Engineering Enterprises, Inc.

Comprehensive Water and Wastewater Systems Master Plan - 2014

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COMPREHENSIVE WATER & WASTEWATER SYSTEMS MASTER PLAN - 2014

Village of Huntley, IL

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The development of the Comprehensive Water and Wastewater Systems Master Plan was a joint effort by Village Staff and EEI. The Village of Huntley Village Engineer, Timothy Farrell, P.E., prepared Sections: 1.0 (entire section), 2.0 (entire section), 4.1 (entire section), 5.1, 5.1.1, 5.1.2 (section introduction), 5.1.3, 5.1.4, 6.1 (entire section), 6.2 (entire section) and 6.3 (entire section). EEI staff prepared the remainder of the report.

ABBREVIATIONS	MEANING
ADD	AVERAGE DAY DEMAND
AMCL	ALTERNATIVE MAXIMUM CONTAMINANT LEVEL
AWWA	AMERICAN WATER WORKS ASSOCIATION
BCL	BOTTOM CAPACITY LINE
BMP	BEST MANAGEMENT PRACTICE
BP/PRV	BOOSTER PUMPING / PRESSURE REDUCING VALVE
BPS	BOOSTER PUMP STATION
CCL	CONTAMINANT CANDIDATE LIST
CF	CUBIC FEET
CMAP	CHICAGO METROPOLITAN AGENCY FOR PLANNING
CMAP PLAN	2050: NORTHEASTERN ILLINOIS REGIONAL WATER SUPPLY/DEMAND PLAN
CT	CURRENT TRENDS
DBP	DISINFECTANT/DISINFECTION BYPRODUCT
EWST	ELEVATED WATER STORAGE TANK
FBRR	FILTER BACKWASH RECYCLING RULE
FT	FOOT
GAL	GALLON(S)
GPCPD	GALLONS PER CAPITA PER DAY
GPM	GALLONS PER MINUTE
GST	GROUND STORAGE TANK
GWR	GROUND WATER RULE (2006)
GWS	GROUNDWATER SYSTEM
HE	HIGH EFFICIENCY
HET	HIGH EFFICIENCY TOILET
IDSE	INITIAL DISTRIBUTION SYSTEM EVALUATION
IEPA	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
I/I	INFILTRATION AND INFLOW
IN	INCH(ES)
ISGS	ILLINOIS STATE GEOLOGICAL SURVEY

ISWTER	INTERIM ENHANCED SURFACE WATER TREATMENT RULE
ISWS	ILLINOIS STATE WATER SURVEY
LCR	LEAD AND COPPER RULE (1991)
LRAA	LOCATIONAL RUNNING ANNUAL AVERAGE
LRI	LESS RESOURCE INTENSIVE
LT2SWTR	LONG TERM 2 SURFACE WATER TREATMENT RULE
MCL	MAXIMUM CONTAMINANT LEVEL
MOU	THE CALIFORNIA MEMORANDUM OF UNDERSTANDING
MMM	MULTIMEDIA MITIGATION
MRDLGs	MAXIMUM RESIDUAL DISINFECTANT LEVEL GOALS
MRDLs	MAXIMUM RESIDUAL DISINFECTANT LEVELS
MDD	MAXIMUM DAY DEMAND
MGAL	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MG/L	MILLIGRAMS PER LITER
MHD	MAXIMUM HOUR DEMAND (PEAK HOUR DEMAND)
MRI	MORE RESOURCE INTENSIVE
MSL	MEAN SEA LEVEL
MTBE	METHYL-T-BUTYL ETHER
PCI/L	PICOCURIES PER LITER
PE	POPULATION EQUIVALENT
PPB	PARTS PER BILLION
PPM	PARTS PER MILLION
PSI	POUNDS PER SQUARE INCH
PWS	PUBLIC WATER SUPPLY
RO	REVERSE OSMOSIS
RWSP	REGIONAL WATER SUPPLY PLAN
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SDWA	SAFE DRINKING WATER ACT
SIU	SOUTHERN ILLINOIS UNIVERSITY CARBONDALE
SF	SQUARE FEET
SMCL	SECONDARY MAXIMUM CONTAMINANT LEVEL

STAGE 1 DBPR	STAGE 1 DISINFECTANT/DISINFECTION BYPRODUCTS RULE
STAGE 2 DBPR	STAGE 2 DISINFECTANT/DISINFECTION BYPRODUCTS RULE
TCL	TOP CAPACITY LINE
TCR	TOTAL COLIFORM RULE
TTHM	TOTAL TRIHALOMETHANE
UCM	UNREGULATED CONTAMINANT MONITORING
UCMR	UNREGULATED CONTAMINANT MONITORING RULES
UG/L	MICROGRAMS PER LITER
USEPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
USGS	UNITED STATES GEOLOGICAL SURVEY
VFD	VARIABLE FREQUENCY DRIVE
VILLAGE	VILLAGE OF HUNTLEY
WM	WATER MAIN
WTP	WATER TREATMENT PLANT
WWTF	WASTEWATER TREATMENT FACILITY

EXECUTIVE SUMMARY

The Village of Huntley is a progressive community that is situated on the western edge of the Chicago suburbs. The Village straddles two counties, McHenry County north of Kreutzer Road and Kane County to the south. It is strategically located in Northeastern Illinois being about 50 and 30 miles from Chicago and Rockford, respectively. The Village experienced a tremendous amount of growth starting in the late 90's through the late 2000's. During this timeframe, the Village's Water Works and Wastewater Systems were expanded to accommodate the new growth. While the Village's growth rate has significantly decreased during the downturn in the economy, the economy has recently picked up and an increased level of growth is anticipated in the near future.

Meanwhile, regional population projections suggest Northeastern Illinois (11 county region of Cook, Lake, DuPage, Will, Kane, Kendall, McHenry, Dekalb, Boone, Kankakee and Grundy) may add as many as 4,000,000 new residents to the region by 2050. With this increase in growth, there will be additional demand on the region's water resources. Regional water planning by the Chicago Metropolitan Agency For Planning (CMAP) led Regional Water Supply Planning Group (RWSPG) have quantified the water supply and demand relationship throughout the region, and have concluded water conservation is necessary to provide for a sustainable region.

Given the anticipated growth, the Village Staff and Village Board wisely decided it was an ideal time to reevaluate the long term expansion of the Village's Water Works and Wastewater Systems. Therefore, the Village embarked on completing this Comprehensive Water and Wastewater Systems Master Plan. The main goal of this plan is to provide planning to maintain sustainable cost-efficient Water Works and Wastewater Systems for current and projected water uses. This Master Plan not only evaluates system expansion utilizing business as usual water use trends, referred to as Current Trends (CT) water use demands, but also evaluates the RWSPG's water conservation recommendations to define practical reductions in projected water demands. This report explores the potential of additional water conservation efforts and calculates the capital cost savings these additional efforts can achieve. The future water demands that include water conservation strategies are defined as the Less Resource Intensive (LRI) water use projections. The Master Plan also evaluates system expansion utilizing the LRI projections, and finally identifies the capital cost savings the Village would realize with a further commitment to water conservation.

This report also assesses the condition and capacity of the Village's Wastewater System. It evaluates impending regulatory challenges, and identifies WWTF improvements needed to continue to operate and maintain both WWTFs under current and near future regulations. It also plans out the expansion of the Village's sanitary sewer network throughout the Village's planning area, and develops an implementation plan for the proposed improvements at the WWTFs.

The Comprehensive Water Master Plan is divided into ten (10) sections. A summary of each of the sections follows.

Introduction

The current Village corporate limits encompass about 14.13 square miles while the planning area outside of the corporate boundary adds another 20.09 square miles of land for a total of 34.22 square miles of land within the study area. The Village offers many opportunities for growth with a significant amount of undeveloped land in the northern and southern portions of the study area and infill growth within the existing Village limits. These areas will one day provide homes to new Village residents, as well as, contribute to the local economy with new commercial, industrial and institutional land uses. Based on the 2010 US Census, the Village's population was estimated to be 24,291. The Village has established the year 2040 for the limits of this planning report. CMAP estimates the Village of Huntley population at 58,997 people by 2040, which is consistent with the historical long term growth patterns in the Village and the amount of open space available for development.

Existing Water Works System

The Village of Huntley first installed a public water supply in 1903. For many years, the Village utilized shallow sand and gravel water wells as the source of supply. In 1994, the Village drilled its first deep well and by 1999, the Village was wholly dependent on the deep sandstone aquifer as its source of supply. The Village currently operates five (5) deep wells (Wells No. 7 – 11) that are tributary to their five (5) individual water treatment plants.

While the water quality withdrawn from the deep sandstone wells is fairly good, all of the wells exceed the Maximum Contaminant Limit (MCL) of 2.0 mg/l for barium and 5.0 pCi/l for combined radium. The Village utilizes cation exchange treatment at all of the water treatment plants to reduce the effluent barium and combined radium levels below their respective MCLs. The cation exchange water treatment process also softens the water. In addition to the cation exchange treatment process, the Well No. 9 Water Treatment Plant (WTP) includes an aeration and detention treatment step to reduce the hydrogen sulfide levels within the raw water.

The Village's Water Works System contains five (5) Elevated Water Storage Tanks (EWSTs) and two detention tanks at two of the WTPs. The total combined water storage within the Village is 3.32 MG. The Village's water main network consists of approximately 143 miles of 4" to 16" pipe and operates as one pressure zone. The Village utilizes a Supervisory Control and Data Acquisition (SCADA) system to monitor the supply, treatment, storage and distribution components of the Water Works System. With Staff's continual focus on system maintenance, the Water Works System components are currently in good condition.

Existing Wastewater System

The Village's Wastewater System includes sanitary sewer pipes ranging in size from 8" to 36", fourteen (14) lift stations and two Wastewater Treatment Facilities (WWTF). While portions of the sanitary sewer network are more than 60 years old, Village staff has reported the sanitary sewer network is in good condition. The Village follows through on an annual sanitary sewer system maintenance program, which includes jetting, root cutting and televising portions of the system each year. The Village also has lined a good portion of the old vitrified clay pipe (VCP) sewers. All of the lift stations are in good condition. Half of the lift stations have onsite backup electrical generators, whereas the other half have portable generator connection capabilities.

The Village's East WWTF was originally constructed in 1950. Major improvements to the facility were completed in 1960, 1977, 1988, 2000 and 2002. The 2002 improvements expanded the WWTF to its current Design Average Flow (DAF) capacity of 1.8 MGD. The Design Maximum Flow (DMF) capacity of the facility is 4.5 MGD. The East WWTF treatment train consists of fine screens, oxidation ditches, secondary clarification and ultraviolet disinfection. Alum is currently fed within the treatment train to aid in the removal of barium from the liquid phase stream to meet the pertinent water quality standard. The biosolids treatment train consists of aerobic digestion and mechanical dewatering with the use of a belt filter press. The facility also has a gravity sludge thickener tank, which is currently not in service.

