

**LEGACY RIDGE
RESIDENTIAL DEVELOPMENT
HIGHLAND MILLS, NEW YORK**

**PRELIMINARY ENGINEERING REPORT
Legacy Ridge Water System**

July 2005

Last Revised January 2006

HDR

LMS

One Blue Hill Plaza
Pearl River, New York 10965

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE #</u>
1.0 INTRODUCTION	1
2.0 PROJECT DESCRIPTION	1
3.0 WATER SUPPLY AND DEMAND REQUIREMENTS	3
4.0 POTABLE WATER SUPPLY WELLS	3
5.0 WATER TREATMENT	4
6.0 STORAGE CAPACITY	5
7.0 WATER SYSTEM ANALYSIS	6

APPENDICES

- APPENDIX 1 – LEGACY RIDGE WATER CONCEPT PLANS
- APPENDIX 2 – WATER DEMAND CALCULATIONS
- APPENDIX 3 – STANDPIPE DETAILS AND SPECIFICATION
- APPENDIX 4 – WATER BOOSTER STATION DETAILS AND SPECIFICATION
- APPENDIX 5 – LEGACY RIDGE WATER SYSTEM SCHEMATIC
- APPENDIX 6 – USGS QUADRANGLE MAP
- APPENDIX 7 – PRESSURE REDUCING STATION DETAILS &
SPECIFICATIONS
- APPENDIX 8 – WATER QUALITY DATA

1.0 INTRODUCTION

This report has been prepared by HDR-LMS on behalf of the Project Sponsor for the residential development known as Legacy Ridge at Highland Mills. The report pertains to the water works improvements that are necessary to serve the proposed residential development known as Legacy Ridge. Legacy Ridge is located on both sides of Trout Brook Road (NY County Route 9) between Smith Clove Road and NY County Route 32. The properties are identified on the Town of Woodbury Tax maps as 3-1-11 and 3-1-12.5 in Highland Mills, Orange County, NY. Parcel 3-1-11 is the northernmost parcel and will be utilized for water supply, water storage, parking, and possible water treatment and otherwise to remain as permanent open space to be dedicated to the town. Parcel 3-1-12.5 will be primarily utilized for housing and water storage.

A site map showing Legacy Ridge site boundaries and topography is included in Appendix 6 of this report. The topography on the Legacy Ridge site ranges between approximate elevations 980 and 340. The area to be developed ranges between elevations 810 and 370. The proposed Legacy Ridge development will be serviced with central water provided by the Town of Woodbury Consolidated Water District (WCWD). Improvements must be made to accommodate Legacy Ridge prior to connecting to the WCWD. Such improvements include, but are not necessarily limited to, the following:

- A new, sufficient on-site water storage capacity to meet the projected consumptive uses and fire demands of Legacy Ridge
- A new water source capable of yielding the average daily water demand of Legacy Ridge community
- A new on-site water distribution system designed and constructed in accordance with both state and local regulations and specifications.

The following report identifies the characteristics and requirements of the proposed Legacy Ridge water distribution system and how the improvements will affect the existing WCWD.

2.0 PROJECT DESCRIPTION

The Legacy Ridge water system will serve a 287-unit housing community consisting of four bedroom single-family homes and a community recreation center. The site layout is based on a proposed R-2A with Conservation Cluster Zoning. The proposed Legacy Ridge water system will connect to the existing WCWD and will reduce the existing system's vulnerability by increasing available storage capacity and water supply. A looped system is preferable to help balance the piping network and reduce friction losses.

The Town of Woodbury requires a minimum pressure of 45 psi at street grade under average flow conditions and 20 psi at street grade during fire flow conditions. HDR-LMS will perform a water model analysis in order to determine the sizing of new water mains to meet the required pressures. The topography on the Legacy Ridge site ranges

between elevation 810 and 370, requiring three zones for water distribution. These zones are identified as High, Intermediate, and Low and are designed at a hydraulic grade level of 975.00, 861.25, and 725.00, respectively. Each zone will connect to the WCWD at specific points in the existing system. A description of each zone is included in Section 6.0 of this report.

