vicinity. Many merchants felt that that the city would be the center of economic growth, and moved businesses and buildings to the new location. The city site was platted by Stuart French of the Coeur d'Or Development Company in 1910.

The City of New Meadows continued to grow as a timber, trading, agricultural, social, and educational center through the twentieth century. Pace of growth has been low to moderate, which has helped to enhance the quality of life and sustain a rich community tradition and heritage.


CITY OF
NEW MEADOWS
AERIAL MAP
Exhibit 1
United States Highway 95
School Lot
Mc Lain
Taylor
State Shed
Colt
Cunningham
Nora
Old Highway
Hubbard
Highway 95
Virginia
Katherine
State Highway 55
Heigho
Miller
Morgan
Commercial
Benedict
Speer
Morgan
Wiley
South End
Norris
Substation
0
350
700
1,400
Feet
N

Planned Transportation Projects

By developing and implementing this transportation plan, the City of New Meadows is creating a transportation system that will improve residents' quality of life, enhance safety, and provide for future commercial and residential growth.

Transportation projects envisioned by the City of New Meadows include:

- ✓ Paving city streets to improve drivability and safety and to reduce dust and ongoing maintenance.
- ✓ Adding to and improving parking in the city's commercial area.
- ✓ Improving pedestrian safety, especially for those crossing Virginia Street (US-95).
- ✓ Improving roadside drainage to minimize damage to the roadways and adjacent properties.

Demographics and Land-use Trends

Population and Demographics

The following tables provide population and demographics information about the City of New Meadows.

Table 1. Historic Population (1970–2004)

Area	1970	1980	1990	2004
City of New Meadows	605	576	534	484
Adams County	2,877	3,347	3,254	3,591

Sources: Idaho Department of Commerce; Idaho Economics; U.S. Census Bureau.

Table 2. Current and Projected Population (2005–2030)

Area	2005	2010	2015	2020	2025	2030
City of New Meadows	508	648	827	1,056	1,348	1,720
Adams County	3,771	4,812	6,142	7,839	10,004	12,768

Sources: Idaho Economics; J-U-B ENGINEERS, Inc.

Table 3. Community Age Groups (1980–2000)

Age	1980	1990	2000
Under 5 years	55	46	33
5 to 19 years	133	126	134
20 to 44 years	237	209	185
45 to 64 years	89	100	128
65+ years	62	53	53
Median age	29.1	31.7	36.2

Sources: Idaho Department of Commerce; Idaho Economics.

Table 4. Housing (1980–2000)

Item	1980	1990	2000
Community			
Total housing units	254	249	262
Median value of owner-occupied housing	31,300	45,700	84,600
Median rent	72	155	506
County			
Total housing units	1,580	1,778	1,982
Median value of owner-occupied housing	33,500	43,900	88,800

Source: Idaho Department of Commerce.

Land Use

Pacific and Idaho Northern Railroad

The Pacific and Idaho Northern Railroad rail corridor is now being developed as the Weiser River Trail in the Rails-to-Trails project. The northern terminus of the trail is 8 miles south of the City of New Meadows at Rubicon. A designated route or pathway from the City of New Meadows to Rubicon would create additional recreational and tourism opportunities for the area.

Payette River Scenic Byway

The City of New Meadows is the northern terminus for the Payette River Scenic Byway. A corridor plan identifies and highlights eight areas of interest well-known to area residents. The plan includes suggestions for preserving and promoting these unique features along the route, including the Meadows Valley area.

City of New Meadows Transportation System Network

Roadway Network

The City of New Meadows is a rural city covering less than 1 square mile. The city streets are generally laid out in a north-south, east-west grid. Most of the city streets serve residential areas, with some commercial buildings along US-95 and Commercial Avenue and some industrial use in the west portion of the city.

In 2006, the city had the following roadway inventory:

- ✓ 4.9 total miles of road
- ✓ No paved roads (with the exception of the state highways and adjacent county roads)
- ✓ No bridges

In addition to the road network, the city maintains about 100 road signs. There are no traffic signals within the city. No curbs and very few sidewalks exist in the city.

Table 5 shows the major highways in the area of the City of New Meadows.

Table 5. Major Highways

Jurisdiction	Route Designation	Miles from the City of New Meadows
Federal interstate	I-84	95
Federal highway	US-95	0
State highway	SH-55	0
Payette River Scenic Byway	SH-55	0

Source: Idaho Department of Commerce.

Functional Classification System

Description

A roadway network is typically comprised of a hierarchy of roadways that are defined by their respective functional classification. Generally, roadways serve two primary functions—access and mobility—and the degree to which a roadway serves these functions define its functional classification.

The City of New Meadows presently has a functional classification map that is maintained and published by the Idaho Transportation Department (ITD). (See **Exhibit 2**.) The functional classification map is updated and republished every five years; however, modifications to the map can be requested at any time by highway jurisdictions depending on land-use changes and traffic-use fluctuations on the roadways.

Functional classification maps are an important part of the highway system for state and federal funding requests, as only roads rated major collector or above are generally eligible for these funds.

Nationally, road networks are constituted as follows:

- ✓ Principal arterial system—2 percent to 4 percent
- ✓ Minor arterial system—7 percent to 10 percent
- ✓ Collector roads—20 percent to 25 percent
- ✓ Local roads—65 percent to 75 percent

Roadway Functional Types

The road map in **Exhibit 2** shows the existing and proposed functional classifications for roads in the City of New Meadows. A description of these classifications follows.

Principal Arterials and Minor Arterials

- ✓ Principal arterials carry longer-distance major traffic flows between population centers and important activity locations, including statewide or interstate travel. Minor arterials also provide direct transportation links between cities and major traffic generators.
- ✓ US-95 is the only principal arterial that passes through the City of New Meadows. This is the main north-south route through Idaho and runs from Oregon to the Canadian border. US-95 is maintained by the ITD.
- ✓ ITD generally requires a minimum right-of-way width of 120 feet for principal arterials and 80 to 100 feet for minor arterials.

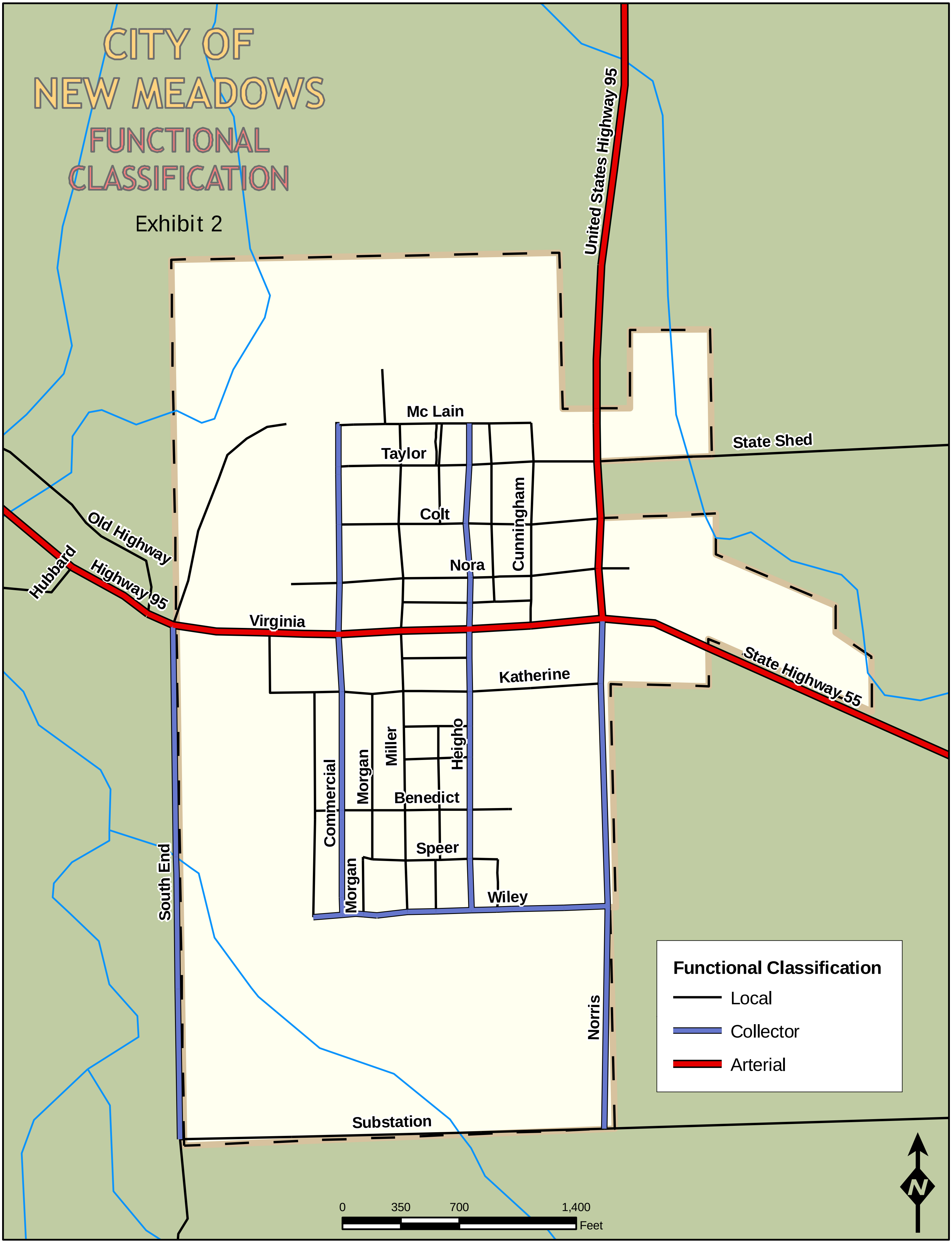
- ✓ The design speed for US-95 near the City of New Meadows is 70 miles per hour (mph). The posted speed is 25 mph within the city limits. Design speeds are typically 5 mph higher than posted speeds.

Collectors

- ✓ Collectors link local streets with the arterial street system and provide travel corridors within a city.
- ✓ Travel speeds and volumes are generally more moderate than arterials and the travel distances shorter.
- ✓ Collector design speeds are typically higher than local street speeds, up to 35 mph.
- ✓ In the City of New Meadows, the streets designated as a collector roads are Commercial Avenue and Heigho Avenue.
- ✓ The typical local road standards indicate a 60-foot minimum right-of-way width for collector streets.

Local Roads

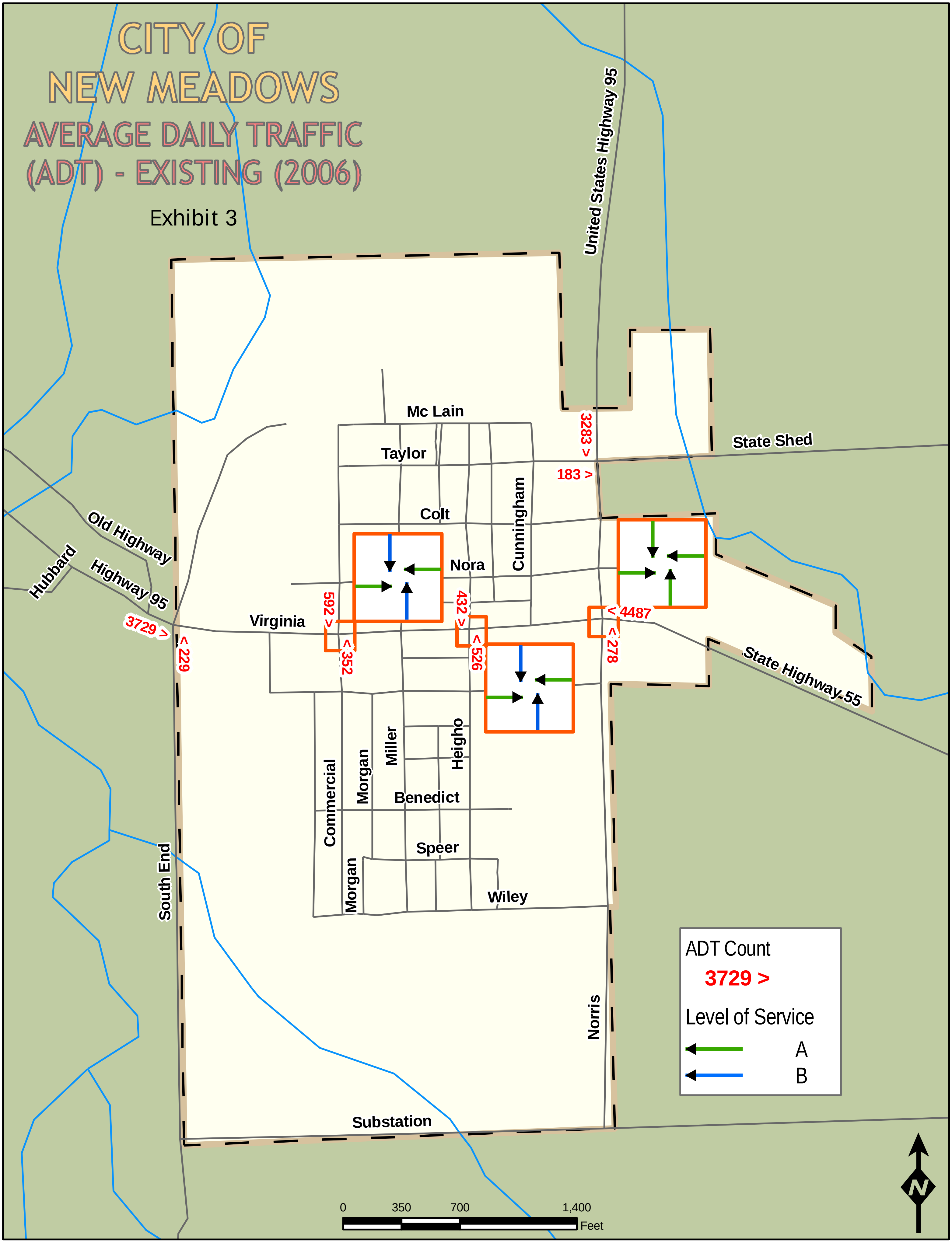
- ✓ The primary function of local roads is to provide access to adjacent residential and business land uses.
- ✓ Local roads are generally low-speed, two-lane roads that carry relatively low traffic volumes.
- ✓ The typical local road standards indicate a 50-foot minimum right-of-way width for local streets.
- ✓ Design speeds for local roads range from 20 to 35 mph.