The East WWTF discharges to the Huntley Branch of the Kishwaukee River. Its effluent limitations, as outlined in its NPDES permit, are consistent with other Kishwaukee River Watershed WWTFs. While it currently does not have an effluent limitation for Total Phosphorus, it is presumed one will be added during the next permit cycle. The East WWTF is well run and is generally in very good condition. Some components of the plant require rehabilitation, but given its current and future service area no additional expansion of the East WWTF is anticipated.

The Village's West WWTF was originally constructed in 1998. With an expansion in 2001 and then another expansion in 2006, the total DAF and DMF capacities of the current facility are 2.6 & 6.5 MGD, respectively. The West WWTF treatment train consists of screening, oxidation ditches, secondary clarification, filtration and ultraviolet disinfection. Alum is currently fed within the treatment train to aid in the removal of barium and phosphorus from the liquid phase stream to meet the pertinent water quality standard. The biosolids treatment train consists of thickening with gravity belt thickeners, aerobic digestion, and mechanical dewatering with the use of a belt filter press.

The West WWTF discharges to the South Branch of the Kiswaukee River. Its effluent limitations are similar to the East WWTF, but the West WWTF already has a Total Phosphorus effluent limitation. The West WWTF is well run and also is in very good condition. Due to the fact that the oldest components are only 15 years old, there is a limited amount of rehabilitation needed at this plant. However, there are a few improvements that will aid the efficient long term operation of the facility. Based on the current and future tributary areas to the West WWTF, it is likely this facility will need to be expanded at some point during the planning period.

Both the East and West WWTFs utilize SCADA systems to monitor the operations of the facilities.

Historical Water Use and Wastewater Flows

The Village's water use from 2009 – 2013 was reviewed to identify recent water use trends for the Water Works System. The water supply and storage systems were assessed for adequacy using evaluation parameters that rate the strength of the supply and storage components. The evaluation concluded that the water supply test parameters were positive in lower water use years and negative in higher water use years. The capacity of the current water supply and treatment resources within the system generally meet the current demands on the system. The *Peak Hour Storage* test parameter indicates the storage capacity of the system is at its limit currently, as well. However, increases in demand on the system will undoubtedly require additional water supply, treatment and storage additions.

The 2009 – 2013 water use data was input into the AWWA water audit program. The results of the analysis indicate the Village's total water loss averaged about 17% for the time period. The amount of water lost equates to over $200,000 annually in monetized costs. Minimizing this lost revenue should be an incentive for continued water loss reduction.

Total Wastewater System flows and flows at each of the two WWTF's were analyzed for 2009 – 2013. The total sanitary sewer flows are well below the current total wastewater treatment capacity. The historical flows to each of the individual facilities were well below the current capacity of each facility, as well. The current total average daily wastewater flow within the sanitary sewer network is approximately 2.02 MGD, which is approximately 46% of the total DAF capacity of the two WWTF's. The infiltration and inflow within the sanitary sewer network is relatively low and wet weather flows at the WWTFs are manageable.

The East WWTF met all of the plant's effluent limits during the time period analyzed with the exception of a few barium limit excursions in 2010, 2011 and 2012. However, there were no excursions in 2013. The West WWTF met all of its effluent limitations for the five year period analyzed.

Projected Water Use and Wastewater Flows

The average 2009 – 2013 water use for the Village calculated to be 90 gpcd with an average maximum day to average day ratio of 2.16. A Current Trends (CT) water use projection was developed by applying these parameters to incremental population equivalent (P.E.) increases up to the 2040 population projection of 58,997 (+33,551 P.E.). The needs assessment calculations determined the CT water supply and treatment deficit in 2040 would be approximately 7,300 gpm and the storage deficit would be 4.3 MG in 2040.

The Village does have the potential of reducing that deficit, though. In an effort to define a reasonable Less Resource Intensive (LRI) demand scenario for the Village, a systematic process was used to efficiently review available information, select relevant water conservation strategies, and calculate estimated savings. Following a review of the 13 water conservation measures recommended by the RWSPG and then a quantification of the amount of demand reduction applicable programs could reasonably provide for the Village of Huntley, it was determined the projected water use per capita per day could be reduced by 15% to 76.5 gpcd under the LRI demand projection. Utilizing the 76.5 gpcd, and Maximum Day Demand to Average Day Demand ratio (MDD:ADD) and Maximum Hour Demand to Maximum Day Demand ratio (MHD:MDD) of 1.75 and 2.0, respectively, the 2040 LRI projected water demands were developed.

The evaluation concluded that while the *Reliable Source Capacity and Peak Hour Storage* needs assessment parameters continue to fail with additional P.E. increases, the water supply deficit is cut about in half to 3,700 gpm under the LRI scenario. The water storage capacity deficit is reduced to 2.0 MG, which is less than half of the CT value.

As part of the LRI water use projection evaluation, the Village's water use for outdoor use (i.e. irrigation) was defined. It was determined 22%, on average, of the Village's annual water use is for outdoor water use. While this percentage is below the National Average (recall irrigation only occurs 6 – 7 months out of the year in Illinois, whereas, many other portions of the nation it could occur all year long), it is well above most Northeastern Illinois communities. For reference, the City of Elgin's outdoor water use was recently calculated to be 10% of their total water supply, and the Village of Algonquin's outdoor water use was 6% of its total water pumped. It has been estimated approximately 50% of the water used for irrigation is wasted due to inefficient irrigation practices (i.e. over irrigation, distribution of irrigation water onto impervious surfaces, etc.). If 50% of the 50% of the irrigation water that is wasted is no longer wasted, the Village of Huntley residents would save 107,675,000 gallons of water per year in 2040, which is just under the typical water use of 3,000 people in a year.

Regulatory Review

A comprehensive review of the existing and future regulations was conducted to determine the current and future regulatory status of the Water Works System. The Village of Huntley's Water Works System is meeting all existing and near future regulations, and current system operation would meet the future regulations currently being contemplated.

A comprehensive review of the existing and future regulations also was conducted on the Wastewater System. Given the federal, state and local focuses on nutrient reduction, it seems likely the East WWTF will receive a Total Phosphorus effluent limitation during the next permit cycle. In addition to the effluent limitation, it is likely special conditions will be added that require additional nutrient removal evaluation.

Based on recent communication with the IEPA, it is our understanding the agency is applying Capacity, Management, Operation and Maintenance (CMOM) requirements on all major WWTFs at their next permit cycle. While the Village's sanitary sewer network is in relatively good shape and has minimal I&I, it seems likely the Village will need to prepare a CMOM plan in the near future.

Sustainable Source Water Assessment

The three sources of water supply available to the Village were analyzed for their long term sustainability potential. Through the use of the recent Illinois State Geological Survey (ISGS) and Illinois State Water Survey's (ISWS) regional and countywide water resources work, it was determined the most viable shallow sand and gravel aquifer in the Huntley area is within the Ashmore formation. The predicted Ashmore formation thickness, based on existing water well logs, was mapped throughout the Village's planning area. While there are some areas of moderate Ashmore formation thickness on the eastern fringe of the Village's planning area, there are already existing municipal wells in the vicinity. Given the existing withdrawals within the eastern portion of the Village's planning area, additional withdrawal from the aquifer could negatively impact the long term sustainability of the aquifer within this portion of the aquifer.

On the other hand, there are some relatively deep sand and gravel deposits on the northwest edge of the Village's planning area which appear to have a limited amount of wells withdrawing water from it. However, given the location of these deposits and the amount of investment that would be needed to integrate a shallow sand and gravel well into the Water Works System from the far northwest reaches of the study area, it was concluded new shallow sand and gravel water wells are not cost effective for this planning reports planning period. If at some point in the future growth in the northwest quadrant of the Village extends toward the intersection of Menshing and Hemmingsen Roads, the Village should reconsider the cost-effectiveness of integrating a shallow sand and gravel well into the Village's supply portfolio. Along with an appropriate level of treatment, the finished water quality of a water treatment plant utilizing a shallow well as the source of supply can be very close to the same as the Village's current deep well fed water treatment plants.

Regional modeling of the deep sandstone aquifer indicates its long term sustainability could be an issue in parts of Northeastern Illinois by 2050. As part of this planning effort, multiple groundwater withdrawal and future Village of Huntley well configurations were evaluated through the use of the ISWS regional deep sandstone water model. While all scenarios showed some level of water level decline in the regional aquifer in the Huntley area, the modeling effort determined the capacity of the deep sandstone aquifer will be sufficient to meet the Village's water supply needs through 2040 and beyond. That being said, increased efficiency in water use, such as through water conservation and reduced water loss within the water main network, will prolong the sustainability of the deep sandstone aquifer further into the future. The Village should extend the deep aquifer's local sustainability as long as possible because the alternatives for other sources of water supply are considerably more expensive.

A Lake Michigan water interconnection may potentially become available from the Northwest Suburban Municipal Joint Action Water Agency (NSMJAWA). However, the charter members own all of the allocation and obtaining an allowance from one or more members would likely be an obstacle. Also, the extent of the capital improvements necessary to extend the service to Huntley make the Lake Michigan interconnection cost prohibitive for the Village of Huntley at this time.

For the basis of this report and for the 2040 planning period, continued use of the deep sandstone aquifer will be sustainable for the Village's immediate and long term water supply plan.

Water Works System Evaluation and Recommendations

In order to correct the *Reliable Source Capacity* and *Peak Hour Storage Capacity* deficit for the projected CT and LRI water use scenarios, sustainable sources of water supply and treatment and additional storage will need to be integrated into the Water Works System. The recommended improvements will meet the projected water supply and treatment needs and provide sufficient water storage volume to continue to provide safe and adequate water to the Village of Huntley given both CT and LRI demand scenarios. The recommendations are broken down into supply and treatment, storage and distribution. Under the CT demand scenario, the following improvements are recommended:

- *CT Supply & Treatment:*
  - Well No. 12 and Well No. 12 WTP — $6,892,000
  - Well No. 13 and Well No. 13 WTP — $6,942,000
  - Well No. 14 and Well No. 14 WTP (Building Sized For Well No. 17 Future Connection) — $7,310,000
  - Well No. 15 and Well No. 15 WTP (Building Sized For Well No. 19 Future Connection) — $7,147,000
  - Well No. 16 and Well No. 16 WTP — $6,881,000
  - Well No. 17 and Wells No. 14 & 17 WTP Expansion — $5,822,000
  - Well No. 18 and Wells No. 11 & 18 WTP Expansion — $6,100,000
  - Well No. 19 and Wells No. 15 & 19 WTP Expansion — $5,659,000
- *CT Storage:*
  - EWST No. 6 (1.50 MG) — $4,640,000
  - EWST No. 7 (1.25 MG) — $4,047,000
  - EWST No. 8 (1.00 MG) — $3,456,000
  - EWST No. 9 (1.00 MG) — $3,456,000
- *CT Distribution:*
  - Extend large diameter water main network in accordance with the recommended Master Plan
  - Replace small diameter water mains with a minimum of 8" water main (i.e. replace 4" water main with 8" water main) at the end of the small diameter water main's useful life

With the reduction in water demands for the LRI scenario, the planning period system needs decrease. The changes to the recommended improvements with a future water demand that is consistent with the LRI projections are as follows:

- *LRI Supply & Treatment:*
  - Well No. 12 and Well No. 12 WTP $6,892,000
  - Well No. 13 and Well No. 13 WTP $6,942,000
  - Well No. 14 and Well No. 14 WTP $6,892,000
  - Well No. 15 and Well No. 15 WTP $6,731,000
- *LRI Storage:*
  - EWST No. 6 (1.50 MG) $4,640,000
  - EWST No. 7 (1.00 MG) $3,456,000
- *LRI Distribution:*
  - Extend large diameter water main network in accordance with the recommended Master Plan
  - Replace small diameter water mains with a minimum of 8" water main (i.e. replace 4" water main with 8" water main) at the end of the small diameter water main's useful life

Exhibits summarizing the Water Works System Master Plan for both the CT and LRI scenarios were developed. The projected capital investment for the supply and treatment and storage improvements to meet the CT water demand scenario were calculated to be $52,753,000 and $15,599,000, respectively. The total projected capital investment to meet the CT demands would be $68,352,000. With the reduction in the required improvements to meet the LRI demand scenario, the total cost of the improvements for the planning period reduces to $35,553,000, which is nearly a $32,800,000 reduction.

