

---

# Water Distribution System Model Update

December 2012

---

City of Columbia Heights,  
Minnesota

Bolton & Menk Project No. N21.105076

---

REPORT ON WATER DISTRIBUTION SYSTEM MODEL UPDATE

CITY OF COLUMBIA HEIGHTS  
COLUMBIA HEIGHTS, MINNESOTA

DECEMBER 2012

BMI Project No. N21.105076

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Signature: \_\_\_\_\_

Typed or Printed Name: Douglas E Klamerus

Date: December 6, 2012

Lic. No. 40893

BOLTON & MENK, INC.  
CONSULTING ENGINEERS AND LAND SURVEYORS

## TABLE OF CONTENTS

SECTION 1	EXECUTIVE SUMMARY .....	1
SECTION 2	INTRODUCTION .....	2
SECTION 3	EXISTING FACILITIES .....	
	A. Water Sources .....	3
	B. Service Zones .....	3
	C. Pump Stations .....	3
	D. Storage .....	5
	E. Distribution System .....	6
	F. Pressure Reducing Valves (PRVs).....	6
SECTION 4	EXISTING WATER DEMANDS .....	
	A. Peaking Demand Factors .....	7
	B. Water Use Trends .....	7
SECTION 5	ANALYSIS OF EXISTING DISTRIBUTION SYSTEMS .....	
	A. Existing Water Pressures .....	9
	B. Pressure Transients .....	11
	C. Existing Available Fire Flow .....	11
	D. ISO Report Review .....	12
	E. Extended Period Simulations .....	14
	F. Pipe Velocities and Friction Losses .....	14
SECTION 6	PROPOSED WATER SYSTEM IMPROVEMENTS.....	
	A. Pump Stations .....	15
	1. Pump Station No. 2.....	15
	2. Pump Station No. 3.....	15
	B. Storage .....	15
	C. Pressure Zone Modifications .....	15
	1. Do Nothing.....	16
	2. City Installation of Individual PRVs.....	16
	3. Creation of Third Pressure Zone.....	16
	4. Creation of Fourth Pressure Zone .....	16
	D. PRV Station Repairs .....	17
	E. Distribution System Improvements .....	17
	1. Continuation of Water Main Lining Program.....	17
	2. Water Main Improvements .....	17

	F. Interconnection with City of Hilltop.....	18
SECTION 7	ANALYSIS OF PROPOSED WATER SYSTEM IMPROVEMENTS.....	
	A. Proposed Water Pressure .....	20
	B. Proposed Available Fire Flows .....	20
SECTION 8	CONCLUSIONS AND RECOMMENDATIONS .....	23

**LIST OF FIGURES**

<b>Figure Number</b>		<b>Follows Page</b>
3-1	Existing Water Distribution System .....	3
5-1	Existing Average Day Pressure .....	9
5-2	Existing Maximum Day Available Fire Flow.....	12
6-1	Proposed Water Distribution System.....	18
7-1	Proposed Average Day Pressure.....	20
7-2	Proposed Maximum Day Available Fire Flows .....	21

<b>Table Number</b>		<b>Page</b>
2.1	Existing Service Zones .....	2
3.1	Existing Facilities System Pumps.....	5
3.2	Storage .....	5
4.1	Peaking Factors Used for Computer Modeling .....	7
4.2	Average Daily Water Use .....	8
5.1	Recommended Residential Fire Flows .....	12

**APPENDIXES**

- Appendix A Hydrant Flow Test Results
- Appendix B ISP Report
- Appendix C Model Junction and Mode Data