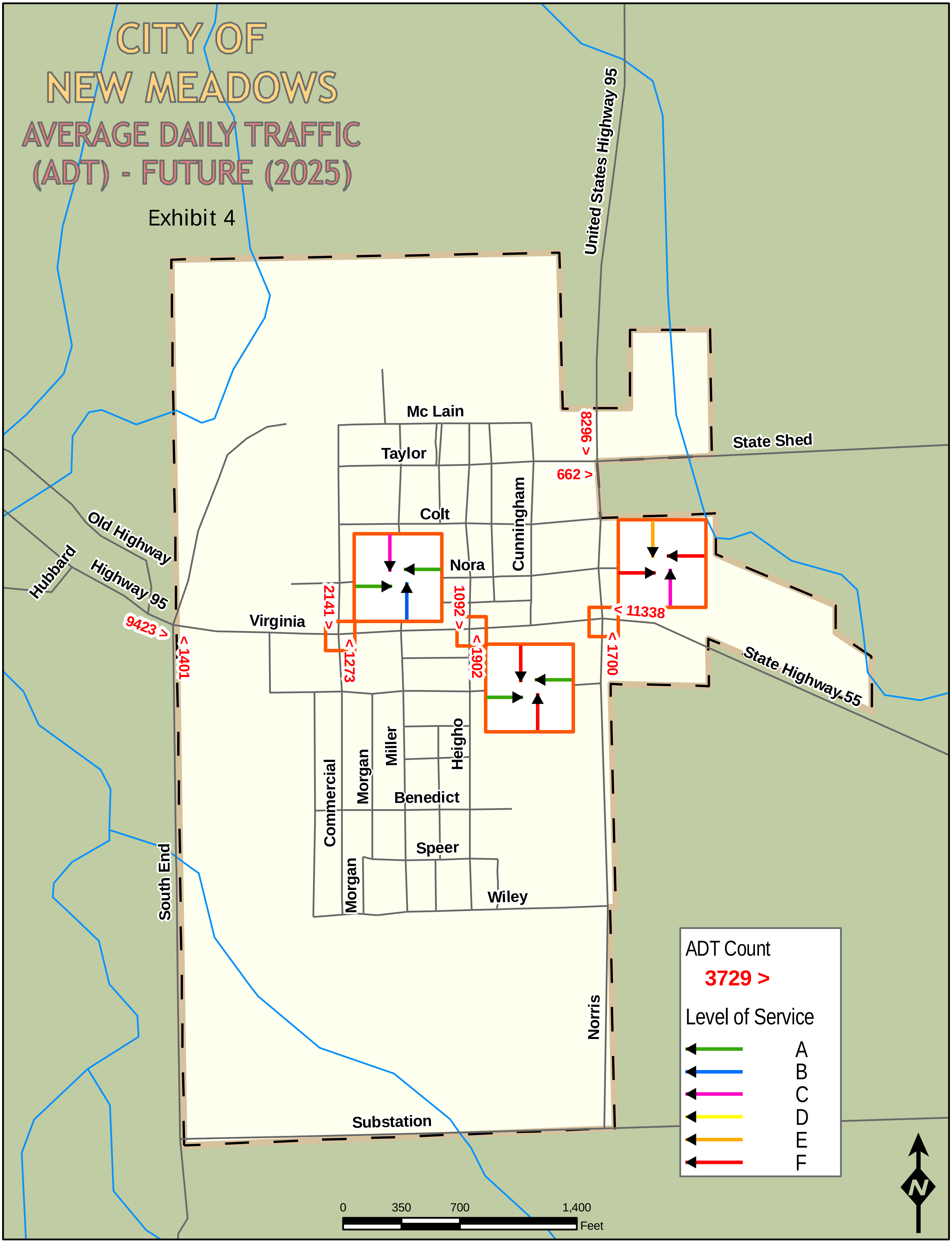

CITY OF
NEW MEADOWS
FUNCTIONAL
CLASSIFICATION
Exhibit 2
United States Highway 95
State Shed
Mc Lain
Taylor
Colt
Cunningham
Nora
Old Highway
Hubbard
Highway 95
Virginia
Katherine
State Highway 55
Commercial
Morgan
Miller
Heigho
Benedict
Speer
Morgan
Wiley
South End
Norris
Substation
Functional Classification
Local
Collector
Arterial
0
350
700
1,400
Feet
N

Traffic Volumes and Patterns

Average Daily Traffic (ADT) volumes are shown in **Exhibit 3** and **Exhibit 4**. Volume data has been collected sporadically on city roads.

Virginia Street (US-95) carries a very high traffic volume in relation to other roads within the City of New Meadows. Virginia Street is estimated to be operating at reasonably free flow and will continue to do so for many years. However, operational issues such as a high percentage of turning traffic should be addressed to maintain an adequate level of safety and to improve safety.


CITY OF
NEW MEADOWS
AVERAGE DAILY TRAFFIC
(ADT) - EXISTING (2006)
Exhibit 3
United States Highway 95
Mc Lain
Taylor
Colt
Nora
Cunningham
State Shed
Old Highway
Hubbard
Highway 95
Virginia
3283 >
183 >
592 >
< 352
432 >
< 526
< 4487
< 278
3729 >
< 229
State Highway 55
Commercial
Morgan
Miller
Heigho
Benedict
Speer
Wiley
Morgan
South End
Norris
Substation
ADT Count
3729 >
Level of Service
A
B
0
350
700
1,400
Feet
N


CITY OF
NEW MEADOWS
AVERAGE DAILY TRAFFIC
(ADT) - FUTURE (2025)
Exhibit 4
United States Highway 95
Mc Lain
Taylor
Colt
Nora
Cunningham
State Shed
Virginia
Old Highway
Highway 95
Hubbard
State Highway 55
Commercial
Morgan
Miller
Heigho
Benedict
Speer
Wiley
Morgan
South End
Norris
Substation
8296 >
662 >
9423 >
< 1401
2141 >
< 1273
1092 >
< 1902
< 11338
< 1700
ADT Count
3729 >
Level of Service
A
B
C
D
E
F
0
350
700
1,400
Feet
N

Operational Measures

Roadway Levels of Service (LOS)

A typical measure of roadway operation is level of service (LOS). (See **Table 6**.) LOS is an assessment of traffic-flow characteristics and mobility. Each segment of a roadway can be rated from A to F to reflect traffic conditions at the given demand or service volume. A level of service rating of A means essentially uninterrupted flow, while a rating of F indicates a breakdown of traffic flow with excessive delay. Within urbanized areas, intersection operations dictate the LOS on roadways. Because there is only one controlled intersection on Virginia Street (US-95) and the speed limit is below the threshold for evaluating the roadway as a rural road, there is no reliable way of evaluating LOS.

Table 6 describes the traffic flow that can be expected at different levels of service.

Table 6. Descriptions for Rural Roadway Levels of Service

LOS	Description
A	Free flow. This rating represents the highest quality of service; speeds are controlled by drivers' desires.
B	Reasonably free flow. Drivers are delayed up to 50 percent of the time in groups. The need for passing to maintain speed becomes significant.
C	Stable traffic flow. Drivers are delayed up to 65 percent of the time in platoons with a larger group. Unrestricted passing demand exceeds passing capacity. Congestion is due to turning traffic.
D	Approaching unstable traffic flow. Passing becomes extremely difficult. Passing demand is high, but passing capacity approaches zero. Turning vehicles cause a wave in the traffic stream.
E	Unstable flow. Passing becomes nearly impossible and platooning becomes intense. Interruptions encountered are due to turning or slow vehicles.
F	Forced or heavily congested flow. Volumes are lower than capacity and speeds are highly variable.

Source: *Highway Capacity Manual* (2000).

Intersection Levels of Service

Traffic flow is typically measured by level of service at intersections. Two-way stop-controlled and all-way stop-controlled intersections measure level of service by the stopped delay at the intersection. (See **Table 7**.)

At two-way stop-controlled intersections, drivers on the controlled approaches are required to select gaps in the major street flow before crossing the road or turning. The capacity of the controlled legs is based on the following factors:

- ✓ Distribution of gaps in the major street traffic stream

- ✓ Driver judgment in selecting a gap through which to execute the desired maneuver
- ✓ Follow-up time required by each driver in a queue

Table 7. Level of Service at Stop-controlled Intersections

LOS	Description
A	Less than 10 seconds of delay
B	More than 10 and less than 15 seconds of delay
C	More than 15, but less than 25 seconds of delay
D	More than 25 seconds and less than 35 seconds of delay
E	More than 35 seconds, but less than 50 seconds of delay
F	More than 50 seconds of delay

Source: *Highway Capacity Manual* (2000).

The selected intersections in the City of New Meadows are unsignalized and presently perform well from a capacity standpoint. (See **Table 8**.) The US-95/SH-55/Norris Avenue intersection is the busiest intersection in the city. It generally functions well but does experience brief periods of congestion during summer weekends or when there queues of slower moving vehicles (trucks and RV's). The poor access control adjacent to the intersection does degrade the intersection's capacity but the analysis software is not able to account for the effect in its calculations. These accesses likely have a bigger impact on safety than capacity because of the additional decision making required of the drivers utilizing the accesses.

By the year 2025 traffic congestion on Virginia Street (US-95) during traffic peak hours will be at unacceptable levels without capacity improvements made along Virginia Street and at the US-95/SH-55/Norris Avenue intersection. (See **Table 9**.) The US-95/SH-55/Norris Avenue intersection will require signalization or additional east/west through lanes in order to operate sufficiently.

The capacity problem at Heigho Avenue is due to two factors:

- ✓ Lack of adequate gaps in traffic on Virginia Street
- ✓ Interaction of pedestrians crossing Virginia Street

Although the delay is not likely to reach the level shown in Table 9 because of the grid street network, additional through-lane capacity will be required before 2025. Additional traffic lanes on Virginia Street will make pedestrian crossings more difficult, which needs to be addressed during the design process.

Table 8. Current Levels of Service at Selected Intersections (2006)

Intersection	Eastbound		Westbound		Northbound		Southbound	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Virginia St. (US-95)/ Commercial Ave.	Virginia St. (Major)		Virginia St. (Major)		Commercial Ave. (Minor)		Commercial Ave. (Minor)	
	7.5	A	7.6	A	10.5	B	10.6	B
Virginia St. (US-95)/ Heigho Ave.	Virginia St. (Major)		Virginia St. (Major)		Heigho Ave. (Minor)		Heigho Ave. (Minor)	
	7.8	A	7.7	A	12.9	B	14.4	B
Virginia St. (US-95)/ SH-55/Norris Ave.	Virginia St. (Major)		SH-55 (Major)		Norris Ave. (Minor)		US-95 (Major)	
	9.1	A	9.0	A	8.0	A	8.8	A

Table 9. Future Levels of Service at Selected Intersections (2025)

Intersection	Eastbound		Westbound		Northbound		Southbound	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Virginia St. (US-95)/ Commercial Ave	Virginia St. (Major)		Virginia St. (Major)		Commercial Ave. (Minor)		Commercial Ave. (Minor)	
	8.0	A	7.9	A	15.0	B	18.4	C
Virginia St. (US-95)/ Heigho Ave.	Virginia St. (Major)		Virginia St. (Major)		Heigho Ave. (Minor)		Heigho Ave. (Minor)	
	8.4	A	8.8	A	161.2	F	189.5	F
Virginia St. (US-95)/ SH-55/Norris Ave.	Virginia St. (Major)		SH-55 (Major)		Norris Ave. (Minor)		US-95 (Major)	
	117.2	F	199.4	F	18.0	C	45.4	E

Crash Location—Road Segments and Intersections

Urban roadways trend towards numbers of crashes with lower severity than rural roadways. This can be attributed to higher traffic volumes and increased roadway access, but lower vehicular speeds.

Table 10 lists locations where crashes were recorded in the City of New Meadows. **Exhibit 5** identifies the geographic locations of collisions.

Only the US-95/SH-55 intersection in the City of New Meadows had at least two crashes. Both were low-severity rear-end accidents, which are common at controlled intersections. No accident trends or specific safety deficiencies can be determined from the accident history available.

Table 10. Collision Locations (2000–2005)

Location	Intersection or Segment	Accidents	Injuries	Fatalities	Comments
US-95	SH-55	2	–	–	–
US-95	Commercial Ave.	1	1	–	–
US-95	Heigho Ave.	1	–	–	–
Heigho Ave.	Katherine St.	1	1	–	Pedestrian
Nora St.	Alley	1	1	–	Pedestrian
Nora St.	Driveway	1	–	–	–

Source: ITD (2006).

Sidewalks

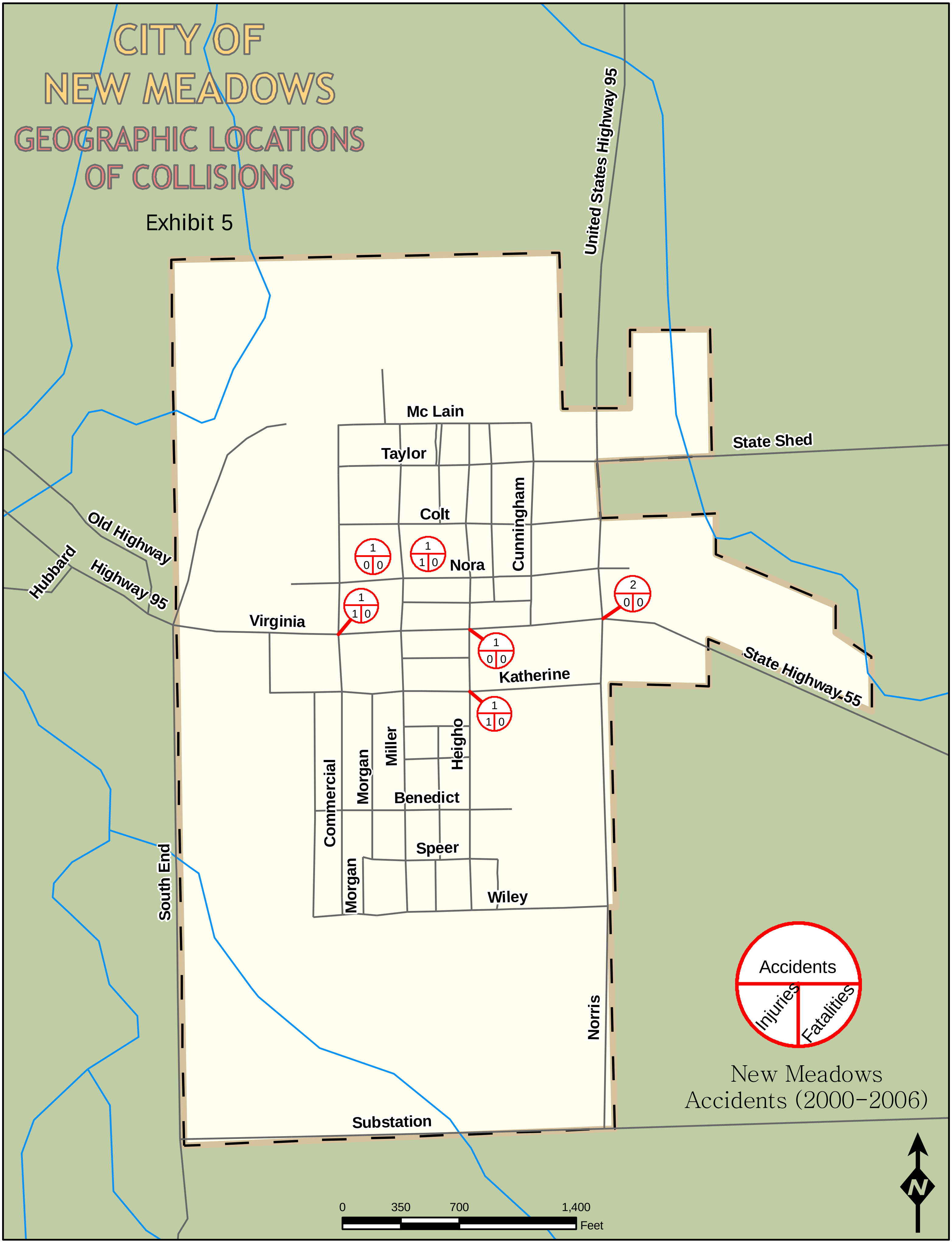
Exhibit 7 (ahead) shows the approximate location of sidewalks in the city. Sidewalks along the commercial development on the north side of Virginia Street are in generally good condition. Some spot locations might not meet existing Americans with Disabilities Act (ADA) guidelines. The few sidewalks that exist in the residential areas north of Virginia Street are in very poor condition and in some instances probably provide little benefit as sidewalks. The remaining areas of the city have no sidewalks.