Although both population and approximate timeframes for improvements were provided as part of the Master Plan Phasing and Implementation Plans, it will ultimately be the water demands on the system that dictate when and what improvements will need to be constructed. As the Village continues to mature, expand, and practice water conservation strategies, the water demands will evolve. It is recommended the Village continuously monitor and evaluate its Water Works System as the Village develops. The staging of these water works improvements is dependent on the construction schedule and financing of the annexed and proposed developments. The Phasing and Implementation Plan must continually be reviewed and should be modified based on the rate of development and where the development is actually occurring.

Wastewater System Evaluation and Recommendations

The topography along with the potential wastewater generation projections of the undeveloped portions of the Village's planning area were reviewed. A proposed wastewater collection plan was developed for the Village's entire planning area. Given the flat topography within the Village's planning area, it would appear the Village will need to add 6 – 8 new lift stations to serve all areas planned for sanitary sewer service. At least one lift station, Lift Station No. 14W (Talamore Reed Road #1) is proposed to be abandoned when a large diameter gravity sewer is extended north of the WWTF toward the railroad tracks. It is possible some of the other three lift stations east of Lift Station 14W also could be abandoned with gravity sanitary sewer extension into those areas. A couple lift station and force main routing options were developed for the southern service area. When development initiates in the southern service area, the Village will need to determine the best short and long term option to service the entire area.

While expansion of the East WWTF is not contemplated in the future, the facility will require some operation and maintenance improvements and regulatory/capacity upgrades, as follows:

East WWTF Operation and Maintenance Improvements

- Replace valves and gates in northwest orbal oxidation ditch → $85,000
- Replace effluent valves in northeast closed loop reactor oxidation ditch → $50,000
- Modify flow splitter box for northwest oxidation ditch compatibility with clarifies 2 and 3 → $55,000
- Upgrade non-potable water system → $145,000
- Upgrade UV system → $320,000
- Demolish gravity sludge thickener tank and add gravity belt thickener within a building → $1,100,000

East WWTF Regulatory/Capacity Improvements

- Remove Secondary Clarifier No. 1 and construct a chemical feed building for Barium and Phosphorus removal → $650,000
- Install Variable Frequency Drives (VFDs) and a control system (w/ DO probes) for the oxidation ditch aerators to improve biological nutrient removal of the facility → $450,000
- Convert existing Sand Filter Building to Chemical Feed Building or Tertiary Disk Filter Building → $900,000
- Replace 12-inch effluent parshall flume with 18-inch flume → $30,000
- Replace influent raw sewage pumps with larger capacity pumps → $200,000
- Install internal recycle on oxidation ditches for Total N removal → $165,000

At some point in the future, development within the West WWTF service area will reach a point where wastewater flows exceed the current capacity of the plant. At that time, or at an appropriate amount of time in anticipation of that occurrence, the West WWTF will need to be expanded. In the meantime, operation and maintenance improvements will be necessary and potential regulatory driven improvements have been planned. A summary of the proposed improvements is as follows:

West WWTF Operation and Maintenance Improvements

- Improve the oxidation ditch drainage efficiency by connecting the drain lines to a raw sewage pump station → $155,000
- Automate the aerobic digester controls → $25,000
- Replace the drain mud valves on Oxidation Ditch Nos. 1 and 2 → $30,000
- Replace existing comminutors/screens with alternative screening approach → $525,000
- Construct new Administration/Laboratory/Garage Building to increase operational efficiencies at the facility → $1,250,000

West WWTF Regulatory/Capacity Improvements

- Add one new 1.5 meter belt filter press for dewatering and replace the existing conveyor liner → $500,000
- Replace motors and add VFD's and control system upgrades on Oxidation Ditch No. 2 → $300,000
- Add two (2) digester tanks and one (1) blower → $420,000
- Double the sludge storage capacity → $175,000
- Add third pump to Raw Sewage Pump Station No. 2 → $45,000
- Add second filter in Sand Filter Building B → $430,000
- Install internal recycle on oxidation ditches for Total N removal → $165,000

A proposed phasing and implementation plan for the proposed improvements also has been provided as part of this report.

Sustainable Water Works System and Wastewater System Planning

The nearly $32,800,000 capital cost difference between the CT and LRI water scenarios clearly demonstrates the financial benefits of a modest reduction in per capita water use through increased water conservation. To that end, this Comprehensive Water and Wastewater Systems Master Plan is a valuable planning tool and stepping stone for the Village's Water Works and Wastewater Systems. The next steps for the Village are to review the existing policies regarding the Village's water conservation strategies and goals, and to develop financing alternatives for the identified improvements. By evaluating water conservation opportunities, the Village will not only show how they continue to be good stewards of our limited resource of water, but the Village also has the potential to significantly reduce the required capital investment in the Water Works System. To be successful from a financial perspective, it also is recommended that the Village review the water rates to determine how revenue will be impacted by a moderate decrease in water consumption resulting from water conservation measures. In addition, we recommend the Village develop a formal emergency action plan to minimize water consumption during critical and/extreme circumstances whether the plan includes voluntary or mandatory actions.

This Master Plan advocates similar goals to those of the regional water supply planning efforts championed by CMAP. The water supply sources of the western portion of Northeastern Illinois know no political boundaries. Their geographic extent is such that their availabilities are dependent on everyone's wise use of the resource. Therefore, we also recommend the Village continue to build strong, collaborative relationships regionally for sustainable water use so the region and the Village of Huntley can extend the capacity of the local water resources for an economically and environmentally sustainable region.

SECTION 1: INTRODUCTION

The Village of Huntley is a progressive community that is situated in suburban Chicago's "Golden Corridor" at the crossroads of Interstate 90 and Illinois Route 47, approximately 50 miles northwest of the Chicago Loop and 30 miles east of Rockford. The Village straddles two counties, McHenry County north of Kreutzer Road and Kane County to the south.

The Village was incorporated in 1851 and has been considered a small town with a rural character throughout its history. Farming was the Village's original primary economic driver and during the first boom years (1850s – 1920s) the Village also prospered from the local dairy industry. Manufacturing emerged in the Village in the 1930s and the mix of agricultural/rural, commercial, light industrial and manufacturing opportunities fostered the Village's steady growth trend until the 1990s. Beginning in the 1990s, western urbanization coincided with the attractive Village amenities that led to a rapid population surge lasting for nearly two decades. With major transportation routes such as Interstate 90 and Illinois Route 47, the Village of Huntley offers families and businesses a rural environment with convenient access to adjacent metropolitan areas. Even with the growth, the Village has managed to preserve and enhance the desired small town character while thriving from new economic development.

While the Village's population has grown significantly over the last two decades, the utility infrastructure has grown proportionately to meet the added demands. In the latter part of the 2000's and early part of the 2010's, the housing market has turned upside down and residential growth in the community went to a near standstill for a moment. With the indicators for development pointing up, Village leadership wisely decided it was an ideal time to reevaluate the asset planning and expansion approach of the Water Works and Wastewater Systems. Therefore, the Village engaged EEI to assist with the completion of this Comprehensive Water and Wastewater Systems Master Plan.

1.1 Purpose

While the population growth for the Village of Huntley and Northeastern Illinois is expected to rebound, the Village has wisely questioned whether future water use would continue at its current trend. With the development of CMAP's Water 2050 plan, the Regional Water Supply Planning Group has concluded the current supply of water within Northeastern Illinois will be unable to meet the regional current trends water use. Therefore, it is imperative that the region place a focus on developing a framework for water supply planning and management including water conservation measures as a means to extend our limited water supply resources.

With the Village of Huntley's sustainability focus, and with the recommendations of Water 2050, the Village decided it would be appropriate to evaluate the expansion of the Water Works and Wastewater Systems under two water demand scenarios. Utilizing water demand terminology from Water 2050, the Current

Trends (CT) water demand scenario will evaluate the expansion of the system under "business as usual" water use patterns. Following a review of potential water conservation programs and establishment of water conservation goals, a Less Resource Intensive (LRI) water demand projection will be created. The system expansion will then be planned under the lower demand projection, as well. Lastly, the capital cost for the improvements needed to expand the system to meet both demand projections will be compared to determine the capital cost savings with the higher water conservation commitment.

In addition to defining the expansion of the Water Works and Wastewater Systems and evaluating the capital cost savings of a focused community wide comprehensive conservation effort, this report also will present findings from a sustainable source water assessment, a regulatory audit review, a current and future pressure zone review and an infiltration and inflow review within the wastewater system. With sustainability at this Master Plan's core, the Village of Huntley will have the roadmap for expanding and operating sustainable Water Works and Wastewater Systems.

1.2 Previous Water Works System Planning Documents

As the growth and water use patterns of the Village have changed, the Village of Huntley has continued to plan for the infrastructure management and expansion of their Water Works System. The most recent Water System Master Plan updates prior to this Master Plan was the 2002 Water System Master Plan and associated update in 2005. In 2007, an Aquifer Water Supply Report was completed and led to the Exploratory Test Hole Program Geotechnical Report for the area southeast of Kreutzer Road and Illinois Route 47 (Par Development site, east of Walmart). A Water System Model was first developed as part of the 2002 Master Plan and was updated in 2008 with a focus on the planning area south of I-90. Where applicable, the findings of these reports and studies are referenced and built upon within the context of this Master Plan.