The existing Skyline and Summit/Overlook portions of the WCWD benefit most from the proposed connections. The Skyline water system is currently pressurized by the Birchwood Water Booster Station located near the Birchwood Ave/Skyline Dr intersection. This booster station draws from the Summit/Overlook system. The 100,000 gallon Skyline Tank located off Summit Drive provides fire storage for the Skyline system located south of the Riegel Rd/Skyline Dr intersection. This portion of the Skyline system is referred to as the Skyline Low Zone. The upper lying area of the Skyline system (north of the Riegel Rd/Skyline Dr intersection) is not fully provided with fire protection due to the lack of pressure provided by the Skyline Tank. This portion of the system is referred to in this report as the Skyline High Zone.

The Summit/Overlook is pressurized by the Addams St well field, Summit Ave Tanks #1 and #2 and the Overlook Tank. This system operates at a maximum hydraulic grade of 725.00 and covers the largest area within the WCWD. The following provides a description of the connection points and how they benefit the existing system. An approximate location of each connection point is shown on Appendix 1 of this report.

Connection Point #1 – The Legacy High Zone (HGL = 975.00) will be extended in the southwest corner of the site to the Skyline Drive High Zone. This will provide the Skyline High Zone with adequate fire protection as well as gravity feed system. The Skyline Low Zone must be disconnected from the Skyline High Zone to avoid an undesirable increase in pressure caused by this connection. The exact location of the water main extension and the location of the connection point to the existing WCWD are yet to be determined.

Connection Point #2 – The Legacy Intermediate Zone will connect directly to the Skyline Drive Tank (HGL = 861.25). This will provide the Legacy Intermediate Zone with the necessary storage for consumptive use. Fire storage will be provided by LR Tank #1. An additional 2,600 L.F. water main extension will be necessary to connect the Skyline Drive Low Zone to the Skyline Tank. This extension is required in order to separate the Skyline High and Low Zones

Connection Point #3 - A proposed water main will be extended from the Legacy Ridge Low Zone to the Summit Avenue system. The water main extension will exit the southeast corner of the Legacy Ridge site and will travel south along N.Y. County Rout 9 and connect to the existing water main along Hamilton Avenue. The water main extension will be pressurized by the proposed LR Tank #2 (overflow elevation 725.00), the Legacy Ridge Supply Wells, and the Summit/Overlook system.

3.0 WATER DEMAND AND SUPPLY REQUIREMENTS

The Legacy Ridge residential development has demand requirements for both consumptive and fire flow usage. Consumptive usage is the day-to-day water usage that can be estimated using the *New York State Department of Environmental Conservation's Design Standards for Wastewater Treatment Works* © 1988. This type of demand is often referred to as the average daily demand (ADD). Water demand for fire flow (a.k.a. emergency) usage is referred to as Needed Fire Flow (NFF) and is calculated using methodology presented in the *Guide For Determination of Needed Fire Flow* © ISO Properties, Inc., 2001.

Water systems are typically designed to provide adequate firm capacity to meet or exceed the maximum daily demand (MDD). "Firm capacity" is defined as the amount of water that can be supplied to a particular water system with the highest yielding well out of service. The Town of Woodbury (Town) has indicated that firm capacity is provided by the existing WCWD and is not a concern for new water supply. Therefore, since firm capacity is achieved elsewhere in the WCWD, MDD is not used to calculate new source requirements. At a minimum, a new water supply source equating to the MDD of Legacy Ridge must be supplied to meet the consumptive usage. The existing WCWD water supply coupled with the new water source must be capable of meeting the MDD of Legacy Ridge with the largest well out of service.

A summary of the Legacy Ridge system water demands and storage requirements are summarized in Table 1. Water demand calculations are provided in Appendix 2 of this report.

Table 1 - Summary of Water System Demands & Storage Requirements	
Average Daily Demand =	97.2 gpm
Maximum Daily Demand =	157.9 gpm
Needed Fire Flow (2-hr duration) =	1000.0 gpm
Total System Demand =	1,157.9 gpm
Minimum Storage Required =	260,000 gallons
Storage Provided =	510,000 gallons

4.0 POTABLE WATER SUPPLY WELLS

Three new groundwater supply wells (TW-01, TW-02 and TW-04), will provide additional source capacity to the WCWD. One additional well (TW-03) was also installed but subsequently abandoned due to elevated turbidity levels. The three wells are located in the northeast portion of the WCWD near the NY County Route 34 (a.k.a. Trout Brook Road) and NY County Route 32 intersection. The new supply wells are completed in the underlying sand and gravel aquifer associated with Woodbury Creek. The three wells were installed between June and November 2005 by Hayward Baker Inc. using a dual rotary drilling rig to minimize the disturbance to the formation and facilitate the