In a city with such limited resources and so many infrastructure needs, sidewalks may not be one of the top priorities for improvement. When funding for sidewalks is available, the area of highest priority should be school pedestrian routes, streets adjacent to the park, and the route along the retail/commercial area on Virginia Street. As part of its approval for all new development and major site renovations, the city should require that sidewalks be constructed along the public street frontage. To provide enough space for drainage swales, the sidewalks should be placed at the edge of the street right-of-way or in an easement outside the right-of-way unless the stormwater system has been installed that is capable of accepting the storm run-off. In that case, the city should require that curbs and gutters be installed as well, with the sidewalk located somewhere between the back of the curbs and the right-of-way lines.

CITY OF NEW MEADOWS

GEOGRAPHIC LOCATIONS OF COLLISIONS

Exhibit 5



Drainage

Drainage is an important part of road construction and maintenance. The following drainage issues are related to roadways:

- ✓ Drained base and sub-grade to prevent reduced pavement section strength and failure
- ✓ Drainage parallel to the roadway to avoid localized flooding of the road surface
- ✓ Adequate cross-drainage to minimize the risk of roadway fill failure and prevent flooding of adjacent upstream lands
- ✓ Erosion protection to prevent loss of lateral support and degradation of water quality

The City of New Meadows does not have an underground storm drain system. J-U-B ENGINEERS, Inc. completed a storm drainage study and master plan in 1991 for the City of New Meadows (see the appendix). The recommendations were not acted upon because of the lack of available funding. The findings and recommendations of the study are still valid because the city has experienced almost no growth or change to its roadway infrastructure since 1991.

It will be important to implement the storm drainage master plan as roadways are improved to ensure that the investment in the roadways is not wasted because of poor drainage conditions. This may dictate the order in which some roads are improved in order to build the drainage system along with the roadway system.

Access Management Policies

Description

Roadways function for both mobility of the public and accessibility to adjacent properties. Both functions are essential, but roadways are designed with different emphasis on each function.

An **arterial** is designed to carry more traffic at higher speeds. Mobility is paramount, while the roadway's access function is minimized. This emphasis necessitates a design for higher speeds and restriction of access along the arterial.

On the other hand, access is the primary function of **local** roads. A local road is more important for providing access than for providing mobility. Travel speeds are low and accesses are permitted.

Collectors provide the bridge between local roads and arterials. A collector road should allow controlled access under specific conditions. Speeds on collectors may be from 25 to 50 mph, depending on the surrounding land uses. A rural collector road should be continuous between arterials, collectors, traffic generators, and towns/cities to provide intracounty travel corridors.

Access Spacing

Short spacing between private access drives complicates the driving task. Drivers must watch for ingress and egress traffic at several points simultaneously while maintaining lateral and longitudinal control of the vehicle and monitoring vehicles ahead, behind, and in adjacent lanes.

Longer spacing between accesses simplifies the driving task by reducing the amount of information that drivers must process and react to and by increasing the time between conflict points.

Access control is an essential part of good land-use and transportation planning. It can be implemented through two primary approaches on local road systems:

- ✓ An access or right-of-way permit system
- ✓ Planning, zoning, and subdivision processes

ITD and the Local Highway Technical Assistance Council (LHTAC) have similar approach policies. **Table 11** summarizes ITD access spacing requirements. The LHTAC standard approach policy does the following:

- ✓ Encourages joint use approaches
- ✓ Provides for a minimum separation of 330 feet for private approaches
- ✓ Provides a maximum of two approaches per property tract or business frontage
- ✓ Provides geometric requirements that include the following:
    - ○ Sight distance
    - ○ Minimum and maximum width
    - ○ Grade
    - ○ Approach alignment

Table 11. Summary of ITD Access Spacing Requirements

Access Type	Functional Classification	Type	Intersection Spacing	Approach Spacing	Signal Spacing
I	Rural Minor and Major Collector	At-Grade	0.25 mile	300 feet	0.5 mile
II	Rural Minor Arterial	At-Grade	0.25 mile	500 feet	0.5 mile
	Urban Collector and Minor Arterial	At-Grade	660 feet	150 feet	0.25 mile
III	Rural Principal Arterial	At-Grade/ Interchange	0.5 mile	1,000 feet	0.5 mile
	Urban Principal Arterial	At Grade/ Interchange	0.25 mile	300 feet	0.5 mile
IV	Rural Principal Arterial (Multiple-Lane)	At Grade/ Interchange	1 mile	N/A	0.25 mile
	Urban Principal Arterial (Multiple-Lane)	At Grade/ Interchange	1 mile	N/A	0.25 mile
V	Rural Interstate	Interchange	3 miles	N/A	N/A
	Urban Interstate	Interchange	1 mile	N/A	N/A

Source: Idaho Transportation Department (ITD).

Design Standards

The following information provides recommended roadway design standards for the City of New Meadows. It is recommended that these revised standards be adopted in the existing city ordinances.

Purpose

The purpose of this section is to provide standards for the construction or reconstruction of roadways. These standards are for roadways in low-to-medium density residential and light commercial areas. A large-scale development study will be required for any development that generates sufficient traffic to necessitate additional construction requirements.

Large-scale Development

Any requirement of this section may be altered as a result of a large-scale development study that may be required by the City of New Meadows. Any alterations shall be at the discretion of the City of New Meadows.

Right-of-way

Table 12 shows roadway right-of-way minimum width requirements.

Table 12. Right-of-way Standard Widths

Type of Roadway	Minimum Width of Public Right-of-way (feet)
Arterials	80 to100
Collectors	70
Local roads and streets	60 or 70
Subdivision streets*	50

* Subdivisions in city impact areas shall follow current right-of-way widths of the closest city.

Arterials and collectors are the roads so designated by the City Council and are identified in the City's functional classification map or other planning documents. Local roads or streets are those streets not specifically identified as an arterial or collector but provide a function of carrying traffic from multiple commercial or residential developments. Subdivision streets are those roadways that carry only traffic within the subdivision in which it was constructed or into an adjacent development.

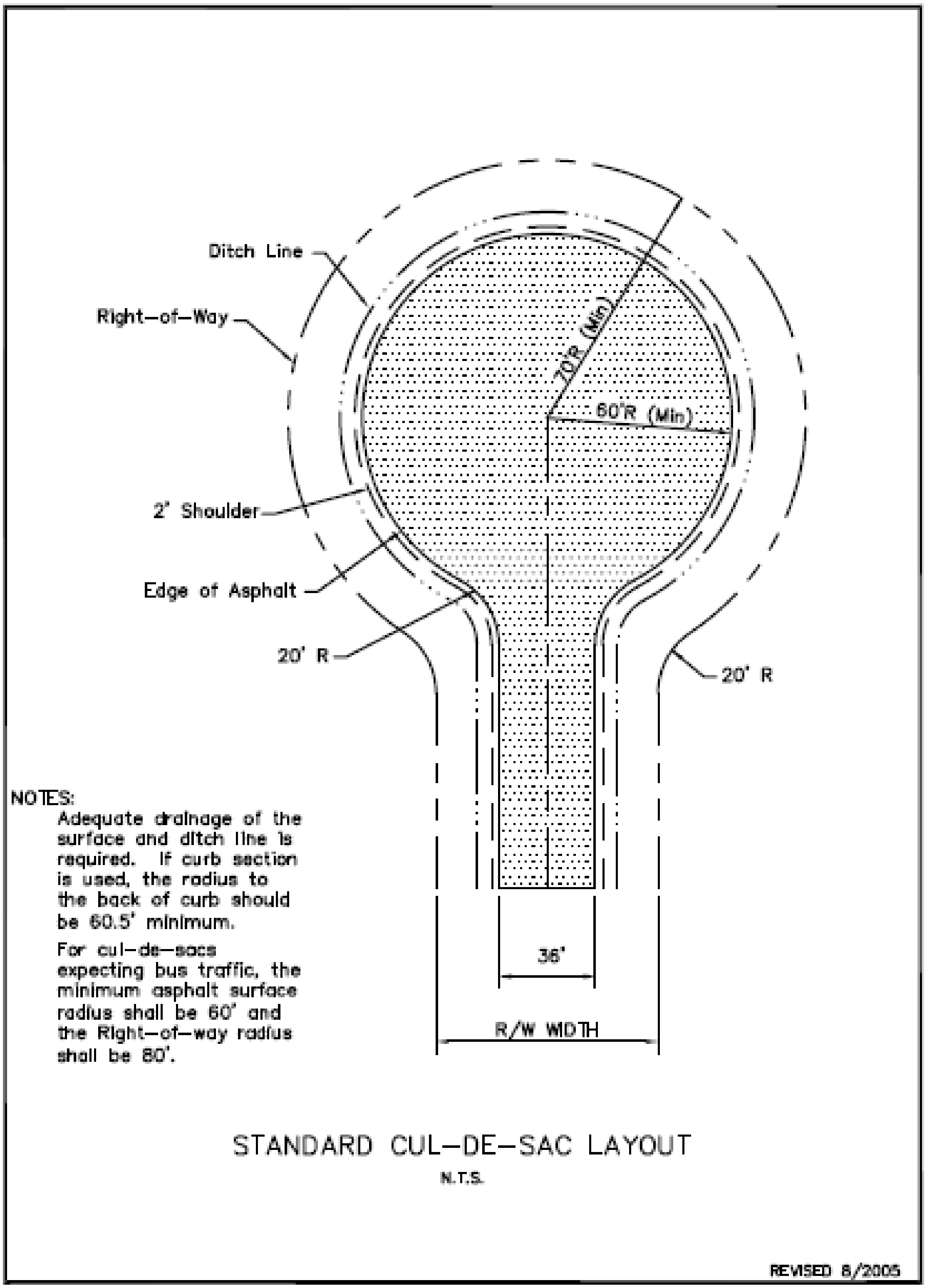
Cul-de-sacs and Dead-end Streets

Cul-de-sacs shall have a minimum right-of-way of a 60-foot radius with additional highway right-of-way as needed to accommodate unusual cut and fill sections. Cul-de-sacs of a temporary nature may be allowed, providing each public right-of-way is shown on the plans or plat and approved by the city. All cul-de-sacs shall be paved whether temporary or permanent. If buses are expected to use the cul-de-sac, the minimum public right-of-way shall be an 80-foot radius. A standard cul-de-sac layout is shown in **Figure 1**.

The maximum length of a road to end in a cul-de-sac shall be 880 feet or as directed by the city.

Dead-end streets shall be prohibited except where temporarily permitted by a subdivision phasing plan or to provide for future connections between developments. A temporary cul-de-sac shall be provided when a temporary dead-end street serves four or more lots. The temporary cul-de-sac shall be constructed in accordance with the standards detailed above.

Figure 1. Standard Cul-de-sac Layout



Roadway Design Criteria

Table 13 is intended to show the minimum and maximum values for various parameters used in design criteria for the three classes of streets and highways to be designed. Modification by the city on an individual project-by-project basis may be accomplished by following appropriate procedures.

Table 13. Roadway Design Parameters

Design Parameter	Arterial	Collector	Local Roads and Streets
Vertical grades*			
Minimum	0.5%	0.5%	0.5%
Maximum	6.0%	6.0%	10.0%***
Horizontal curvature	7^{0}	11.5^{0}	25^{0}
Minimum radius**	820 feet	275 feet	165 feet
Design speed	35 to 60 mph	30 to 45 mph	20 to 35 mph
Angles of intersection	80 to 90^{0}	80 to 90^{0}	75 to 90^{0}
Grade at intersection	3% over a minimum of 50 feet First 10 feet of intersecting road must be at -3%		

* Roadways constructed using curb and gutter sections may have a minimum grade of 0.35%.

** Radius measured to centerline of roadway, utilize guidelines from the American Association of State Highway Transportation Officials (AASHTO) to determine actual radius.

*** May be increased to 12% with special attention to maintenance consequences and concurrence from emergency service agencies.

Roadways shall be constructed with applicable characteristics shown in **Figure 2**. In areas of high ground water, a geotextile grid fabric shall be installed between the subgrade and subbase material to provide additional structural stability.

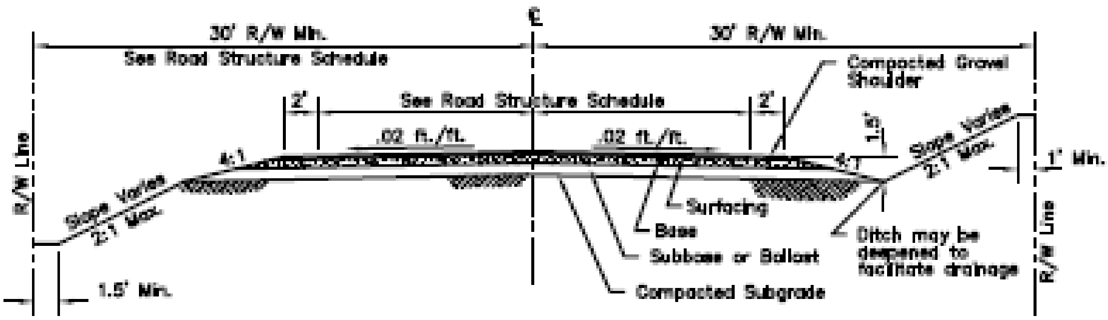
The minimum centerline radius of any curve shall be 100 feet.

Vertical geometry and passing or stopping sight distances shall be in accordance with the latest AASHTO document *Policy on Geometric Design of Highways and Streets*.

Site triangles on approaches and intersection from a stop condition shall be unobstructed along both directions of the road in accordance with the AASHTO document *Policy on Geometric Design of Highways and Streets*.