1.3 Previous Wastewater System Planning Documents

Similar to the Water Works System, the Village kept pace with the rapid development within the community by properly planning for the expansion of their Wastewater System. The most recent Wastewater System planning documents prior to this Master Plan were the 1991 Wastewater Treatment Facilities Plan and associated updates in 1992, 1993 and 1999. A Sanitary Sewer Master Plan was prepared in 2005. Where applicable, the findings of these reports and studies are referenced and built upon within the context of this Master Plan.

1.4 Study Area

The study area for this report along with the Village's and neighboring corporate boundaries are depicted on Exhibit 1-1. The study area aligns with the Village's sanitary sewer service planning boundary, and is consistent with current boundary agreements with adjacent communities, as well. The current Village corporate limits encompass about 14.13 square miles while the planning area outside of the corporate boundary adds another 20.09 square miles for a total of 34.22 square miles within the study area. Exhibit 1-1 also identifies the current Village Facility Planning Area boundary, which encompasses 20.8 square miles.

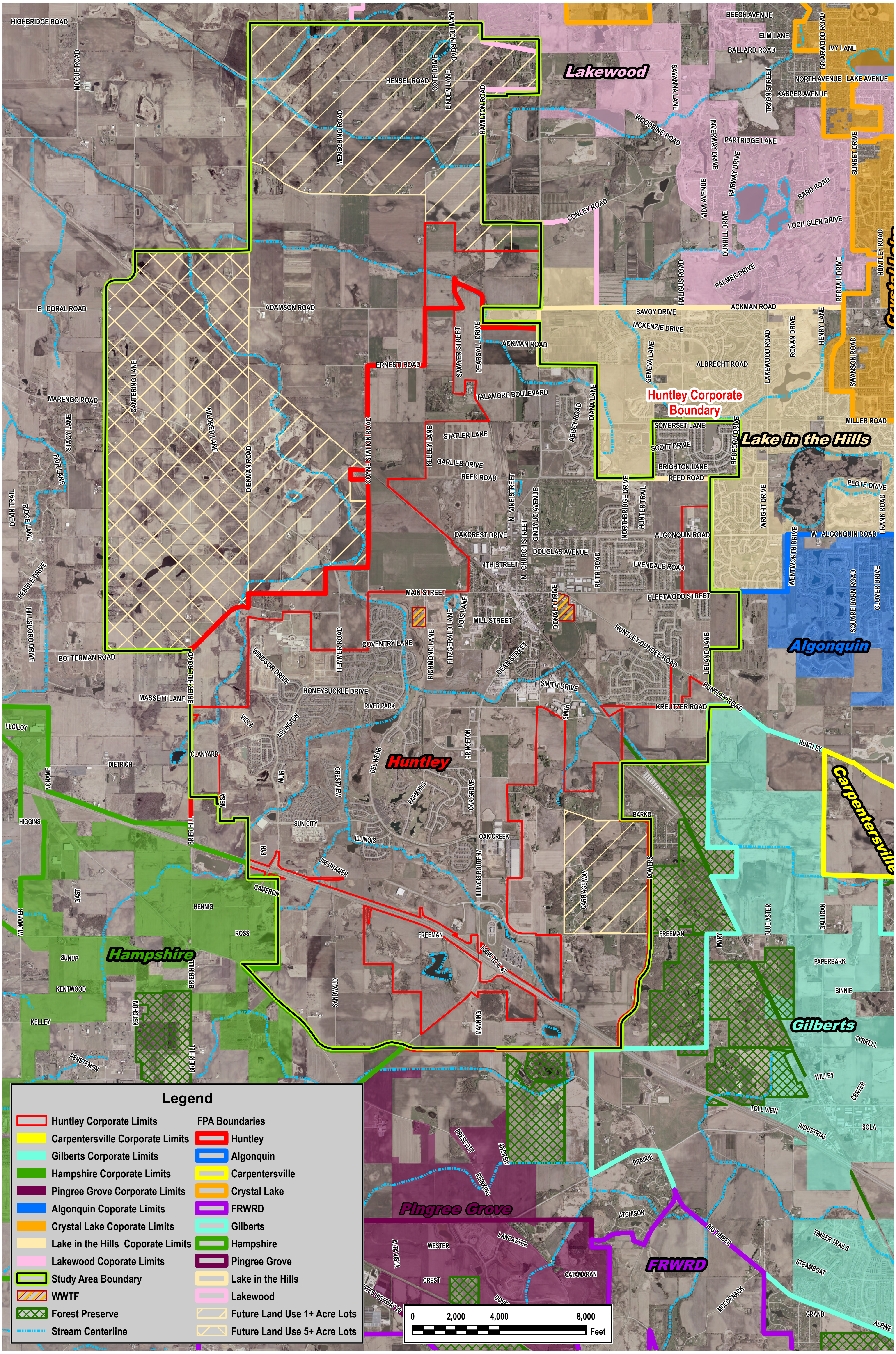
It should be noted the Village has identified approximately 9.92 square miles within the planning area whose ultimate land use would be large lot (i.e. 1+ and 5+ acre lots) residential. Since it is generally not cost effective to serve residential lots of this size with municipal water and wastewater service, it is assumed water and wastewater service to the homes would be provided with individual wells and onsite wastewater management systems.

1.5 Historical Population

Table No. 1-1 provides the Village's population figures from 1970 to 2010. Huntley experienced relatively moderate growth between 1970 and 1990, growing from 1,432 persons in 1970 to 2,453 in 1990. Like many communities located in northeastern Illinois, Huntley grew significantly throughout the 1990's and early 2000's. From 1990 to 2000 the population grew over 133% whereas the decade of 2000 to 2010 saw an expansive growth of 324%. By 2010, the Village's population had grown to just under 25,000 people as identified in the US Census conducted that year.

Table No. 1-1: Historical Population
Village of Huntley, IL

Year	Population	Annual % Increase
1970	1,432	--
1980	1,646	1.40%
1990	2,453	4.07%
2000	5,730	8.85%
2003	12,270	28.89%
2005	16,719	16.73%
2008	23,229	11.59%
2010	24,291	2.26%



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DATE: JULY 2014
PROJECT NO.: HU1401
BY: KKP
PATH: H:\GIS\PUBLIC\HUNTLEY\HU1401
FILE: HU1401_EXH 1-1 STUDY AREA.MXD

COMPREHENSIVE WATER AND WASTEWATER SYSTEMS MASTER PLAN

EXHIBIT 1-1
STUDY AREA

NORTH

1.6 Projected Population

Forecasting future population patterns in a geographic location can be very complex. Economic conditions, social perspectives, governmental influences, environmental factors, and many other circumstances can disrupt population dynamics. A perfect example of a situation that altered the Village's potential population growth pattern occurred just in the last few years. With the rapid growth trends of the 1990's and early 2000's, and the available land remaining to develop within the planning boundary, the Village was preparing for a continued steady population increase. However, with the subsequent downturn in the economy, the situation has changed and now the Village is trying to balance Water Works and Wastewater System planning for a moderate growth rate consistent with current patterns, all the while preparing for a potential upswing in the economy that could attract a massive influx of developers back to the Village. Nevertheless, reasonable population projections should be made utilizing the most current, best available sources of information in order to establish a baseline for determining immediate, near future and long term Water Works and Wastewater System needs.

The Village of Huntley offers many opportunities for population growth with a significant amount of undeveloped land throughout the outer limits of the study area and infill within the existing Village limits. When a municipality in northeastern Illinois is preparing a Master Plan, the basis for population projections is often those published by the Chicago Metropolitan Agency for Planning (CMAP). The best available population projection for the Village of Huntley is approximately 58,997 people for year 2040 based on CMAP's data. Since the planning period for this Master Plan is approximately 25 years to year 2040, CMAP's projections coincide with the planning period of this document. Assuming a constant growth rate from 2010 to 2040, the annual percent increase in population can be estimated at 3.0%. The Village staff concurs with the CMAP population forecasts in that they seem to complement the amount of land in the planning area destined for development and the Village amenities that will attract developers.

The projected population trends are summarized in Table No. 1-2 and graphed with the historical trends in Exhibit 1-2.

Table No. 1-2: Projected Population

Village of Huntley, IL

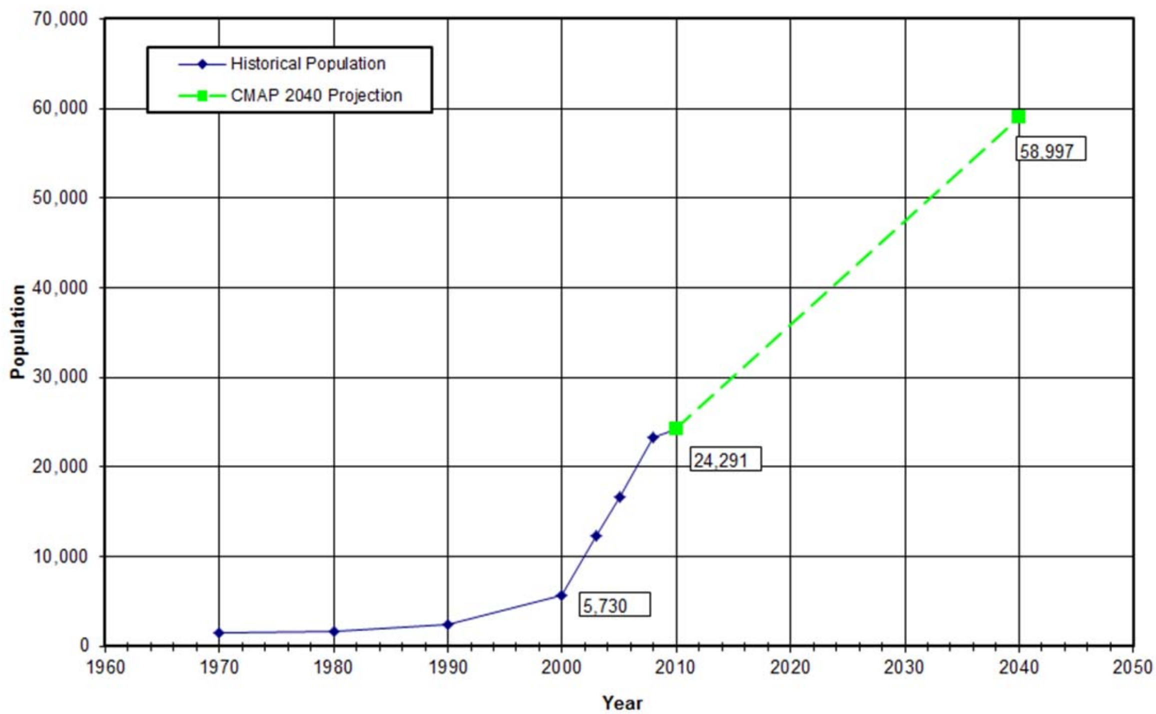
Year	Population	Annual % Increase
2010	24,291	3.00%
2015	28,163	3.00%
2020	32,652	3.00%
2025	37,856	3.00%
2030	43,890	3.00%
2035	50,886	3.00%
2040$^{\Delta}$	58,997	3.00%

Notes:

$^{\Delta}$ CMAP 2040 CMAP population projection.

Exhibit 1-2: Historical and Projected Population Summary

Village of Huntley, IL



SECTION 2: EXISTING WATER WORKS SYSTEM

The Village of Huntley's existing Water Works System can be divided into five main components, namely: 1) supply, 2) treatment, 3) storage, 4) distribution and 5) controls. The condition of all of the Village's Water Works System facilities is excellent. It is obvious Village staff operates and maintains the system with diligence and intelligence. In order to establish a foundation for asset management and system expansion, an inventory of the existing system must first be completed. Following a brief overview of the Village's Water Works System, this section of the report will provide that inventory.

2.1 Overview

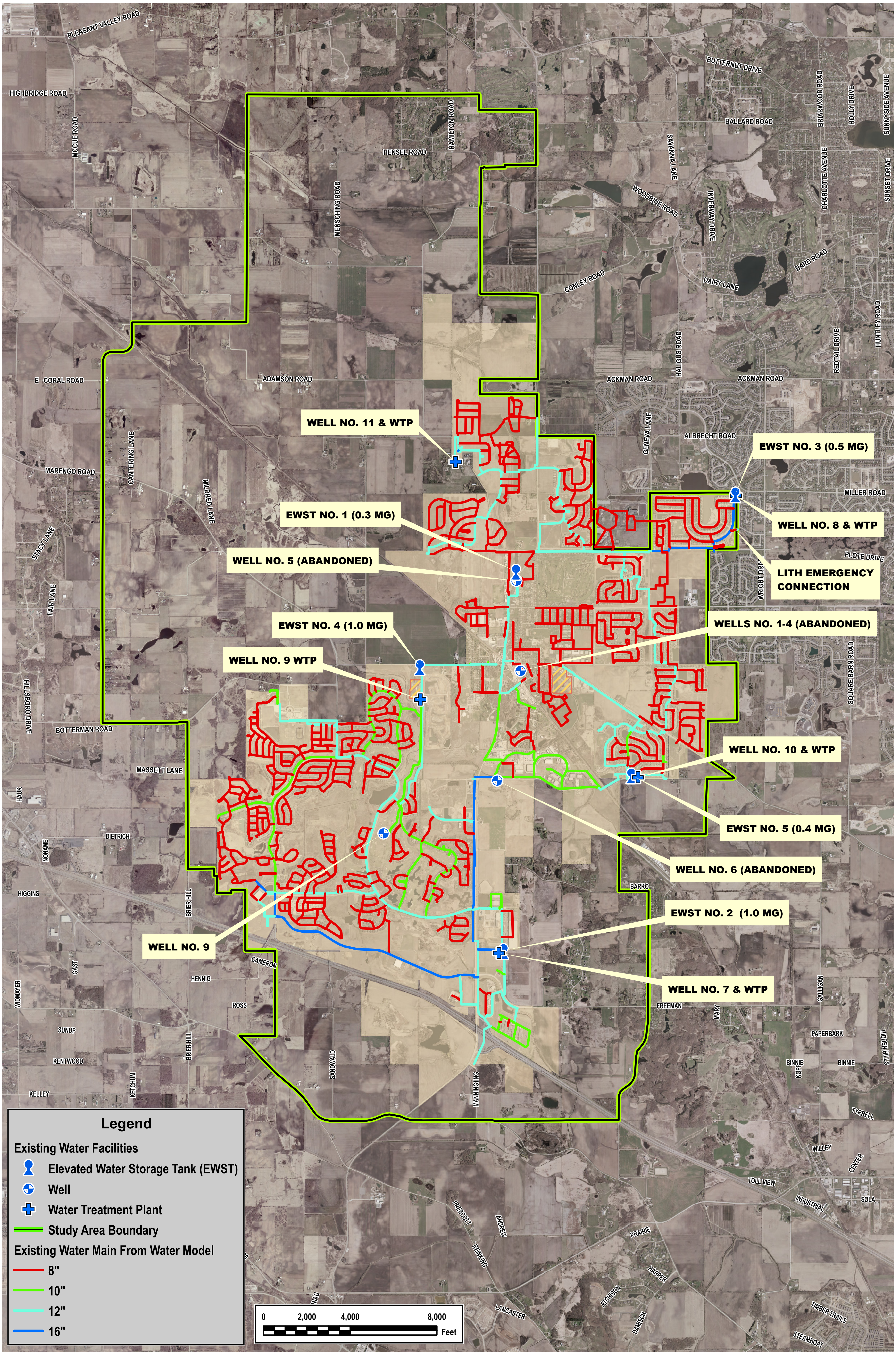
The Village of Huntley first installed a public water supply in 1903 with the completion of a shallow sand and gravel well. The Village expanded its use of the localized sand and gravel aquifer resource and by 1979 had drilled a total of six shallow public water supply wells. Due to the supply limitations and objectionable iron concentrations in the localized shallow sand and gravel deposits, the Village began incorporating high capacity deep wells in 1994 and became completely dependent on deep sandstone aquifers by 1999.

All six (6) shallow wells have been abandoned and as of now, the Village operates and maintains five (5) deep wells that pump groundwater to five (5) water treatment plants that distribute water to over 140 miles of water main and a combined 3.318 million gallons of elevated and ground water storage within one pressure zone. The water system currently serves over 25,000 people within the Village along with a host of other types of government/institution, commercial, and industrial consumers. Exhibit 2-1 illustrates the locations of the Water Works System facilities. A more detailed evaluation of these Water Works System components is presented in the following sections.

2.2 Supply

The Village of Huntley currently utilizes the deep sandstone aquifer as its sole source of water supply. The construction and capacity characteristics of the Village's five (5) deep water wells are summarized in Table No. 2-1 along with a summary of the pumping equipment and maintenance history. The annual well usage from each well as a percentage of the total from 2009 through 2013 is graphically presented in Exhibit 2-2. Review of Exhibit 2-2 highlights the fairly consistent balance of well usage from year to year.

The Village had historically obtained water from the shallow sand and gravel deposits, but abandoned the last shallow well in 1999. The following sections provide detailed descriptions of the Village's former and current sources of water supply.



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DATE:	JULY 2014
PROJECT NO.:	HU1401
BY:	KKP
PATH:	H:\GIS\PUBLIC\HUNTLEY\HU1401
FILE:	HU1401_EXH_2-1_WATER WORKS.MXD

COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 2-1
EXISTING WATER WORKS SYSTEM

NORTH

Table No. 2-1: Existing Water Supply Summary

Village of Huntley, IL

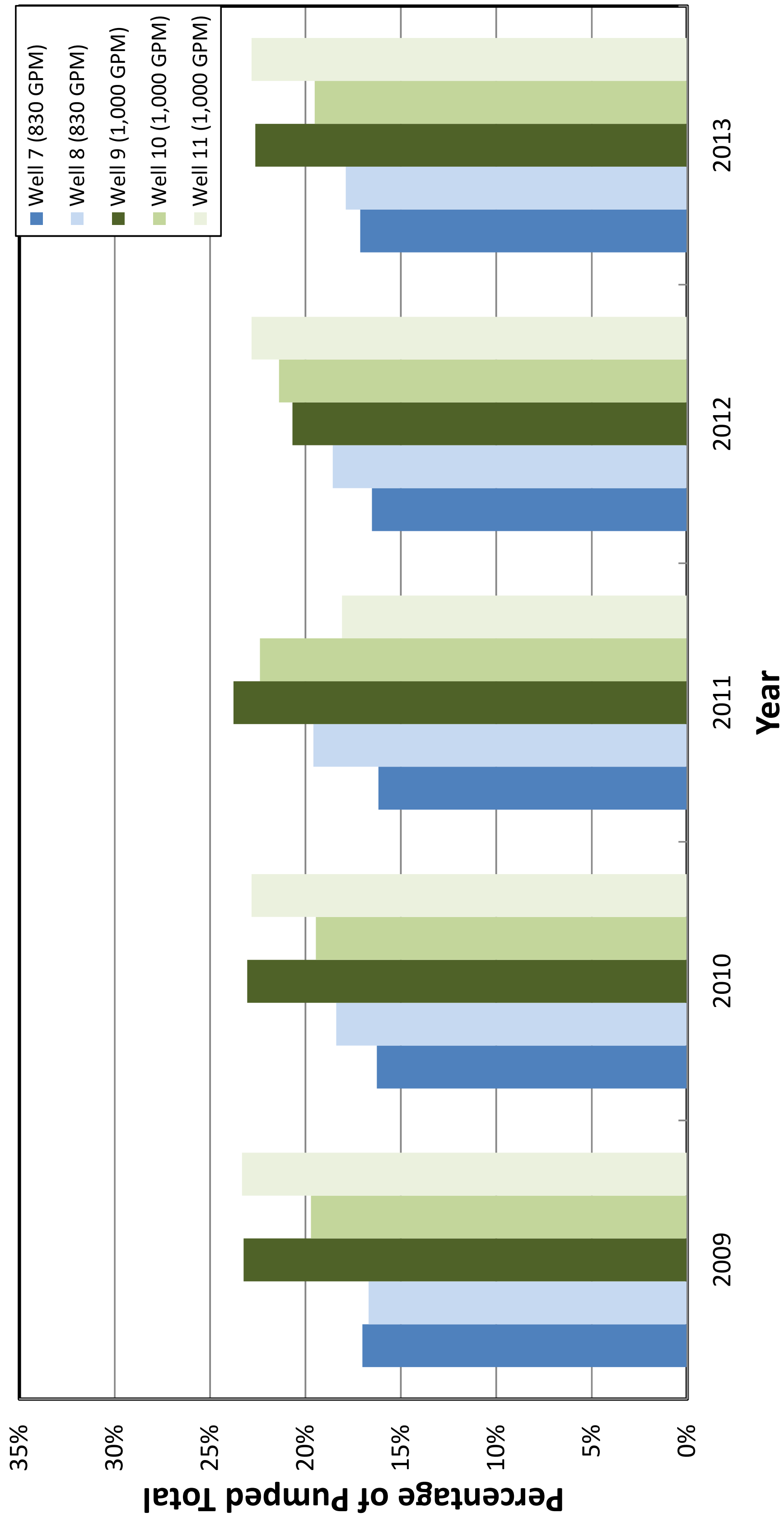
WELL NO.	AQUIFER						DEPTH			EQUIPMENT	DESIGN CONDITION		INSTALLED MANUFACTURER AND TYPE		PUMPING ASSEMBLY CONDITION		COMMENTS
	SG	SL	GP	SP	IG	MS	WELL (FT)	CASING (FT)	SETTING (FT)	INSTALL DATE	FLOW (GPM)	TDH (FT)	PUMP	MOTOR	PUMP	MOTOR	
7					♦		1,268	1,095	698	2011	800	750	FS/BJ 11MQH 13 Stage	FS/BJ 250 HP 14 H 460V	Rebuilt	Maintenance	
									698	2006	800	750	FS/BJ 11MQH 13 Stage	FS/BJ 250 HP 14 H 460V	Rebuilt	Maintenance	Assembly Pulled in 2011 for Preventative Maintenance
									698	1994	800	750	FS/BJ 11MQH 13 Stage	FS/BJ 250 HP 14 H 460V	New	New	Well Drilled and Developed w / Bulk Shooting; Assembly Pulled in 2006 for Preventative Maintenance
8				♦	♦		1,260	665 (Liner at 970-1095)	799	2014	900	865	FS/BJ 11MQH 16 Stage	FS/BJ 250 HP 14 H 460V	Rebuilt	Maintenance	
									806	2008	900	865	FS/BJ 11MQH 16 Stage	FS/BJ 250 HP 14 H 460V	Rebuilt	Maintenance	Assembly Pulled in 2014 for Preventative Maintenance
									789	2006	900	810	FS/BJ 11MQH 15 Stage	FS/BJ 250 HP 14 H 460V	Rebuilt	Maintenance	Assembly Pulled in 2008 for Due to Reduced Performance; Added a Bowl Stage
									705	1997	900	755	FS/BJ 11MQH 14 Stage	FS/BJ 250 HP 14 H 460V	New	New	Assembly Pulled in 2006 for Preventative Maintenance; Added a Bowl Stage
9					♦		1,320	1,100	760	2012	1,000	720	FS/BJ 11MQH 15 Stage	FS/BJ 300 HP 14 H 460V	Rebuilt	Maintenance	
									760	2007	1,000	720	FS/BJ 11MQH 15 Stage	FS/BJ 300 HP 14 H 460V	Rebuilt	Maintenance	Assembly Pulled in February 2012 for Preventative Maintenance
									760	1998	1,000	720	FS/BJ 11MQH 15 Stage	FS/BJ 300 HP 14 H 460V	New	New	Well Drilled and Developed w / Bulk Shooting; Assembly Pulled in 2007 for Preventative Maintenance
10					♦		1,330	1,120	739	2013	1,000	867	Christensen 12 CMC 13 Stage	FS/BJ 300 HP 14 H 460V	New	Maintenance	
									750	2008	1,000	850	FS/BJ 11MQL 17 Stage	FS/BJ 300 HP 14 H 460V	Rebuilt	Maintenance	Assembly Pulled in February 2013 for Preventative Maintenance
									750	1999	1,000	850	FS/BJ 11MQL 17 Stage	FS/BJ 300 HP 14 H 460V	New	New	Well Drilled and Developed w / 2 lb Block Shots; Assembly Pulled in 2008 for Preventative Maintenance
11					♦		1,344	1,140	690	2011	1,000	670	FS/BJ 11MQH 12 Stage	FS/BJ 250 HP 14 H 460V	New	New	
									690	2007	1,000	670	Goulds 12CMC 10 Stage	Hitachi 250 HP 14" 460V	New	New	Well Drilled and Developed w / Double Block Shooting, Bulk Shooting and Pressurizing; Thrust Bearing Failure in 2011
TOTAL FLOW CAPACITY ALL SOURCES:											4,700 GPM						
											6.77 MGD						
TOTAL FIRM CAPACITY:											3,700 GPM						
											5.33 MGD						