Clear zone distances shall be in accordance with the most recent edition of the AASHTO document *Roadside Design Guide*.

Figure 2. Typical Road Sections (Not to Scale)



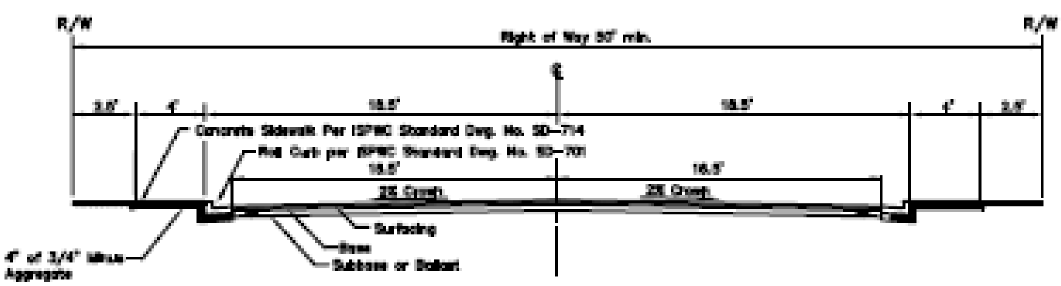
TYPICAL RURAL ROAD SECTION

N.T.S.

ROAD STRUCTURE SCHEDULE

Class of Road	Subbase or Ballast	Base Course	Plant Mix Pavement	Pavement Width	Right of Way Width (FT)
Minor Arterial	12"	6"	3"	36'	100
Collector	11"	6"	3"	36'	80
Residential Collector	10"	6"	2"	36'	60
Local Residential	8"	4"	2"	30'	50

Road Structure Sections may vary for poor soil conditions. Changes to these section requirements will be based on a Geotechnical Report prepared by a Registered Professional Engineer.



TYPICAL URBAN STREET SECTION

NOT TO SCALE

REVISED 6/2006

Approach Spacing

Distances between approaches and from intersections vary depending on the classification of each road. (See **Table 14**.) Approaches on cul-de-sacs, dead ends, and other non-through streets shall be a minimum of 12 feet apart.

Table 14. Non-signalized Access Spacing for Driveways

Functional Classification	Minimum Spacing between Approaches and from Intersections		
	Minimum Use (Private Driveway)	Minor Generator (Cul-de-sac)	Major Generator or Business Approach
Principal Arterial	300 feet	360 feet	450 feet
Minor Arterial	150 feet	240 feet	320 feet
Collector	140 feet	210 feet	250 feet
Other	50 feet	50 feet	125 feet

Note: The road classification of different city roads may change from time to time. This will depend on growth and needs of the city.

Mailbox turnouts shall be in accordance with the LHTAC document *The Location, Support and Mounting of Mailboxes*.

All new construction within city limits and impact areas shall be required to follow the Department of Justice document *ADA Standards for Accessible Design* for all publicly accessible areas. This is applicable, but not limited to the construction of public sidewalks, parking facilities, and building construction.

Impact Areas

Construction within any designated impact area shall be in accordance with the city standards. The city Planning and Zoning Commission shall have the jurisdiction to review any construction plans within designated impact areas.

Drainage

All drainage facilities shall be approved by the city in conjunction with the roadway plans. The design shall be based on the latest edition of the ITD document *Urban Storm Sewer Design for Idaho Highways* or procedures as set forth by the city. The design storm shall be a 10-year, 6-hour event. The conveyance of stormwater and associated runoff shall include winter and spring runoff needs. Any disruption of the normal drainage pattern of the area to be developed must have special consideration to accommodate future drainage.

Roadway surfaces shall be crowned to slope away from the roadway centerline at a grade of 2 percent.

All necessary drainage easements for accommodating drainage structures shall be shown and recorded on the plans or the plat as a part of the approved plans or plat. Drainage easements necessary for draining stormwater across private property shall be shown on the plans or plat and recorded with the city by a letter from the applicant describing the areas containing the easements such as lot lines, and blocks.

When a curb and gutter roadway section is proposed, a complete storm sewer system must be designed and constructed under the review of a registered professional engineer. Stormwater disposal and maintenance thereof may be the responsibility of the developer or a homeowner's association.

Pavement Marking and Signing

The developer shall install stop signs at all intersections with arterial streets. The developer shall also install all other signs required for safe traffic and pedestrian movement in the development. Signs shall be in accordance with the latest edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) published by the Federal Highway Administration.

The city shall determine pavement marking requirements subject to MUTCD requirements on a case-by-case basis. Should centerline markings or other pavement markings be required, they shall be constructed by the applicant in accordance with the latest edition of the MUTCD. The spacing, location, and width of markings will be determined on a case-by-case basis by the city. Paint quality shall be the same as that used by the ITD for its pavement markings.

Culverts and Bridges

All culverts and bridges shall be designed by a professional engineer. Bridges and culverts are subject to stream corridor and floodplain requirements.

All bridges and culverts on natural waterways shall be designed to pass a 100-year flood without damage to the bridge or its approaches, without diverting flood waters onto neighboring properties, and without increasing the level of the base flood downstream.

The developer may be required to install a bridge rather than a culvert on any natural waterway where such action is required by the advice of the Idaho Fish and Game Department, to protect the fishery.

Culverts not included in this section shall conform to drainage standards.

All culverts and bridges shall be designed to support a minimum gross vehicle load of 40,000 pounds.

There shall be a minimum 50-foot tangent approach to all bridges.

Asset Management

As part of the transportation planning process, the City of New Meadows has undertaken a comprehensive asset management process for the Road & Bridge Department. In order to provide the county with a summary of the existing geographic information, a signage, drainage, and sidewalk inventory was completed. These elements provide the first step toward completing an overall asset management system for the city's transportation components. The city does not have any paved roadways under its jurisdiction at this time. It is strongly recommended that a pavement management program be implemented as the city acquires or upgrades roadways to a paved condition.

The following is a summary of completed and recommended asset inventory needs.

Signage

The City of New Meadows completed a sign inventory as part of a sign replacement project that was recently funded by an LHTAC Investment grant. (See **Exhibit 6**.) This inventory and location information was entered into asset management software that will be maintained for the City of New Meadows. Inclusion of these data will allow the City of New Meadows to develop maintenance, replacement, and upgrade strategies for signs.

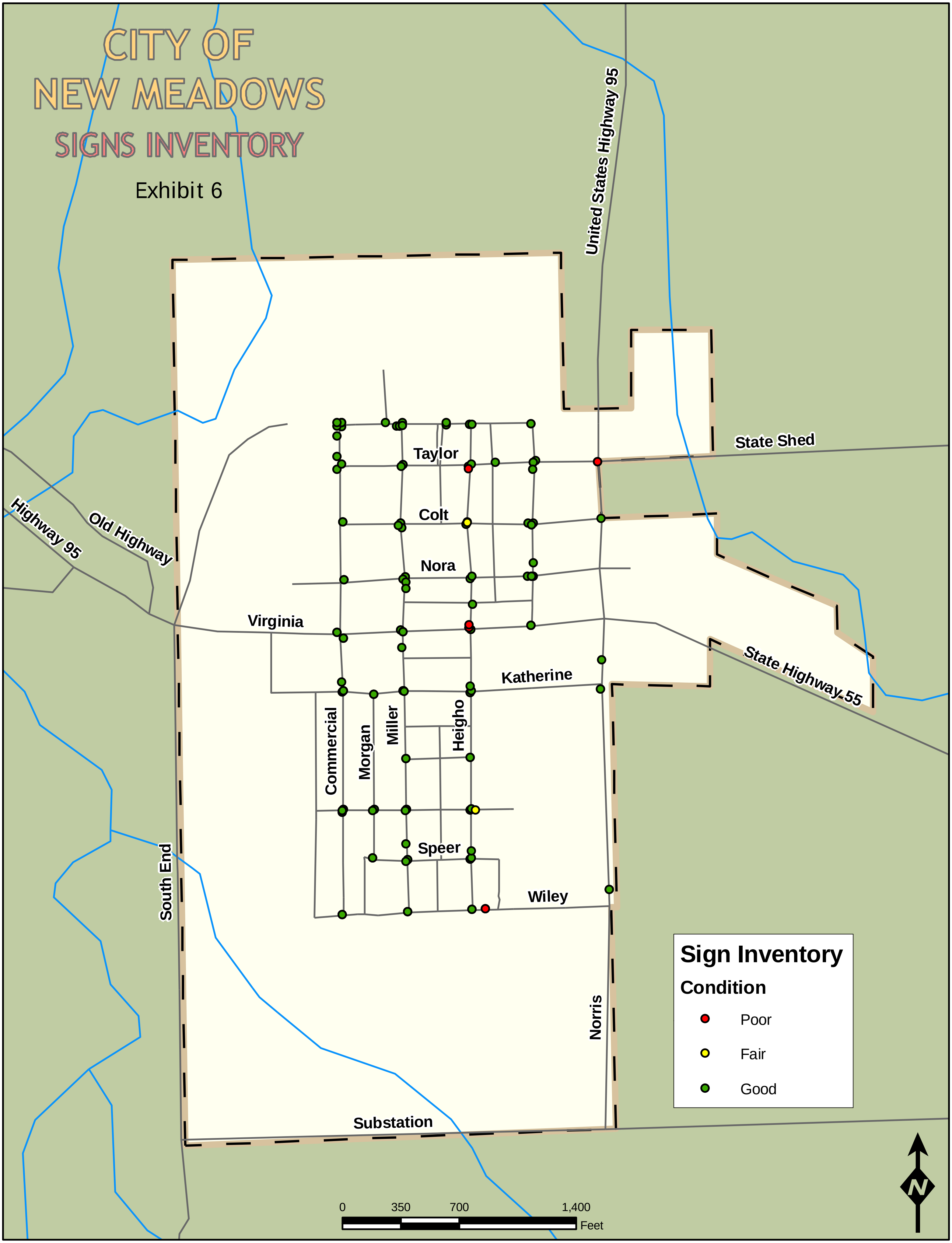
To maintain sign conditions and meet mandated sign upgrade requirements, the city should develop an annual sign budget for continual upgrade and replacement of signs.

Culverts

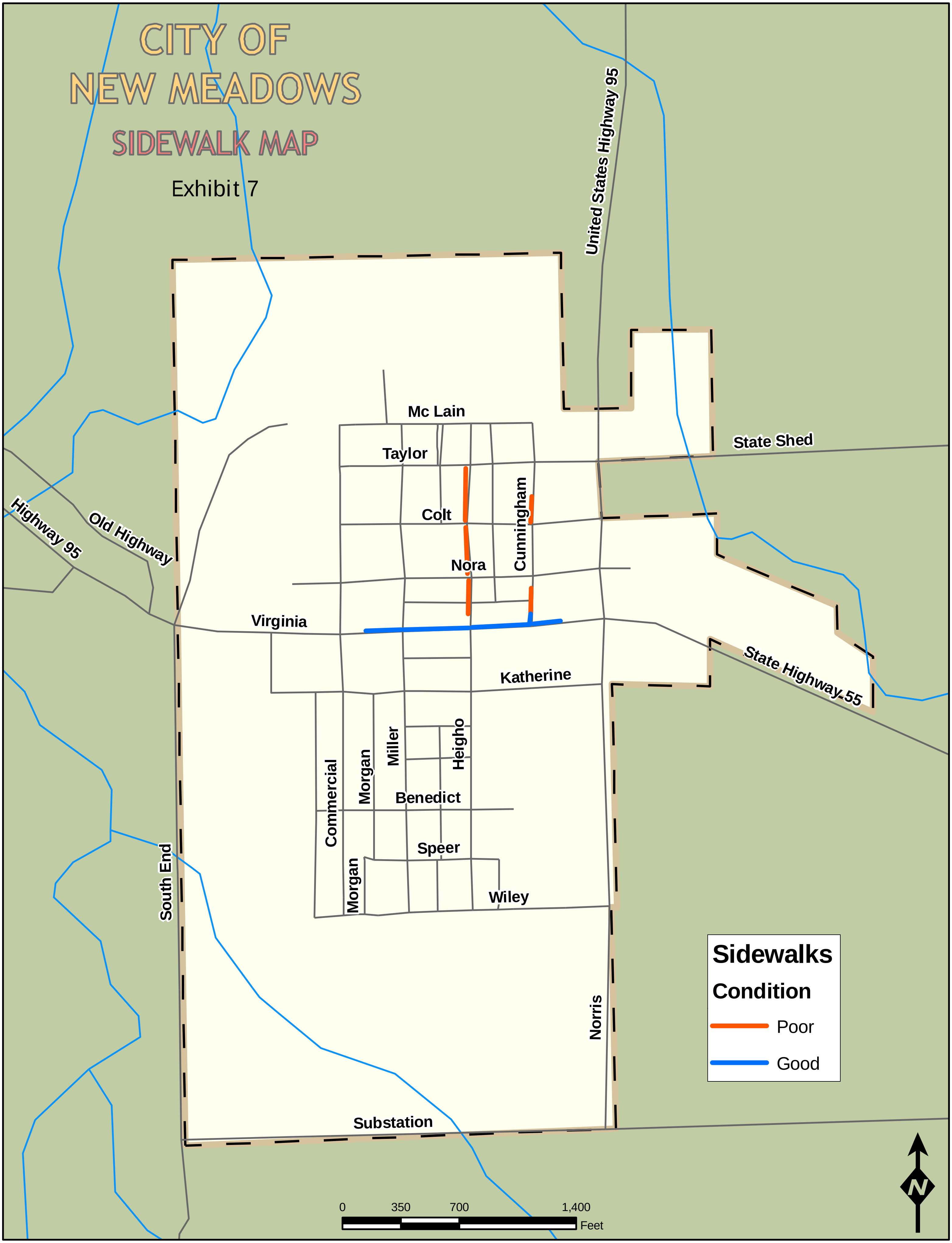
The city's culverts were inventoried during development of the transportation plan. This inventory and location information was entered into the asset management software. Inclusion of these data will allow the City of New Meadows to develop maintenance, replacement, and upgrade strategies for culverts and improve planning for road improvement projects by addressing culvert needs.

Sidewalks

The City of New Meadows has few sidewalks; most border along the north side of US-95. The locations are sporadic, with widths varying from segment to segment. There are few provisions for ADA accessibility. The desire is of the City is to develop sidewalks along the north south routes that provide access to the elementary school. Another priority is to provide better pedestrian access to the city park and the commercial areas along US-95. Exhibit 7 shows the locations of the existing sidewalks in the city.