Notes:

♦ Aquifer Designations: SG = Sand & Gravel; SL = Silurian Dolomite; GP = Galena-Platteville Dolomite; SP = St. Peter (Ancell) Sandstone; IG = Ironton-Galesville Sandstone; MS = Mt. Simon Sandstone

Exhibit 2-2: Annual Well Usage (2009 – 2013)

Village of Huntley, IL



2.2.1 Shallow Sand and Gravel Wells (Abandoned) –

Wells No. 1, 2, 3 and 4 were all located in the same general vicinity approximately 300 feet south of Main Street and 200 feet west of Church Street at the site of a 65,000 gallon elevated water storage wood tank that was abandoned in 1971 and has since been demolished. Well No. 1, drilled in 1903 to a depth of 74 feet was abandoned and capped in 1947. Well No. 2, also drilled to a depth of 74 feet, was abandoned and capped in 1954 after the completion of Wells No. 3 and 4 in 1953. Wells No. 3 and 4 were drilled to a depth of 74 feet and 63 feet, respectively and are presently abandoned and capped. Well No. 5 was drilled to a depth of 95 feet in 1969 and located at the site of the current elevated water storage tank No. 1, behind the Bakley Shopping Center approximately 1,000 feet north of Algonquin Road and 200 feet east of State Highway 47. Well No. 6 was drilled to a depth of 154 feet in 1979 and located along Kreutzer Road approximately 850 feet east of State Highway 47. Wells No. 5 and 6 are presently abandoned and capped, as well. Treatment for the shallow water supply was limited to chemical addition using chlorine, fluoride and phosphate prior to distribution.

By the mid-1990's, the Village's population was poised for a growth spurt and it was clear that additional sustainable sources of water supply would be required to keep pace with the apparent growth. The localized shallow sand and gravel wells that were resourceful for the Village for nearly a century were strained from a flow capacity perspective and were afflicted by some objectionable water quality due to elevated iron and in some cases, manganese. The time had come to incorporate the high capacity deep groundwater aquifer system into the water supply strategy and by 1999 all of the shallow sand and gravel wells were abandoned and sealed from the system.

When shallow Wells No. 1-6 were drilled, there was limited science and research available to aid in locating a public water supply shallow sand and gravel well. Therefore, these wells were likely located by random exploratory test drilling on available Village property. To further research shallow sand and gravel opportunities and in response to the McHenry County Groundwater Resources Management Plan completed in 2006, the Village began taking the necessary steps to investigate alternative water supplies and championed the completion of the 2007 Aquifer Supply Planning Report. Based on recommendations within the report, the Village proceeded with an exploratory test hole program for the area southeast of Kreutzer Road and Illinois Route 47 (Par Development site, east of Walmart). Based on composite sampling of the exploratory test holes, it was concluded that this site had very minimal potential for locating permeable sand and gravel deposits capable of sustaining a high capacity well and therefore the shallow well initiative stalled.

Recent geologic investigations in both Kane County in 2007 and McHenry County in 2013 have provided reliable representations of the area geology and hydrogeology that can be used for preliminary planning and siting for sustainable shallow sand and gravel wells. Section 7.1.1 further reviews the shallow sand and gravel aquifer system and evaluates its potential as a sustainable water supply source.

2.2.2 Deep Sandstone Wells – As previously stated, the Village constructed its first deep sandstone water well, Well No. 7, in 1994. By 1999, three additional deep wells were installed to keep pace with the growing water demands. In 2007, the newest deep well, Well No. 11 was installed bringing the total to five water wells that draw water from one or more deep sandstone aquifer. The pumping equipment installed in the wells provides water at a rate from 830 to 1,000 gpm, depending on the well. The combined raw water capacity of all of the Village's wells is 4,700 gpm whereas the firm capacity with the largest well out of service is 3,700 GPM.

All of the Village's wells are completed into the Ironton-Galesville formation. Well No. 8 is also open to the Galena-Platteville and Glenwood-St. Peter, sometimes referred to as the Ancell, formations. Schematics for each of the Village's existing water wells are included in Appendix A of this report. Section 7.1.3 reviews the deep aquifer system and evaluates its continued use as a sustainable water supply source.

2.2.3 Well Water Quality – Table 2-2 presents a summary of the quality of the raw water from the Village's active wells. It should be pointed out that the values listed were obtained from the latest available data provided by the Village or obtained from the IEPA Drinking Water Watch website. It is recommended that the Village sample and test the raw water for those wells with results listed from sample collection dates more than a few years old.

The raw water from each well has a moderately high hardness (approximately 234 - 288 mg/L measured as calcium carbonate; $CaCO_3$). Wells No. 7, 9 and 11 have iron concentrations greater than the secondary Maximum Contaminant Level (MCL) of 0.3 mg/l, but below the regulatory primary MCL of 1.0 mg/l. All of the wells have measured barium concentrations greater than the regulatory limit of 2 mg/L and combined radium greater than the regulatory limit of 5 picocuries per liter (pCi/L). The treatment systems used for each of the wells are effective at removing these contaminants from the raw well water.

2.3 Treatment

The Village of Huntley operates five (5) water treatment plants, each assigned to a single well, to provide the community's water treatment needs. All five WTP's employ processes that provide drinking water that meets or exceeds federal and state drinking water quality standards. Cation exchange is used at every facility to remove barium, radium, hardness and to a certain degree, iron from the connected deep well. Well No. 9 WTP also uses air stripping to remove hydrogen sulfide and iron impurities.

Table No. 2-2: Well Water Quality Summary

Village of Huntley, IL

Well No.	Bedrock Aquifer* SG	SL	GP	SP	IG	MS	Alkalinity (mg/l as $CaCO_3$)	Hardness (mg/l as $CaCO_3$)	Ca (mg/l)	Mg (mg/l)	pH	SO_4^{2-} (mg/l)	TDS (mg/l)	Na (mg/l)	Cl (mg/l)	Ba (mg/l)	Fl (mg/l)	Fe (mg/l)	Mn (mg/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Comb. Ra (pCi/l)	Comments
Primary MCL							N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	4	1	0.15	N/A	N/A	5	
Secondary MCL							N/A	N/A	N/A	N/A	6.5-8.5	250	500	N/A	250	2	2	0.3	0.05	N/A	N/A	5	
7					X		282	234	62	19	7.3	10.0	272	8.5	5.0	6.8	0.38	0.45	0.01	6.9	8.8	15.7	Data From Engineer's Design Summary; Rads from Pace 4/3/14 Sample
8				X	X		304	254	57	27	7.0	0.6	299	14.8	1.9	3.3	0.46	0.11	< 0.01	NR	NR	7.3	Data From ISWS & NET 7/29/97 Sample; Rads From NET 3/10/98 Sample
9					X		290	256	50	32	7.6	< 5.0	287	10.0	< 5.0	5.7	0.38	0.84	0.01	14.8	8.9	23.7	Data From NET 8/8/98 Sample; Rads From Midwest Laboratory 1/23/08 Sample
10					X		270	245	53	28	6.7	10.1	278	11.2	ND	4.3	0.38	0.21	ND	11.7	6.4	18.1	Data From IEPA Laboratory 8/5/09 Sample; Rads from Pace 4/3/14 Sample
11					X		290	288	61	33	7.8	< 5.0	251	9.7	< 2.0	3.8	0.40	0.34	0.01	11.2	6.0	17.2	Data From First Environmental 2/1/07 Sample

Notes:

*Aquifer Designations: SG = Sand & Gravel; SL = Silurian Dolomite; GP = Galena-Platteville Dolomite; SP = St. Peter (Ancell) Sandstone; IG = Ironton-Galesville Sandstone; MS = Mt. Simon Sandstone

Ca = Calcium; Mg = Magnesium; SO_4^{2-} = Sulfate; TDS = Total Dissolved Solids; Na = Sodium; Cl = Chloride; NH_3 = Ammonia; As = Arsenic; Ba = Barium; Fl = Fluoride; Fe = Iron; Mn = Manganese; Ra-### = Radium; Comb. Ra = Combined Radium 226 & 228;

NR = No Record Found; ND = Non Detect

Highlighted value indicates raw water concentration exceeds Primary MCL for parameter. In all cases, treatment is in place to reduce concentration below the MCL. Routine monitoring is required.