CITY OF
NEW MEADOWS
SIGNS INVENTORY
Exhibit 6
United States Highway 95
State Shed
Taylor
Colt
Nora
Virginia
Katherine
Highway 95
Old Highway
State Highway 55
Commercial
Morgan
Miller
Heigho
Speer
Wiley
South End
Norris
Substation
Sign Inventory
Condition
Poor
Fair
Good
0
350
700
1,400
Feet
N



CITY OF
NEW MEADOWS
SIDEWALK MAP
Exhibit 7
United States Highway 95
Mc Lain
Taylor
State Shed
Colt
Cunningham
Nora
Highway 95
Old Highway
Virginia
Katherine
State Highway 55
Commercial
Morgan
Miller
Heigho
Benedict
Speer
Morgan
Wiley
South End
Norris
Substation
Sidewalks
Condition
Poor
Good
0
350
700
1,400
Feet
N

Other Modes and Means of Transportation

Alternatives to motor vehicles—whether for cost savings, convenience, recreation, or exercise—are a growing component of the transportation infrastructure.

Truck Routes

The City of New Meadows experiences periodic heavy truck traffic due to agricultural activities, logging activities, and changing highway conditions. Most of the traffic is along Virginia Street (US-95) and SH-55. Commercial Avenue on the west side of town also experiences a significant percentage of truck traffic.

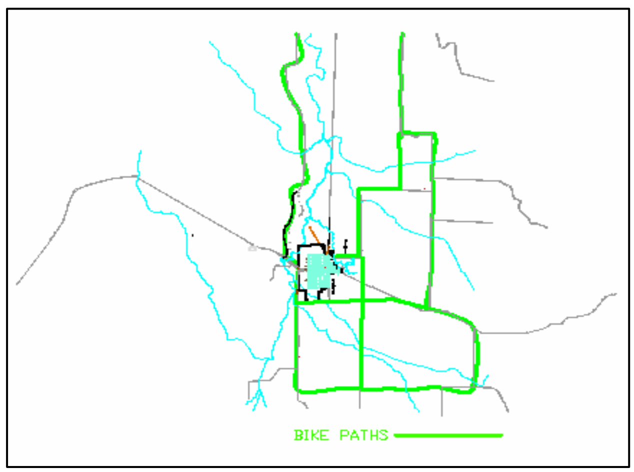
Consideration must be taken for the added effect of and need for large trucks on the road network. Trucks require larger turning radius corners and stronger road sections. Additionally, trucks affect the carrying capacity of the roadways.

Therefore, planning for the future road network should include appropriate measures to accommodate necessary truck traffic.

Trails and Trailheads

The City of New Meadows has no existing trail system, but is located within a short distance of numerous trails within the Payette National Forest. Additionally, the Weiser River Rails-to-Trails trail ends in Rubicon, 8 miles west of the City of New Meadows. The city would like to develop a trailhead and pathway system that connects with the Weiser River trail and other recreational pathways.

Figure 3. Bicycle/Pedestrian Pathway Svstem



One potential location for a trailhead is the Pacific and Idaho Northern Railroad depot, which is an historical landmark that is being refurbished. Although much of the old rail corridor is now privately owned, there may still be opportunities to work with land owners to obtain easements for a rail trail that connects to the Weiser River trail.

The city has also identified a bike route/pathway system in its 2005 Comprehensive Plan. (See **Figure 3**.) Routes on existing roadways should be identified with signage. As the opportunity presents itself, the city should work with developers and land owners to obtain additional rights-of-way or easements to provide either wider roadways or separated pathways along these routes to accommodate bicyclists, pedestrians, and equestrians.

Project Alternative Analysis

The projects described on the following pages were identified through an extensive public involvement process that included:

- ✓ A project kick-off meeting with the mayor and department supervisors
- ✓ Interviews with City of New Meadows police officers, the public works supervisor, city clerk, and emergency medical service personnel
- ✓ Joint meetings with the City of New Meadows City Council and Planning and Zoning Commission
- ✓ An engineering review of traffic, accident, and pavement condition data by the project engineers

Not all projects that were suggested through this process have been included in these lists. Changes and improvements to state highways are not within the jurisdiction of the City of New Meadows. Therefore, these projects are not included. The suggestions related to the state highways are listed separately and will be forwarded to ITD District 3 for its consideration.

Criteria

- ✓ **Safety**
  Evaluates the impact the project will have on overall safety conditions of the targeted project area. Also evaluates potential secondary safety benefits to other areas as a result of its implementation. Safety issues include roadway width, shoulders, speed, and volume of accidents.
- ✓ **Local Access and Circulation**
  Evaluates how the project serves the residents and how the project provides access to appropriate and desired areas of the county and city. Also evaluates whether the project has a negative effect on existing functional roadways.
- ✓ **Maintenance**
  Evaluates the associated annual cost of maintaining completed projects for the design life (20 years) of the projects.
- ✓ **Cost (including right-of-way)**
  Considers the overall cost of the project and the amount of local funds (matching funds) required to complete the project.
- ✓ **Constructability/Feasibility**
  Evaluates ease of construction and impacts that construction will have on traffic and surrounding infrastructure. Also considers whether the project has a realistic chance of being constructed within the next 20 fiscal years.

Recommended ITD District 3 Projects

The citizens of the City of New Meadows would like to see the following projects considered by ITD and encourage ITD District 3 to include them in its planning efforts.

1. Improve or signalize the intersection at US-95 and SH-55

Although the accident rate and congestion at this intersection are low, the intersection configuration and the close proximity of commercial driveways create confusion, which results in many "near misses." The number of crashes at the intersection is likely to climb dramatically as traffic volumes increase. This project was in the preliminary design stage, but was halted because of a loss of funding.

2. Improve drainage along US-95 (Virginia Street)

There are no facilities along US-95 in the urban area to collect or transport stormwater runoff. The city would like to work with ITD in resolving this shared concern.

3. Identify and improve the pedestrian crossing on US-95 (Virginia Street)

There are no marked pedestrian crossings across US-95 in the urban area. At a minimum, a school crossing should be signed and marked at Miller Avenue. Because there is a city park located on US-95 between Miller Avenue and Heigho Avenue, a marked pedestrian crossing at Heigho Avenue would also be desirable.

Future Roadway Corridors

The City of New Meadows has identified preferred corridors for future roads within the impact area. These corridors, listed below, are existing county roads, extensions of existing roads, or new road alignments that would be acquired as development occurs and the city annexes the surrounding lands.

- ✓ Heigho Avenue
- ✓ Farrell Road
- ✓ State Shed Road
- ✓ Walker Lane
- ✓ Substation Road
- ✓ S. End Road
- ✓ An extension of S. End Road north of US-95 approximately one-half mile
- ✓ The extension of Commercial Avenue south to Substation Road
- ✓ The extension of Wiley Street west to S. End Road and east to Walker Lane

- ✓ A new road alignment approximately one-half the distance between Norris Avenue and Walker Lane extending north from Substation Road to at least State Shed Road

These roadways will need to meet arterial or collector road right-of-way and design standards in the future.

The goal of identifying these corridors is to preserve them for future rights-of-way by deterring any permanent construction that might be proposed within them. These corridors were selected based on the understanding that they were the most feasible locations for expanding the current infrastructure (both above aboveground and underground, such as for water and sewer lines and stormwater control) and for enhancing traffic flow though the city.

The city should provide this corridor information to all who inquire about developing within the impact area. Developers should incorporate city corridor plans into the street layout of any proposed development.

City of New Meadows Capital Improvement Plan

Introduction

Transportation concerns of the City of New Meadows that need to be met include paving city streets, providing for safe pedestrian walkways, and improving parking opportunities in the commercial area. These concerns can be addressed through a combination of improvements and additions to the existing transportation system that focus on sidewalks, capacity, and safety issues and roadway upgrades. The City of New Meadows will continue to maintain existing transportation facilities for the traveling public and sustain local and county economic development.

This section summarizes the 5-year capital improvements that are recommended for the City of New Meadows transportation system. In general, roadway improvements are proposed for the north/south streets starting on the west side of town and proceeding east. This is because drainage improvements should be accomplished as the roadways are constructed. The drainage system should be improved from the downstream to minimize capacity restrictions in the system as it is developed.

Capital Improvements

Capital improvements share several characteristics:

- ✓ They are major projects requiring the expenditure of public funds over and above annual operating expenses for the purchase, construction, or replacement of physical assets.
- ✓ They include the acquisition or construction of facilities such as roadways, bridges, rights-of-way, airports, libraries, parks, and city halls.
- ✓ They typically have a useful life of over 10 years.

The CIP does the following:

- ✓ Outlines capital expenditures to be incurred each year over a fixed period of years, generally a 5-year time period with annual review.
- ✓ Optimizes the use of taxpayer dollars.
- ✓ Focuses attention on community needs, goals and capabilities.
- ✓ Increases opportunities for using various matching fund programs.

Capital improvements must be within a city's financial capability if they are to be implemented. The City of New Meadows has developed the CIP to ensure that funds are budgeted for capital improvements.

Capital Improvement Plan Projects

This section describes potential projects for the 5-year CIP. The range of projects includes street paving, drainage improvements, sidewalk installations, and signage improvements. The final plan will contain a list of projects that are within the City of Meadows ability to fund through their annual budget or have a high priority for funding through grant applications.

1 Asphalt Overlays

Location

All city streets are currently unpaved.

Need—Reduced Maintenance Costs/Safety

It is recommended the City focus their initial paving efforts on streets that carry commercial traffic and school traffic. The city's traffic is concentrated on these roads thereby requiring the most maintenance effort to keep the roads in adequate driving condition. The street should be paved wide enough to provide two driving lanes and paved shoulders for an all-weather walking surface or parking.

Improvements

Remove the existing gravel surface to subbase, apply geotextile fabric, and construct a new roadway with a 30-foot-wide triple shot BST surface. Install drainage pipe on Taylor Street, Colt Street, and Nora Street between Miller Avenue and Commercial Avenue according to guidelines in the City of New Meadows storm drainage master plan (see the appendix for a copy of this plan).

Estimated Cost

- ✓ $265,000 for all improvements per four block segment
- ✓ To apply a 30-foot-wide triple shot treatment only is approximately $70,000

Funding Sources

- ✓ LHTAC Investment Program
- ✓ STP-Rural
- ✓ City Roadway Budget
- ✓ ITD maintenance funds

2 Improve/install sidewalks

Location

Focus needs to be in the office/retail area along US-95 (Virginia Street), around the City Park and on the primary walking routes to school. This will provide safe and accessible pedestrian facilities where pedestrian volume is highest. The existing sidewalks in these areas may need to be replaced in due to poor condition, ADA accessibility requirements or alignment issues.

Need—Pedestrian Safety and Mobility

The lack of sidewalks places pedestrians at risk because they may be required to mix with vehicular traffic. This is of particular concern at night and during inclement weather.

Improvements

5-foot-wide sidewalks should be built in most locations but an 8-foot-wide sidewalk may be preferable along the commercial frontage of Virginia Street and around the city park. Sidewalks should not be installed unless drainage improvements are installed along the roadway unless the sidewalk is set back at least 6 feet from the edge of roadway to allow for a drainage swale.

Estimated Cost

- ✓ 5-foot sidewalk - $20 lineal foot
- ✓ 8-foot sidewalk - $36 lineal foot
- ✓ Curb and gutter - $20 per lineal foot

Funding Sources

- ✓ Enhancement Funds
- ✓ LHTAC Investment Program
- ✓ City Roadway Budget
- ✓ Community Block Grant

3 Storm Drain Improvements

Location

City-wide

Need—Health, Safety, Reduced Maintenance Cost

Most of the city's storm drain system consists of road side ditches which have no place to drain the water to. During the spring thaw, the combination of snow melt and rain leads to localized flooding and deterioration of the roadways.

Improvements

The 1991 storm drain study conducted by J-U-B needs to be updated to account for numerous regulatory changes that have occurred since the study was completed. The basic concepts of the study are still valid. Ideally, storm drains would be installed when the adjacent roadway is improved. The system should be built from the low end (outfall) towards the higher elevations of the city. The first project should be to build the pond and trunk line feeding to it.

Estimated Cost

- ✓ Total cost of Storm Drain System $1,478,000
- ✓ Trunk Line and Pond - $557,500

Funding Sources

- ✓ EPA Grant
- ✓ Community Block Grant
- ✓ City Roadway Budget

4 Street Sign Replacement

Location

City wide

Need—Safety

While most of the stop signs in the city are in good condition many of the other regulatory, warning and directional signs are showing their age. Several sign installations are improperly placed or outdated. Replacement of these signs will improve driver awareness of roadway conditions and regulations.

Improvements

Replace substandard, outdated and missing signs.

Estimated Cost

- ✓ $13,500

Funding Sources

- ✓ LHTAC Investment Program
- ✓ City Roadway Budget

5-Year Capital Improvement Plan

The following is a list of capital improvement activities recommended for the next five fiscal years. The priority has been placed on road surface improvements and signage. This was done because of the limited budget for the City of New Meadows. Drainage and sidewalk projects are needed but should be accomplished with funding sources outside of the city's normal funding mechanisms because of the additional costs they add to a roadway project. The surface treatment on roadways will provide some benefit to pedestrians but could exasperate drainage problems in spot locations.

Plan Year 1

Commercial Avenue – McClain Street to Virginia Avenue

- ✓ Hot mix asphalt pavement and sidewalks
- ✓ $280,000

Plan Year 2

Heigho Avenue – McClain Street to Virginia Avenue

- ✓ Surface Treatment
- ✓ $70,000

Sign Replacement

- ✓ School Zone Signs – Update to meet MUTCD Standards
- ✓ $3,000

Plan Year 3

Nora Street – Commercial Street to US-95 (Norris Avenue)

- ✓ Surface Treatment
- ✓ $73,500

Sign Replacement

- ✓ Speed Limit Signs – Replace and/or Relocate
- ✓ $1,700

Plan Year 4

McClain Street – Commercial Street to Cunningham Avenue

- ✓ Surface Treatment
- ✓ $60,000

Cunningham Avenue – McClain Street to Colt Street

- ✓ Surface Treatment
- ✓ $20,000

Colts Street – Cunningham Avenue to US-95

- ✓ Surface Treatment
- ✓ $20,000

Plan Year 5

Heigho Avenue – US-95 (Virginia Street) to Wiley Street

- ✓ Surface Treatment
- ✓ $82,000

Sign Replacement

- ✓ Street Name Signs – Replace and/or Relocate, North Side
- ✓ $4,600

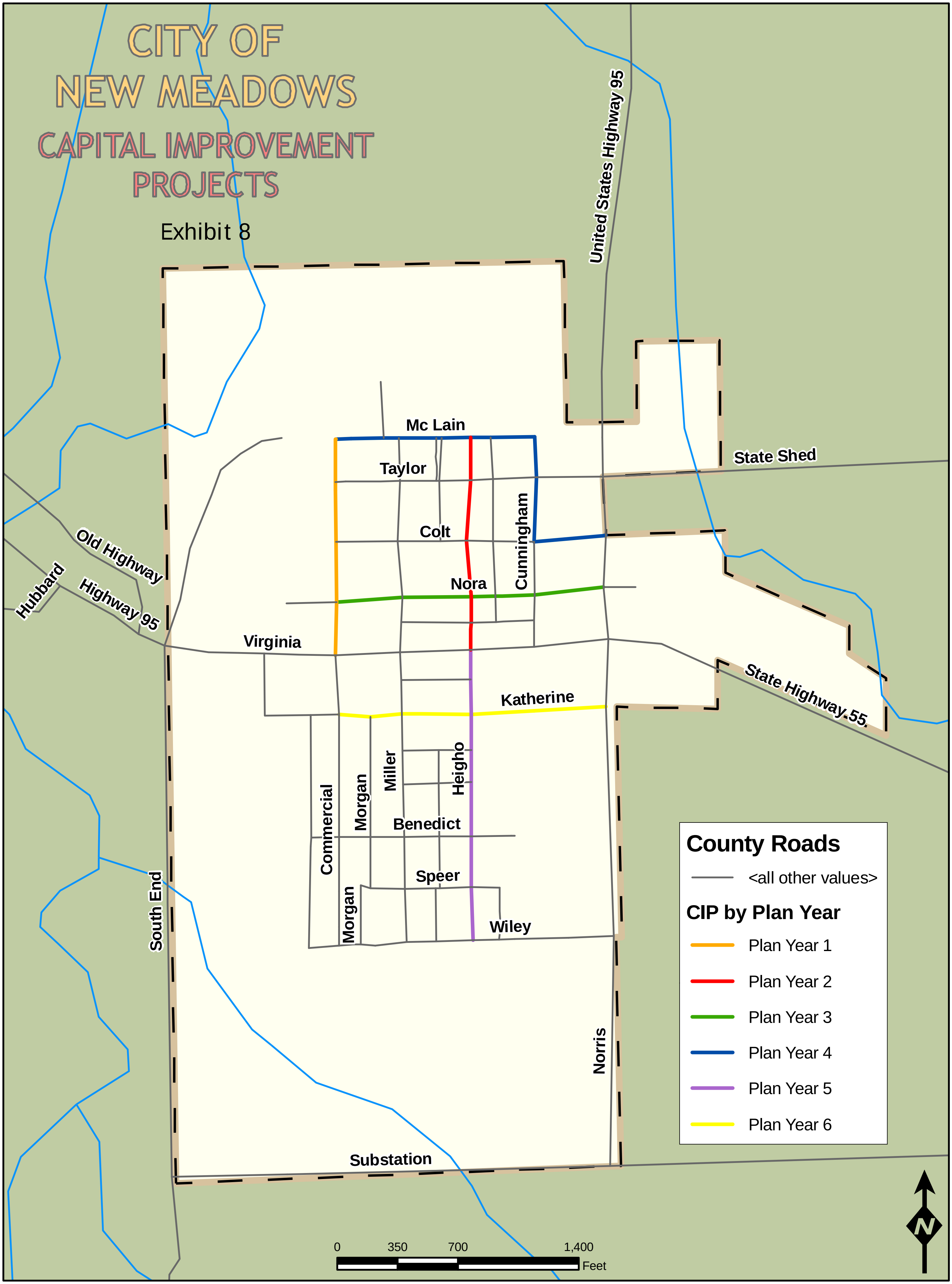
Plan Year 6

Katherine Avenue – Commercial Street to Norris Avenue

- ✓ Surface Treatment
- ✓ $86,000

Sign Replacement

- ✓ Street Name Signs – Replace and/or Relocate, South Side
- ✓ $4,200


CITY OF
NEW MEADOWS
CAPITAL IMPROVEMENT
PROJECTS
Exhibit 8
United States Highway 95
Mc Lain
Taylor
State Shed
Colt
Cunningham
Nora
Old Highway
Hubbard
Highway 95
Virginia
State Highway 55
Katherine
Commercial
Morgan
Miller
Heigho
Benedict
Speer
Morgan
Wiley
South End
Norris
Substation
County Roads
<all other values>
CIP by Plan Year
Plan Year 1
Plan Year 2
Plan Year 3
Plan Year 4
Plan Year 5
Plan Year 6
0
350
700
1,400
Feet
N

Appendix

This appendix contains a copy of *Storm Drainage Study and Master Plan for City of New Meadows*, prepared by J-U-B ENGINEERS, Inc. in September 1991.

STORM DRAINAGE STUDY AND MASTER PLAN

FOR

CITY OF NEW MEADOWS

SEPTEMBER 1991

Prepared By:

J-U-B ENGINEERS, Inc.
Engineers Surveyors Planners
250 South Beechwood Avenue
Boise, Idaho 83709

STORM DRAINAGE STUDY AND MASTER PLAN

FOR

CITY OF NEW MEADOWS

SEPTEMBER 1991

PROFESSIONAL ENGINEER
REGISTERED
6588
9/9/91
STATE OF IDAHO
PHILLIP H. KRICHBAUM

Prepared By:

J-U-B ENGINEERS, Inc.

Engineers Surveyors Planners

250 South Beechwood Avenue

Boise, Idaho 83709

STORM DRAINAGE STUDY AND MASTER PLAN
FOR
CITY OF NEW MEADOWS

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FIGURE 3 - STUDY AREA MAP

CITY OF NEW MEADOWS

STORM DRAINAGE STUDY AND STREET MASTER PLAN

I. INTRODUCTION

A. Project Setting

The City of New Meadows is located in west central Idaho at the intersection of U.S. Highway 95 and State Highway 55. The community lies in the southern portion of Meadows Valley at the headwaters of the Little Salmon River. The Meadows Valley is bordered to the east by the Salmon River Mountains, and to the west by the West Central and Seven Devils Mountain ranges, both which occur primarily in the Payette National Forest. Approximately 600 people reside in this "rural" set community.

B. Climatology

The mean annual temperature and mean annual precipitation as recorded by the Payette National Forest Ranger Station, which is located in New Meadows, are approximately 42°F and 26 inches, respectively. Annual snowfall in the area can be over 90 inches in accumulated depth.

C. Topography

The topography of New Meadows can be categorized as being situated in a broad valley floor. The valley floor is relatively flat, with a mild groundline slope to the northwest. Groundline elevations throughout the townsite vary from approximately 3872 (MSL) in the southeastern portion of the City to 3859 in the northwestern corner of town. Grouse Creek lies east of the City and flows northwesterly to the Little Salmon River. Little and Big Creeks are also tributaries of the Little Salmon River and are located southwest of the townsite. The Little Salmon River lies west of town and has a northerly gradient through the Meadows Valley.

D. Geology

General geological classification of the site can be categorized as alluvial deposits comprised of fine grained clay and silt loams, which range in depth from two to three feet below groundline. Sandy silts typically occur at greater depths.

II. SCOPE AND OBJECTIVES OF MASTER PLAN

A. Need for Improvements

The City of New Meadows has been plagued with storm runoff flooding at an almost annual occurrence. Typically, the most serious flooding occurs during the early spring, when warm southerly storm tracks bring heavy rains onto the snow covered region. This combination of rain on snowfall appears to bring the most severe flooding to the City. The existing storm drainage facilities, which are comprised mostly of roadway ditches and culverts, do not have adequate capacity to convey these high runoff flows; consequently, surcharging and ponding occurs. Several factors besides inadequately-sized storm drainage facilities contribute to the problem.

1. Capacity of the culverts is reduced due to clogging and siltation.

2. Topography of the townsite contributes to the flooding potential. The land area slope does not generally provide enough gradient for positive drainage.

3. The fine grained soils present on the site are not freedraining, which results in higher storm runoff flows.

4. The street system layout does not provide adequate conveyance of surface drainage from adjacent land areas. Street travelway surface is typically raised above the adjoining land areas, and street grades are too mild for longitudinal conveyance of storm runoff flows in the roadway ditches.

B. Authorization

J-U-B ENGINEERS, Inc., received authorization by the New Meadows City Council to perform a Storm Drainage Master Plan Study along with street improvement layout in 1990.

C. Master Plan Study Objectives

1. Develop working hydrologic computer model of City to predict on-site storm runoff flows.

2. Develop alternative conceptual storm drainage facility systems.

3. Select ultimate drainage facilities plan and prepare master plan drawings from City-provided aerial topographic mapping. These master plan drawings are for the purpose of depicting line sizes and a general preliminary layout for the drainage facilities.

4. Analyze street system and revise centerline street grade lines for incorporation into the ultimate drainage plan. Prepare preliminary layout plan and profile street drawings. A complete street system redesign in accordance with AASHTO, Geometric Standards, was out of the scope for this Master Plan.

III. DESIGN CRITERIA

A. Street Layout

The City street network was analyzed with respect to the following criteria:

1. Finished profile grades of streets were set at a minimum of 0.50% in order to provide adequate conveyance of overland storm flows within the roadway ditches. Short reaches of grades lesser than 0.50% can be tolerated but, overall, 0.50% is a recommended standard of practice for gradient in gravel lined street ditches. Several streets required intermediate "rolled" grade breaks to meet the minimum grade criteria.

2. Finished grade profiles were set to minimize "cuts" and "fills" on the existing street gradeline and adjoining properties.

3. A typical roadway section was developed utilizing geotextile fabric within the ballast section (see Figure 2 for Typical Section). The section was developed from J-U-B's "Street Plan" which was prepared for the City in September 1987.

B. Hydrology

1. Design Storm

The rainfall storm frequency, which was selected for analysis and design, was 10 years. This storm is the largest storm, in terms of total precipitation, which is statistically predicted to occur over a 10-year period or has a 10% chance of occurring each year. A 10-year design storm appears to provide a balance between storm drain facility costs and adequate flood protection. Storm drainage facilities which are designed for a 50-year storm, would likely be much more costly than a system which handles a less intense 10-year storm. Some limited and occasional flooding should be tolerated when less frequent more intense storms occur other than the 10-year event. Damage from such less frequent events should be reduced by the in-place storm drain facilities handling the 10-year storm. A 24-hour storm duration was used and was distributed in accordance to the U.S. Department of Agriculture, Soil Conservation Service (SCS), synthetic rainfall distribution Type II. Type II is the most intense storm which occurs in this geographic region. The point precipitation value for the design storm selected was 2.40 inches, which was taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 2, Precipitation - Frequency Atlas of the Western United States, Volume V - Idaho, U.S. Department of Commerce, National Weather Service.

No depth-area reduction in the point precipitation value was allowed since the contributing drainage area is small and, therefore, it is more likely that 2.40 inches of rain will fall uniformly over the entire, contributing drainage area.

2. Study Area Limits and Assumptions

a. On-site Conditions

Figures 1 and 3 show the study area limits for the Storm Drainage Master Plan. The study area consisted mostly of the existing townsite. These limits were set primarily from the available aerial topographic mapping which was provided by the City. Urban growth outside this study area may occur, but was considered as non-contributing in terms of the storm runoff flows. Assumptions pertaining to the off-site areas and ultimate land utilization are discussed in further detail per the following section. It is important that developments, which may occur outside of the study area, be fully evaluated for their potential storm runoff impacts to the storm drainage system. Norris Avenue sets the east study area border while Commercial Street forms the western limit. Wiley and McLain Streets are respectively the south and north delineations.

b. Off-site Conditions

The following assumptions were taken:

- Land areas south of Wiley Street were not considered as contributing to the on-site storm runoff flows. Along the southern right-of-way of Wiley Street, there exists a drainage ditch which appears to intercept storm runoff flows from the south, and conveys these flows to the west. These flows are discharged into tributaries of Little Creek and do not enter the on-site storm patterns. The irrigation ditch then forms a line of drainage delineation from southern land areas. Storm runoff from future developments may be conveyed by this drainage ditch without entering the City storm drain system.

- Land areas north of McLain Street were assumed off-site. Highway 95, which runs north to the City of Riggins, delineates storm runoff flows from land aras northeast of study area. Storm runoff flows from these land areas are also intercepted by the West Branch of Goose Creek. West of Highway 95, and north of Mclain Street, lies a bench area where the New Meadows Airport is located. Storm runoff flows should partially be intercepted by the ditch that is located east of Cunningham Avenue and travels northwesterly past Mclain Street. The prevailing drainage pattern of the remaining land areas north of Mclain Street is westerly towards the Little Salmon River.

- As shown on Figure 3, the westerly lots adjoining Commercial Street, set the westerly delineation line for the study area. Topography west of this line provides westerly drainage towards the Little Salmon River and, therefore, can be classified as off-site.

- There exists the possibility of contributing storm runoff flows entering the study area which are generated from the large cultivated land areas to the east of Norris Avenue and south of State Highway 55. Past observations show the majority of these runoff flows enter the "on-site" study area at the intersection of Katherine Avenue and Norris Avenue. A system of culverts and ditches along Katherine Avenue convey these flows westerly through town. Previous improvements have been made to divert these overland flows to minimize their impact on the City's existing drainage facilities. The improvements included construction of diversion berms within the large cultivated field immediately east of Norris Avenue and south of State Highway 55. One berm was constructed to capture runoff flows on the eastern one-half of the field. The berm provides conveyance to the north where the flows are piped under Highway 55 and subsequently discharged to an open channel. The other berm was constructed east of the Wiley Street and Norris Avenue intersection. This berm was constructed to divert some of the field runoff flows to the Wiley Street ditch. Both of the diversion berms have a limited effectiveness on preventing storm runoff flows from entering the City at Katherine Avenue and Norris Avenue intersection.

To account for the off-site storm runoff flows which are generated from the land areas east of Norris Avenue and south of Highway 55, past site observations were used in lieu of hydrological modeling. Key City personnel, who were familiar with the magnitude of these runoff flows from past storm events, provided a means of estimating these flows. It was assumed that these runoff flows were equal to an eighteen inch (18 inch) culvert capacity at full flow conditions which is approximately 5 cfs. Runoff flow may exceed the assumed value if adequate off-site improvements are not rigorously implemented, such as the rehabilitation of the diversion berms; construction of new interceptor drains and culverts, and modification of irrigation practices. These improvements will help minimize the introduction of off-site runoff flows into the City storm drain system. It is unfeasible, in terms of economical storm drain sizing, to set this entire land area (east of Norris Avenue and south of Highway 55) as contributing watershed to the on-site runoff flows. The impact of such large flows would yield an overly conservative storm drain sizing.

3. Ultimate Land Development

The study area ("on-site") as shown on Figure 3 was considered as fully residentially developed. Land areas outside of the study area were considered essentially "off-site" and, therefore, not contributory to the storm drain system. Development, then, of these off-site land areas and subsequent ultimate storm runoff flows should not be introduced into the on-site runoff flows, unless the developments modify the existing physiographic features and prevailing drainage patterns. It is important that developments occurring both within and outside of the study area be evaluated to determine if its drainage is consistent with the assumptions made in this study.

4. Irrigation Drainage

A full investigation of irrigation water flows and corresponding rights within the study area was out of the scope of services for this study. Irrigation water conveyance systems and storm water collection systems should typically be kept separate from each other.