Highlighted value indicates raw water concentration exceeds Secondary MCL for parameter. In some cases, treatment is in place to reduce concentration below the MCL. Routine monitoring is recommended.

Highlighted value indicates raw water concentration for parameter that may be approaching Primary or Secondary MCL or may cause water quality issues. Routine monitoring is recommended.

2.3.1 Well No. 7 Water Treatment Plant (WTP) – The Well No. 7 WTP was originally constructed in 1993 to provide chemical treatment on water drawn from deep Well No. 7. Chemical treatment includes disinfection with chlorine gas, blended phosphates for corrosion control and hydrofluosilicic acid for fluoridation. In 1996 the treatment process was expanded to include three (3) vertical cation exchange vessels. Regeneration water from the cation exchange vessels is captured in the below slab concrete backwash holding tank and then pumped into the sanitary sewer system. Emergency power consists of a 600 kW auto-start diesel generator that can operate Well No. 7 and all process equipment at the WTP. Exhibit 2-3 presents a flow diagram depicting Well No. 7 WTP unit processes. Table No. 2-3 provides summary information on Well No. 7 WTP unit processes.

An inventory and audit of each process identified some potential deficiencies or asset management elements that should be considered for the planning period.

- The cation exchange resin was last changed in 2008 after 12 years of service. Another resin change should be programmed after another 12 years of service in 2020;
- The chemical feed scales and readers are reaching their service life and should be considered for replacement;
- Staff has indicated a desire to replace the existing centrifugal brine pump with a positive displacement hose pump.

Exhibit 2-3: Well No. 7 Water Treatment Plant – TP 04 Process Flow Diagram

Village of Huntley, IL

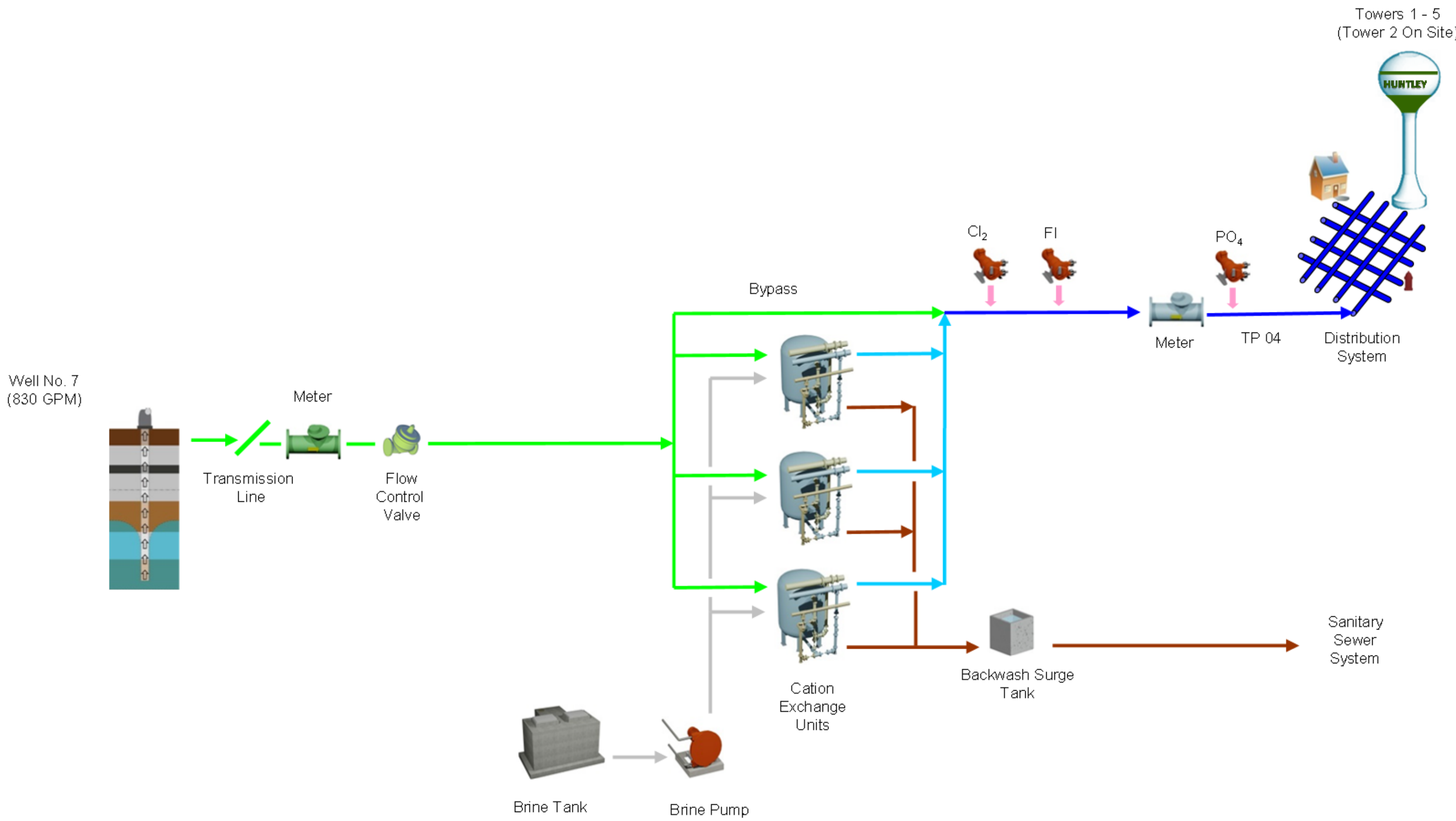


Table No. 2-3: Well No. 7 Water Treatment Plant Unit Process Summary

Village of Huntley, IL

Treatment Application Point No.	Process Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate *	Design Capacity	Comments and Recommendations
Well No. 7 Water Treatment Plant - 13550 IL Route 47										
TP 04 - Supply Well No. 7	Cation Exchange (CE)	3 Vertical Pressure Vessels - 12" Gravel, 51" (211 cf) CE Resin	1996	18	2008 - Resin Change	Good	8' Dia x 8' Sidewall Height Each	Surface Loading Rate: 4.3 GPM/SF @ 900 GPM	6.5 GPM/SF Max	Softening, Radium and Barium Removal; Program resin change out in 2020
	Backwash Holding Tank	Concrete Structure Below Treatment Room Floor	1996	18	UN	Good	UN	N/A	N/A	2 ABS centrifugal backwash pumps 524 GPM @ 22.3' TDH; 4HP; Backwash not metered
	Brine Pump	March Centrifugal Brine Feed Pump	1996	18	UN	Good	82 GPM @ 85' TDH; 2 HP	N/A	82 GPM	
	Chlorine Gas Disinfection	Chemical Feed Equipment	1993	21	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added before entering distribution system; Consider new scale
	Hydrofluosilicic Acid	Chemical Feed Equipment	1993	21	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1 GPH @ 110 PSI	N/A	N/A	Added before entering distribution system; Consider new scale
	Phosphate	Chemical Feed Equipment	1993	21	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1 GPH @ 110 PSI	N/A	N/A	Ortho/Poly blend For corrosion control and sequestering; Added before entering distribution system; Consider new scale
	Controls	AB PLC & OIT	UN	UN	2014	Good	N/A	N/A	N/A	1 Main PLC and 1 Softener PLC; New OIT's in 2014
	Emergency Electrical Supply	Diesel Generator	1993	21	Indeterminate	Good	600 kW w/ Autotransfer Switch	N/A	N/A	Located outside at WTP No. 7 site and operates Well No. 7 and WTP No. 7

Notes:

Design Loading Rates are per IEPA standards and/or published water treatment plant design manuals.

Highlighted cell indicates process has some deficiency or recommended improvements based on audit

2.3.2 Well No. 8 Water Treatment Plant (WTP) – The Well No. 8 WTP was constructed in 1997 to treat water from deep Well No. 8. The process treatment train consists of three (3) vertical cation exchange vessels. Chemical treatment includes disinfection with chlorine gas, blended phosphates for corrosion control and hydrofluosilicic acid for fluoridation. Regeneration water from the cation exchange vessels is captured in the below slab concrete backwash holding tank and then pumped into the sanitary sewer system that flows to the Lake-In-The-Hills Sanitary District. Emergency power consists of a 500 kW auto-start diesel generator that can operate Well No. 8 and all process equipment at the WTP. Exhibit 2-4 presents a flow diagram depicting Well No. 8 WTP unit processes. Table No. 2-4 provides summary information on Well No. 8 WTP unit processes.

An inventory and audit of each process identified some potential deficiencies or asset management elements that should be considered for the planning period.

- The cation exchange resin has not been changed in the WTP 17 year operation. The resin should be programmed for a change in 2015 or 2016;
- The chemical feed scales and readers are reaching their service life and should be considered for replacement;
- Staff has indicated a desire to replace the existing centrifugal brine pump with a positive displacement hose pump.