Nuisance irrigation water runoff from residential lawns or agricultural areas were not considered to act concurrently with storm runoff flows. The likelihood of the 10-year design storm occurring at peak irrigation water runoff seems remote.

C. Environmental Aspects

The purpose of this section is to provide a brief overview of environmental concerns which may affect the project. New regulations which address the water quality aspects of storm water runoff discharges are being implemented by the EPA, through Section 402 of the Clean Water Act; however, it appears that these regulations will not place restrictions on this project.

The U.S. Fish and Wildlife Service and Idaho Department of Fish and Game Agencies will need to be consulted to ensure that no endangered species are affected by storm water runoff discharges into the Little Salmon River. If Federal funds are used to finance the project, the funding agencies will require documentation that no federally listed endangered species will be adversely affected by the project. To meet these requirements, a biological survey/assessment may be required under Section 7 of the Endangered Species Act. These procedures are usually very straight forward, but may become involved if the Little Salmon River near the outfall point is considered an anadromous fish holding waterway, and if the anadromous fish (i.e., salmon), become listed as a threatened species. The National Marine Fisheries Service would likely become involved in the project and may require additional conditions.

The U.S. Army Corps of Engineers may have jurisdiction over drain ditches that would be encroached by the storm drain truckline alignment. Subsequently, permits may need to be secured.

IV. HYDROLOGICAL MODELING

A. Modeling Method

Storm runoff flows for the study area were determined using software developed by Pizer Inc. "Hydra-Storm and Sanitary Sewer Analysis Software," Version 4.0. The storm runoff analysis method selected was the Soil Conservation Service (SCS) method which incorporated some modifications by the Santa Barbara method. This method generates storm runoff hydrographs given design storm and drainage subbasin characteristics such as percentage of impervious areas, soils, ground cover, land slope, and hydraulic length. The program has the ability to combine individual subbasin hydrographs; thus, forming composite hydrographs. Hydrographs can be routed in open channels and gutters or collected via catch basins and routed through subterrain conduits.

The SCS TR-55 Method "Urban Hydrology for Small Watersheds" program and hand calculations using the Rational Method were used to check storm runoff flows that were generated from the Hydra model.

B. Subbasin Delineation

Subbasins were determined for each catch basin in the storm drain system. A subbasin can be defined as a land area which uniquely contributes only its storm runoff flow to a single point of outlet. Aerial topographic maps, which were supplied by the City, were used for defining the subbasins and determining subbasin acreage. The limits of the subbasins were determined by the existing topography (i.e., prevailing land drainage patterns) and proposed drainage orientation of street grades. Some field investigations and interviews with key local personnel helped refine the subbasin delineation. The entire study area encompasses some 110 acres which was broken down into 75 subbasins varying in size from 0.5 to 5.5 acres.

C. Hydrological Soil Grouping

The SCS field office, which is located in Weiser, Idaho, was contacted in order to obtain soils information in the area. The SCS provided soil maps, hydrological soil grouping, and soil descriptions from their draft "Soil Survey of Adams and Washington Counties, Idaho." There are four hydrological soil groups (HSG) which occur in the immediate vicinity of New Meadows. These soil groups are classified in accordance to the minimum "bare soil" infiltration rates ("A" being the highest infiltration rate, lowest runoff potential). HSG "D" soils dominate over other soil types in the study area. Some HSG "B" soils occur over the northwestern corner of the town; however, their impact was assumed to be negligible; therefore, the entire study area was conservatively assumed to be of HSG "D." The HSG "D" soils consist mostly of clay and silt loams and in conjunction with saturation from high groundwater, have a high potential for runoff. Urbanization has less of an effect on storm runoff with HSG "D" soils than with other groupings. Because of the low infiltration rates of HSG "D" soils, the effect of increased urbanized impervious areas is less dramatic.

D. Curve Number Determination

An important subbasin characteristic and parameter used in the SCS method is the curve number. The curve number is a function of soil type, ground cover, antecedent moisture condition, and land use. Even though impervious areas exist, urban area soil types remain an important parameter for determining storm runoff. Hydrological soil type determination was described in the previous section. Ground cover also in conjunction with soil type, influence runoff from land areas. Urban grass lawn areas were considered as being in good condition.

Urban land use significantly affects the subbasin's storm runoff potential by creating impervious areas such as house rooftops, driveways, sidewalks, parking lots, and streets. Surface storage "ponding" and soil infiltration of rainfall are reduced by these impervious areas thereby increasing the subbasin's peak storm water runoff flow and volume of storm water runoff. Antecedent Moisture Condition II was selected for the study. This parameter takes into account soil moisture prior to the design storm rainfall. Condition II is described as an average condition, where as Condition I is very dry soil, and Condition III is soil which is close to saturation.

The above parameters yielded a composite curve number of 85 using SCS TR-55 methods.

E. Time of Concentration

Time of concentration can be defined as the time required for storm runoff to travel from the most hydraulically remote point to subbasin outlet. Times of concentrations were calculated as outlined in SCS TR-55 and NEH-4 and also in accordance with the Idaho Transportation Department methods. Flow path lengths and slopes from the most hydraulically remote point to the subbasin outlet (catch basin) were determined from the aerial topographic maps. Generally, the time of concentration flow paths were divided into reaches of different hydraulic classifications. In upper reach, storm water was assumed to occur as overland sheet flow, followed by reaches of shallow concentrated flow or open channel flow in roadway ditches. Storm runoff, hydrograph shape and correspondingly peak runoff flow and runoff volume are largely impacted by the time of concentration; therefore, a degree of care must be used in estimating this parameter.

F. Storm Drain Design Criteria/Assumptions

The following describes the storm drain design criteria and assumptions which were incorporated in the computer modeling.

1. Minimum pipe slopes per Great Lakes-Upper Mississippi River Board, "Ten States Standards" were held to provide a minimum scouring velocity of 2 fps. This velocity will minimize settling of solids in the conduits.

2. Pipes were sized for peak flow conditions at a maximum partially flowing depth ratio of d/D = 0.89.

3. Minimum pipe diameter considered was 12 inches.

4. Mannings pipe friction factor selected was 0.013 for conduits and 0.035 for gravel-lined roadway ditches.

5. Minimum pipe cover was set at two (2) feet.

6. At manholes, no minimum drop between inlet pipe invert to outlet pipe invert was selected.

7. Storm flows were allowed to be conveyed overland by the typical street ditch, until the ditch reached bank full condition. Flows were then collected by grate inlet/catch basins and then routed to the storm drain system. Catch basin inlet capacity was assumed equal to 2 cfs.

8. No existing storm drainage facilities were utilized in the modeling.

9. Outfall ditch elevations at Katherine, Benedict, and Taylor Streets were field verified. Due to the limited groundline

slope, some outfall pipe invert elevations were set at the flowline elevation of the outfall ditches. Surcharging could develop in the storm drain pipe at outfall ditch highwater conditions. Limited surcharging can be tolerated if catch basins are not backflowed.

10. Considerations were given to minimize alignment problems with existing utilities; however, a thorough underground utility investigation was out of the scope of services for the Master Plan Study.

G. Modeling Results

The modeling results lead to three alternative storm drain layouts, which are described below:

1. Alternative #1

This alternative consists of five main storm drain laterals along Wiley, Benedict, Katherine, Nora, Colt, and McLain Streets. The Wiley Street lateral was sized to match the existing facility sizing, since little on-site storm flows contribute to this line.

The Benedict Street lateral's service area is bounded to the south by Wiley Street and the north by Cedric Street. West right-of-way line of Norris Avenue sets the eastern border while the lots fronting Commercial Street to the west, form the western service area boundary. The Benedict lateral outfalls to the existing ditch west of Commercial Street. For the storm drain to "daylight" at the outfall ditch, an inverted siphon would be required to avoid the existing sanitary sewer along Commercial Street. The inverted siphon would allow the storm drain to pass below the sewer and then surcharge up to the outfall ditch.

The Katherine Street lateral's service area is approximately bounded to the north and south by Virginia Avenue and Cedric Streets, respectively. Land areas adjacent to Norris Avenue set the eastern border while the lots fronting Commercial Street to the west, form the western boundary. This lateral outfalls in the same manner as the Benedict lateral at the ditch west of Commercial Street.

Nora Street Lateral's service area is bounded to the south by Virginia Avenue. The south one-half of Blocks 41-45, set the northern limit. U.S. Highway 95 and Commercial Street form respectively the east and west boundaries. Storm runoff flows in this area are collected by the Nora Street storm drain lateral and conveyed westerly to a trunk line along Commercial Street, which routes flows northward toward the intersection with Colt Street.

The Colt Street Lateral collects storm runoff flows from a service area which is bounded to the east and west by U.S. Highway 95 and Commercial Street, respectively. The north one-half of Blocks 41-45 set the southern service area limit, while Taylor Street is the northern boundary. Storm runoff flows are conveyed to the west into the Commercial Street trunk line.

The last lateral is the McLain Street lateral. The respective service area is bounded by McLain and Taylor Streets, respectively, to the north and south. Cunningham Avenue and Commercial Street comprise the respective east and west boundaries. This storm drain collects and conveys storm runoff flows into the Commercial Street trunk line at Taylor Street intersection.

At the intersection of Taylor and Commercial Streets, the Commercial Street trunkline discharges into the large drain ditch which flows adjacent to the City's wastewater treatment plant and, eventually, into the Little Salmon River.

2. Alternative #2

This alternative is very similar to Alternative #1, except that the Commercial Street trunk line is extended southerly to collect Benedict and Katherine laterals. Outfalls are to ditches at Wiley and Taylor Streets only. No inverted siphons are required for the Benedict and Katherine laterals, since the Commercial Street trunk line is below the sanitary sewer.

3. Alternative #3

This alternative is very similar to Alternative #2 except that the trunk line is not routed along Commercial Street but is aligned 160 feet to the west along the abandoned rail line. This trunk line alignment will avoid the congested utility corridor along Commercial Street.

4. Alternative Summary

Alternatives #2 and #3 offer some advantages by lessening the number of discharge-outfall points. By reducing the outfall locations, fewer ditches will require maintenance. However, Alternative #1 will be somewhat more cost effective. Alternative #1 minimizes the conveyance of storm flows through the City by providing outfalls at "earlier" intervals in the storm drain system. Alternative #1 storm drains at Katherine Avenue and Benedict Street will need to pass through an inverted siphon for clearance under the 8" sanitary sewer at Commercial Street. The inverted siphons can create additional maintenance. Some surcharging could develop in the laterals of all alternatives because the outfall invert elevations are set near or at the ditch flowline elevations. The site's topographic relief is very mild and prevents the outfall invert elevations from being raised. During highwater conditions in the ditches, it appears that surcharging will occur; however, the catch basins should not be overflowed.

V. FUNDING ALTERNATIVES

A. Funding Alternatives

There exists four funding mechanisms applicable to storm drain system projects. Descriptions of these sources are provided below.

1. Idaho Community Development Block Grants - Department of Housing and Urban Development

Annually, Idaho receives $6-7 million for funding eligible CDBG activities. Cities and counties may apply to the State for funds to improve infrastructure. There is a maximum of $400,000 grant per public facility project and preapplications must be submitted by November 1. The local entity must provide approximately 50-60% of the project cost in local cash match through Local Improvement Districts, Business Improvement Districts, bond issues, etc.; and, the project must meet one of HUD's National Objectives: elimination of slum and blight; project benefit to predominately (51%) low/moderate income people; or solving an imminent threat.

The Grant can be written by an Idaho Certified Grants Administrator. J-U-B has the capability of performing this function. Grant funds can be used for Administration, Engineering Architectural fees, Construction and Inspection fees.

2. Farmers Home Administration - Department of Agriculture

The Farmers Home Administration is authorized to provide financial assistance for water and waste disposal facilities, in rural areas and towns of up to 10,000 people, although priority will be given to areas smaller than 5,500 people. Grants or loans are available depending upon family income. (Since New Meadows 1980 median household income is $17,375.00, and $14,700 is the maximum income guideline used by Farmers Home, the town would qualify for a loan only - currently 6-7/8%). Applications may be made at any time for the 40-year loans and the bonds will be purchased by Farmers Home. These loan funds can be used to provide the required local cash match for CDBG applications.

Farmers Home loan funds are also available for community facilities including streets.

3. <u>Local Improvement Districts</u>

Communities in Idaho have the power to create local improvement districts (LIDs). LIDs are formed in order to construct and finance an Infrastructure project that benefits a particular area. An LID is formed by a local government and the improvements are paid for by the proceeds from the sale of bonds. Bonds are repaid over a long period of time through special assessments levied on the property within the LID. The bonds sold to finance the improvements can be sold as tax-exempt, so the cost to the property owners is generally less than private financing. LIDs are not typically used in City-wide storm drainage facilities, since the assessment procedure, which may be based on the property's impervious area, is difficult and controversial to determine. They are used extensively, however, for street improvement projects.

4. <u>General Obligation Bonds</u>

The traditional means of financing most large non-revenue producing capital improvements has been through the use of general obligation (G.O.) bonds. Entities may borrow money or issue G.O. bonds totaling up to a certain percent of the taxable value of the property in the community. An election must be held and the question must pass by 66-2/3% majority vote of the qualified electors voting on the issue. Entities with existing bonded indebtedness can often issue additional debt and can coordinate existing bond maturity schedules to match newly issued bond maturity schedules.

B. Summary

A creative approach will be required to utilize a combination of the above funding sources. A CDBG could be pursued with an FHA loan being utilized as the local match. Revenue potential will have to be investigated to determine the feasibility generating local matching funds. Phasing the project would reduce somewhat the revenue burden.

VI. RECOMMENDATIONS

A. It is recommended that Storm Drain Master Plan Alternative #3 be adopted as shown on the 1" = 100' scale preliminary layout plans. This alternative will minimize alignment problems, with existing utilities routed in Commercial Street greatly simplifying the trunk line construction. Alternative #3 incorporates only one outfall point, which is the large drain immediately south of the City's wastewater treatment plant. Maintenance efforts can be focused on this drain ditch only, instead of several. The drain ditch also lies within the public right-of-way, thereby enhancing its maintenance. Opinion of probable construction costs for the storm drainage system are listed in Table 1.

B. It is recommended that the City adopt the conceptual street drainage plan which is incorporated in the preliminary layout plans. The street grades shown on the preliminary layout should supplement the overall "Street Plan" prepared by J-U-B ENGINEERS, Inc., for the City of New Meadows in September of 1987.

C. The City should develop a plan for a time phased construction of these drainage improvements. The main trunk line is expected to be constructed first, followed by phased construction of the laterals. The City may elect to perform portions of the work with City forces. Nonetheless, whether the construction is performed by City work forces or let out to bid, detailed construction plans and specifications should be developed, along with a full field survey.

D. A continuation of maintenance efforts for both the existing and proposed storm drainage improvements cannot be over-emphasized. Optimal performance of the storm drain system cannot be achieved by clogged catch basin inlets, culverts, obstructed roadway ditches, and debris ridden storm drains. A rigorously implemented maintenance program will reduce the risk of flooding and subsequent property damages.

Generally, the maintenance program should entail keeping the catch basin grated inlets free of leaves, branches, trash, snow, and ice; cleaning sediments and other deposited material from catch basin bottoms; and checking that the grated inlets are secure and placed properly, to prevent safety hazards. Roadway ditches and outfall channels should be inspected regularly for obstructions. Culverts and storm drain pipes should be inspected and kept clean of deleterious materials.

E. The City needs to implement a program to minimize the introduction of off-site storm water runoff and irrigation flows into the City storm drain system. Most notably is the large land area east of Norris Avenue and south of Highway 55. A combination of storm runoff and irrigation wastewater converge at Katherine Avenue and Norris Avenue, and typically causes flooding of this area. Several berms have been constructed in the field are east and adjacent to Norris Avenue to divert these flows from entering the City. These berms have a limited effectiveness. There appears to be several approaches to solving this problem:

1. The City can improve the construction of these diversion berms and regularly maintain them to reduce flows at the intersection of Katherine and Norris Avenues. This will require close coordination with affected property owners on the diversion berm construction. The City should also meet with the property owners to discuss irrigation practices and measures to reduce irrigation wastewater introduction into the City. County roads and roadways southeast of the City could possibly be improved to divert waste irrigation water flows and stormwater flow away from the City. Coordination with the State Department of Transportation would be required since some diverted flows may be routed into the culvert which crosses Highway 55 east of the Payette Forest Service Ranger Station.

2. If the off-site irrigation wastewater or storm runoff cannot be adequately diverted from the Katherine Avenue and Norris Avenue intersection, a diversion structure will be required. This structure will divert flows in excess of 5 cfs, to the existing open ditch along Katherine Avenue. The Katherine roadway drainage ditch and existing open ditch will need to be separated. Flows under 5 cfs can be introduced into the storm drain system.

F. New developments both within the Master Plan Study area and off-site need to be fully evaluated by the City in terms of their impacts to the storm drain system and whether these impacts can be accommodated. The City may elect to pursue City ordinances on large developments, which stipulate that post development runoff flows exceeding pre-existing flows are to be managed on-site, such as through the use of retention basins.

TABLE 1
STORM DRAINAGE FACILITIES MASTER PLAN
OPINION OF PROBABLE CONSTRUCTION COST

ITEM	QUANT.	UNIT	UNIT COST	COST
STORM DRAIN PIPE				
12"	4125	L.F.	$20.00	$82,500
15"	2170	L.F.	$21.00	$45,570
18"	1060	L.F.	$26.00	$27,560
21"	2470	L.F.	$31.00	$76,570
24"	1120	L.F.	$33.00	$36,960
27"	640	L.F.	$45.50	$29,120
30"	815	L.F.	$65.00	$52,975
36"	1780	L.F.	$68.00	$121,040
42"	690	L.F.	$110.00	$75,900
54"	640	L.F.	$140.00	$89,600
MANHOLES	43	EA.	$1,000.00	$43,000
CATCH BASINS	98	EA.	$400.00	$39,200
HIGHWAY CROSSING	1	L.S.	$7,800.00	$7,800
TOTAL				$727,795
30 % CONTINGENCY				$218,339
TOTAL COST				**$946,134**

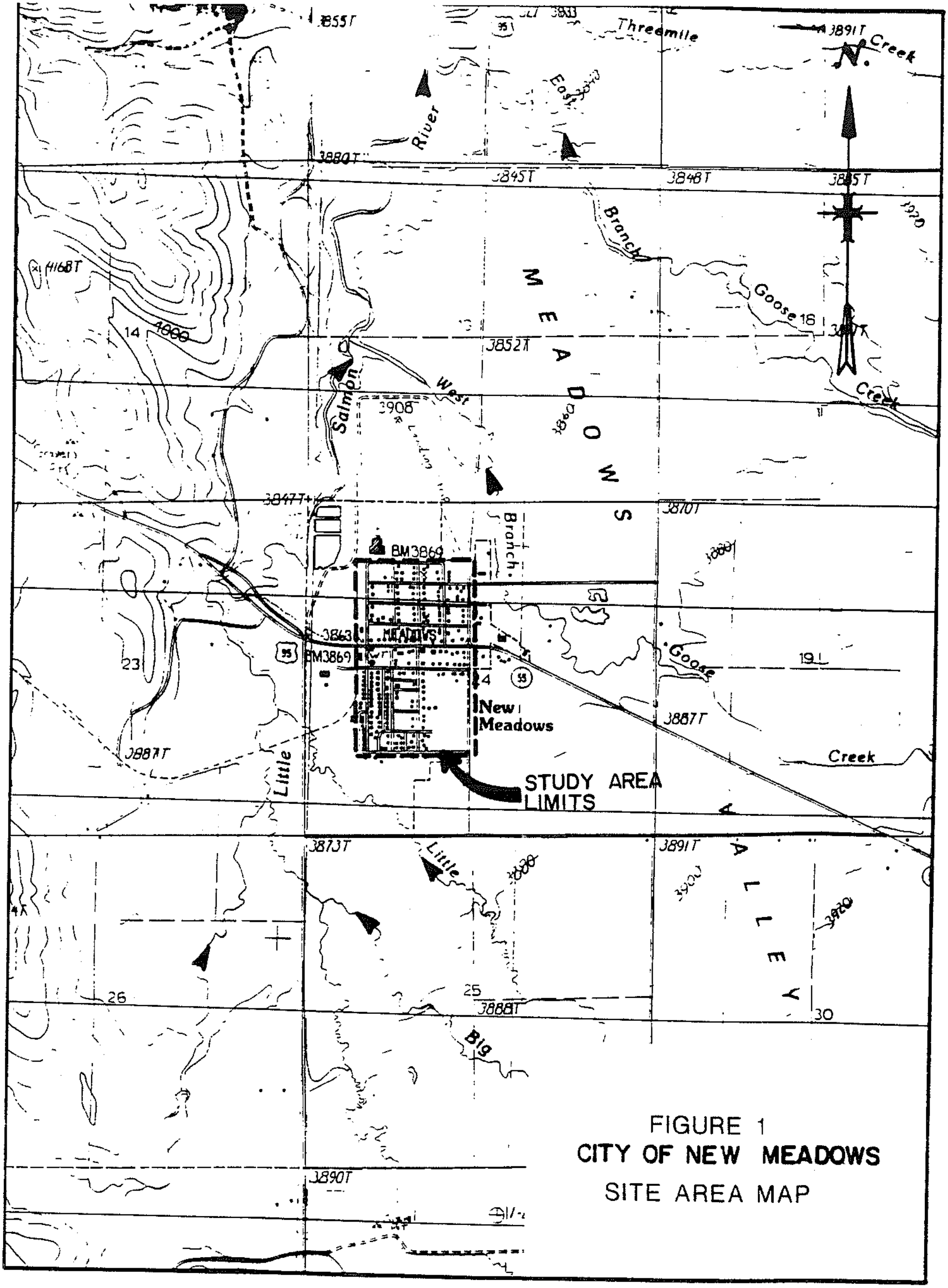
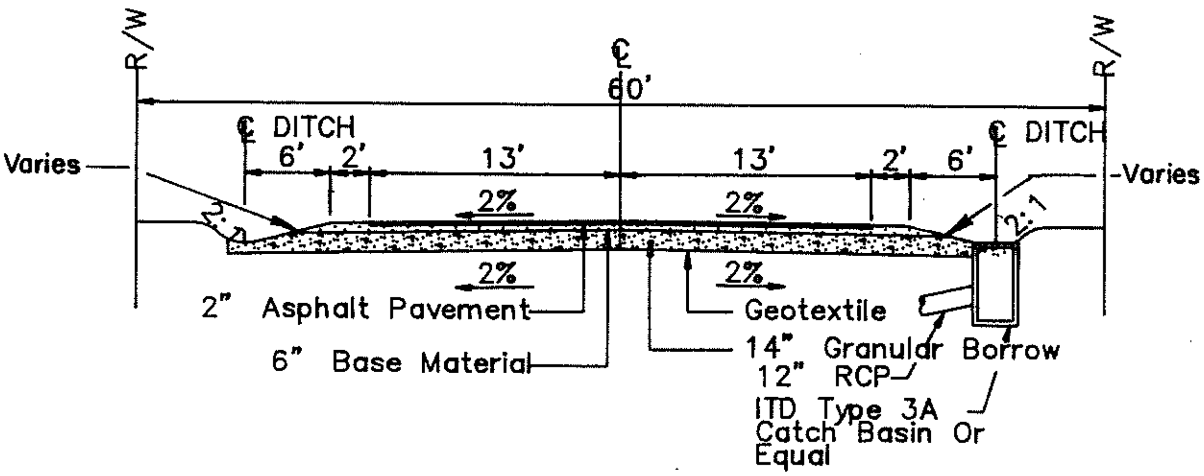


FIGURE 1
CITY OF NEW MEADOWS
SITE AREA MAP



TYPICAL STREET SECTION
WITH STORM DRAIN AND CATCH BASIN

NO SCALE

FIGURE 2

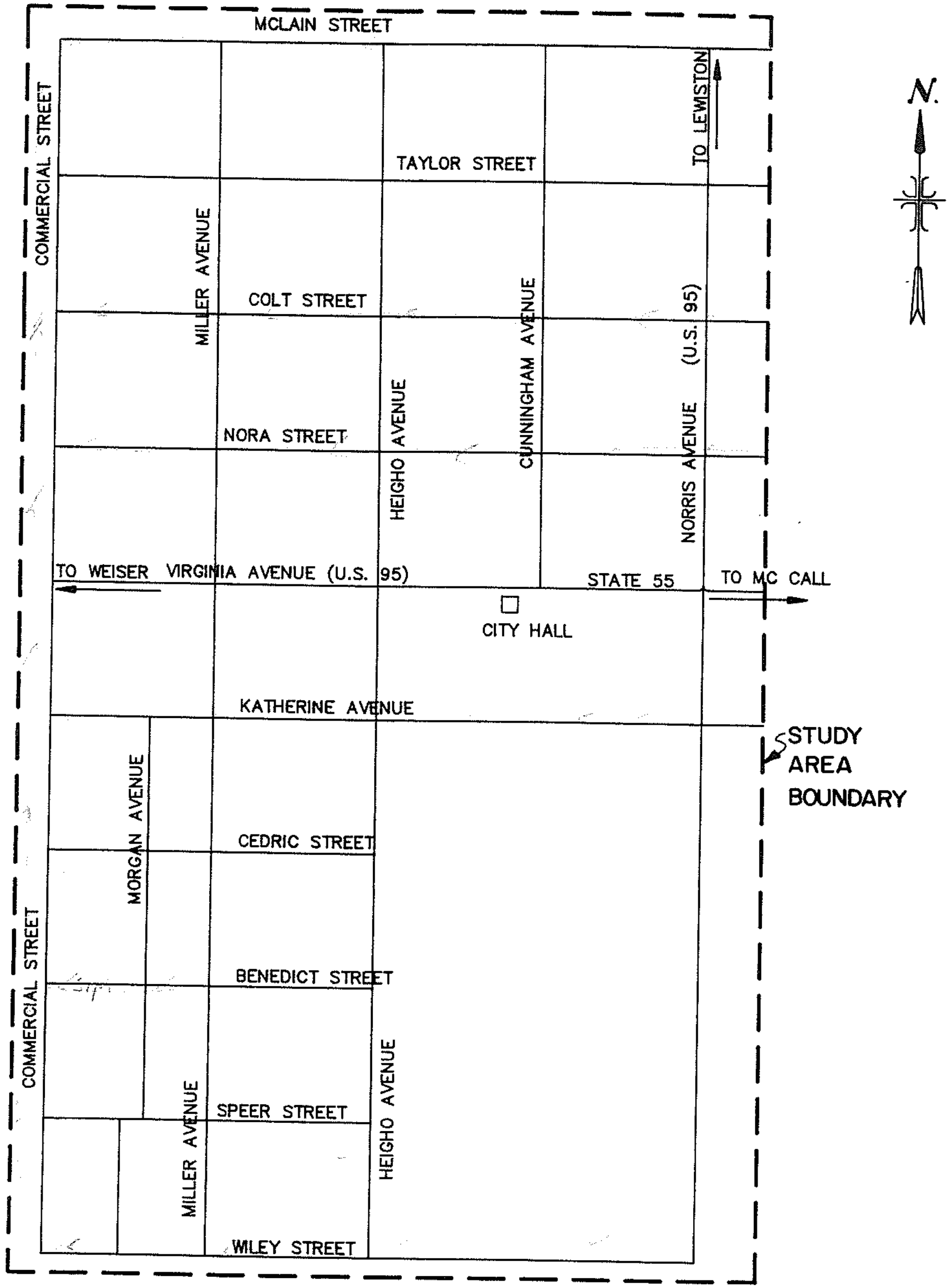


FIGURE 3
STUDY AREA MAP

CITY OF NEW MEADOWS

Roadway Costs - 1991

Preferred Section - 30' Wide

Item	Description	Quantity Per Foot	Unit Cost	Total Cost Per Foot
1.	Excavation	3.34 Cubic Yards	$ 2.00	$ 6.68
2.	Fabric	4.16 Sq. Yards	0.75	3.12
3.	Subbase (Granular Borrow)	1.30 Cubic Yards	6.00	7.78
4.	Base Material	0.40 Cubic Yards	7.50	3.01
5.	Asphalt Pavement	0.38 Ton	40.00	15.00
	Total Cost Per Linear Foot			$35.59

Collector Roads - 24' Wide

Item	Description	Quantity Per Foot	Unit Cost	Total Cost Per Foot
1.	Excavation	2.67 Cubic Yards	$ 2.00	$ 5.34
2.	Fabric	3.33 Sq. Yards	0.75	2.50
3.	Subbase (Granular Borrow)	1.037 Cubic Yards	6.00	6.22
4.	Base Material	0.321 Cubic Yards	7.50	2.41
5.	Asphalt Pavement	0.30 Ton	40.00	12.00
	Total Cost Per Linear Foot			$28.47

Residential Streets - 22' Wide

Item	Description	Quantity Per Foot	Unit Cost	Total Cost Per Foot
1.	Excavation	0.963 Cubic Yards	$ 2.00	$ 1.93
2.	Fabric	3.111 Sq. Yards	0.75	2.33
3.	Subbase (Granular Borrow)	0.963 Cubic Yards	6.00	5.78
4.	Base Material	0.296 Cubic Yards	7.50	2.22
5.	Asphalt Pavement	0.275 Ton	40.00	11.00
	Total Cost Per Linear Foot			$23.26

The above costs are shown for budgetary purposes only. Any modifications available through the use of day labor, volunteer work, or availability of materials from less expensive sources would adjust these costs accordingly.