Exhibit 2-4: Well No. 8 Water Treatment Plant – TP 05 Process Flow Diagram

Village of Huntley, IL

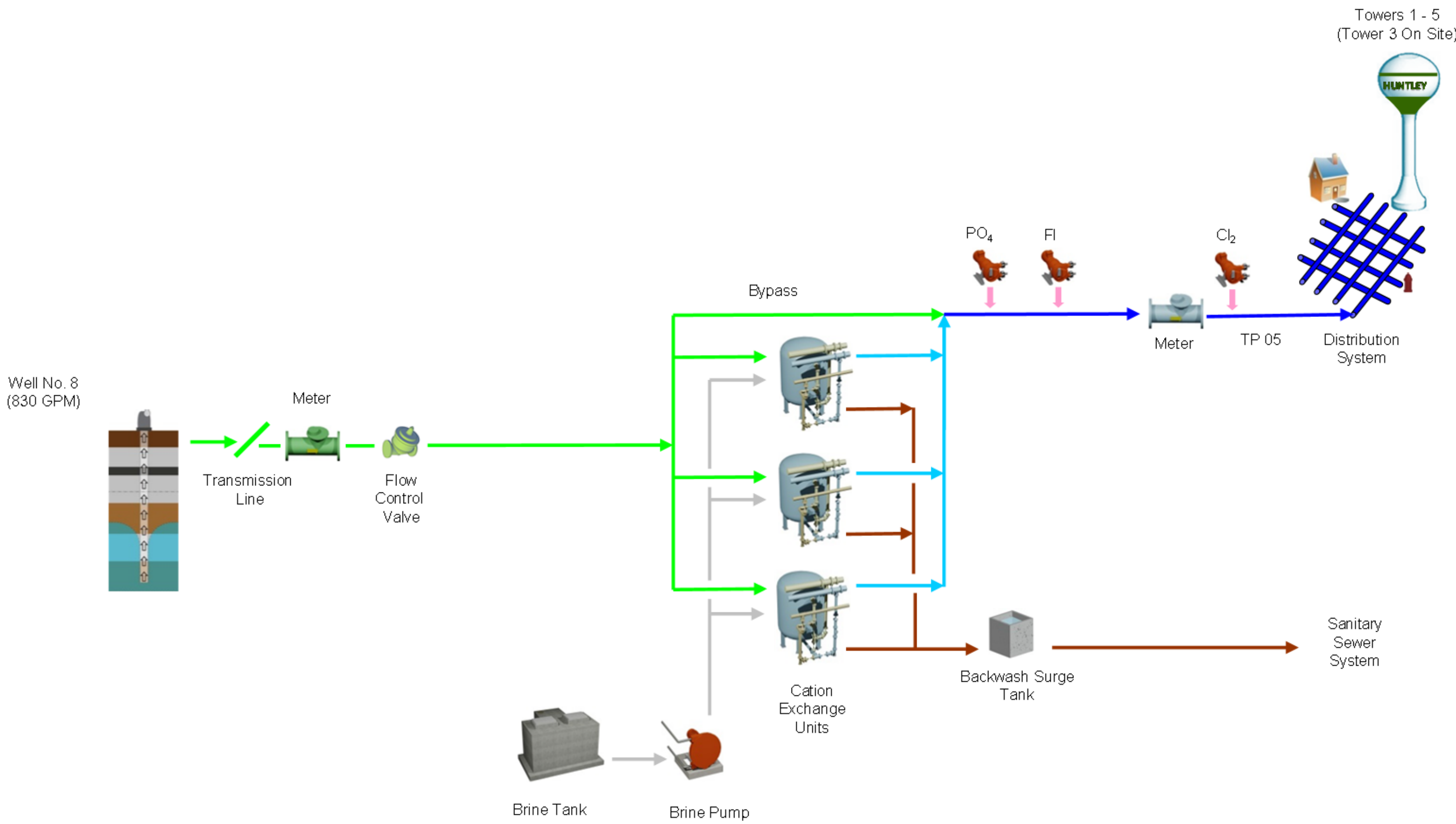


Table No. 2-4: Well No. 8 Water Treatment Plant Unit Process Summary

Village of Huntley, IL

Treatment Application Point No.	Process Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate *	Design Capacity	Comments and Recommendations
Well No. 8 Water Treatment Plant - 9644 Bedford Drive										
TP 05 - Supply Well No. 8	Cation Exchange (CE)	3 Vertical Pressure Vessels - 12" Gravel, 48" (211 CF) CE Resin	1997	17	UN	Good	8' Dia x 8' Sidewall Height Each	Surface Loading Rate: 4.3 GPM/SF @ 900 GPM	6.5 GPM/SF Max	Softening, Radium and Barium Removal; Resin past useful life - consider change out in 2015
	Backwash Holding Tank	Concrete Structure Below Treatment Room Floor	1997	17	UN	Good	UN	N/A	N/A	2 centrifugal backwash pumps -- GPM @ -- TDH; 2HP; Backwash to LITH SD
	Brine Pump	March Centrifugal Brine Feed Pump	1997	17	UN	Good	82 GPM @ 85' TDH; 2 HP	N/A	82 GPM	
	Chlorine Gas Disinfection	Chemical Feed Equipment	1997	17	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added before entering distribution system; Consider new scale
	Hydrofluosilicic Acid	Chemical Feed Equipment	1997	17	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 0.5 GPH @ 100 PSI	N/A	N/A	Added before entering distribution system; Consider new scale
	Phosphate	Chemical Feed Equipment	1997	17	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1 GPH @ 110 PSI	N/A	N/A	Ortho/Poly blend For corrosion control and sequestering; Added before entering distribution system; Consider new scale
	Controls	AB PLC & OIT	UN	UN	2013	Good	N/A	N/A	N/A	1 Main PLC and 1 Softener PLC; New OIT's in 2013
	Emergency Electrical Supply	Diesel Generator	1997	17	UN	Good	500 kW w/ Autotransfer Switch	N/A	N/A	Located outside at WTP No. 8 site and operates Well No. 8 and WTP No. 8

Notes:

Design Loading Rates are per IEPA standards and/or published water treatment plant design manuals.

Highlighted cell indicates process has some deficiency or recommended improvements based on audit

2.3.3 Well No. 9 Water Treatment Plant (WTP) – The Well No. 9 Water Treatment Plant was constructed in 1999 to treat water from deep Well No. 9. Well No. 9 is located over one mile south of the WTP. Water from Well No. 9 is pumped through a raw water transmission main to the WTP where it is introduced to pre-chlorine gas treatment followed by a forced draft aerator for iron oxidation and hydrogen sulfide removal. The water then drops down into a 61,000 gallon detention tank and is re-pressurized by one of two horizontal split case high service pumps rated for 1,100 GPM each. The high service pumps send the water through three (3) vertical cation exchange vessels. Before entering the system, the water is disinfected with gas chlorine. Blended phosphates are added for corrosion control and hydrofluosilicic acid is added for fluoridation. Regeneration water from the cation exchange vessels is captured in the below slab concrete backwash holding tank and then gravity flows into the sanitary sewer system. Neither Well No. 9 nor the WTP is fitted with emergency power. Exhibit 2-5 presents a flow diagram depicting the treatment process at Well No. 9 WTP. Table No. 2-5 provides additional information on the unit treatment processes.

An inventory and audit of each process identified some potential deficiencies or asset management elements that should be considered for the planning period.

- The aeration media appears to be in serviceable condition; However, staff should continue to monitor the media and wash or change out as deemed necessary;
- The cation exchange resin was changed out in FY14 after 15 years of operation. The resin should be programmed for a change in another 12-15 years;
- The chemical feed scales and readers are reaching their service life and should be considered for replacement;
- Staff has indicated a desire to replace the existing centrifugal brine pump with a positive displacement hose pump.

Exhibit 2-5: Well No. 9 Water Treatment Plant – TP 06 Process Flow Diagram

Village of Huntley, IL

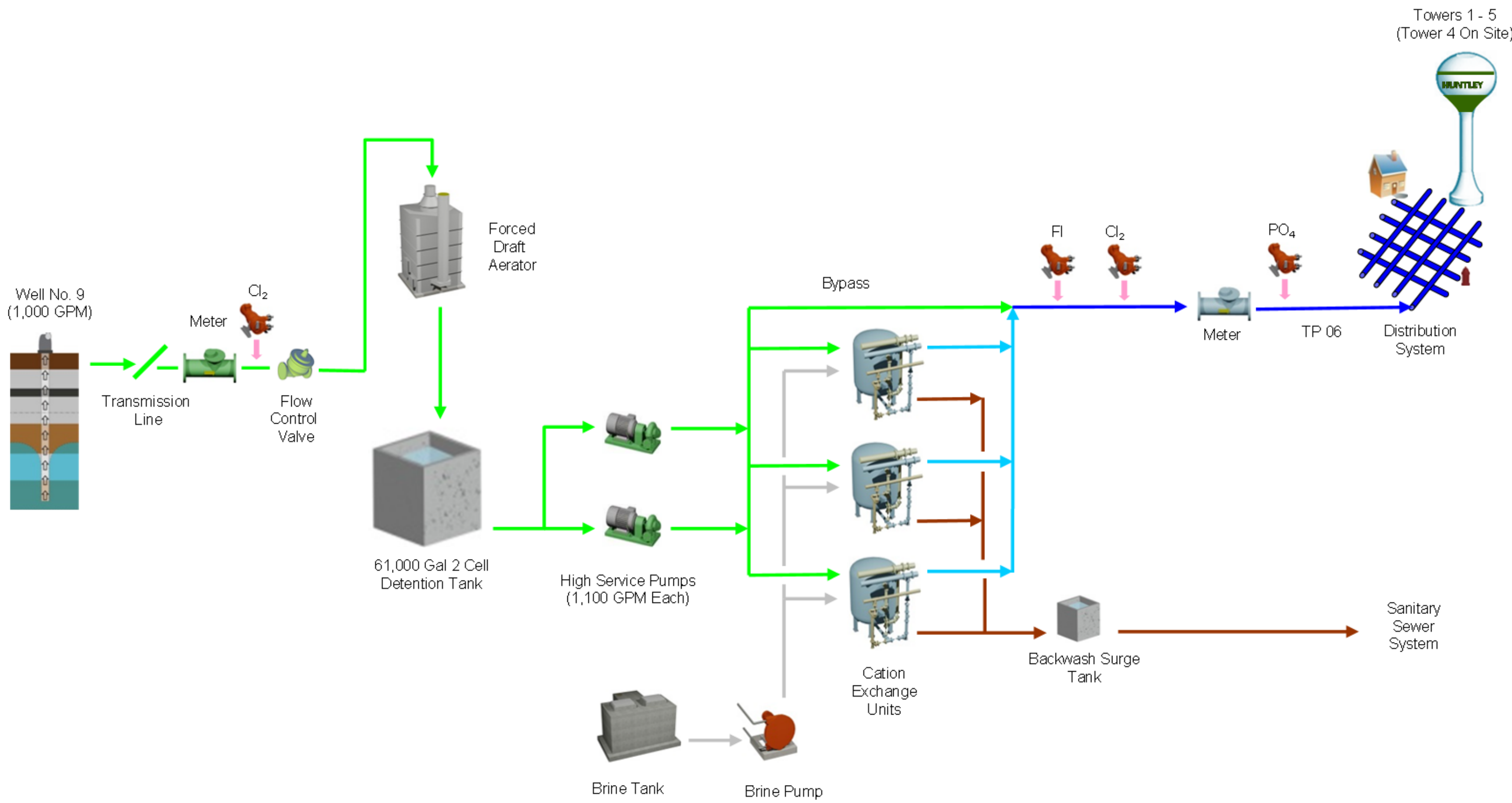


Table No. 2-5: Well No. 9 Water Treatment Plant Unit Process Summary

Village of Huntley, IL

Treatment Application Point No.	Process Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate *	Design Capacity	Comments and Recommendations
Well No. 9 Water Treatment Plant - 12601 Main Street										
TP 06 - Supply Well No. 9	Aeration	1 Forced Draft Aeration Tower	1999	15	UN	Good	UN	UN	N/A	For oxidation of hydrogen sulfide and iron; Monitor aerator media;
	Detention Tank	Concrete Structure	1999	15	UN	Good	61,000 Gal	N/A	UN	
	High Service Pumps	2 Horizontal Split Case Centrifugal Pumps	1999	15	UN	Good	1,100 GPM @ 190' TDH; 75 HP	Firm Capacity 1,100 GPM	3.16 MGD	Across the line starters
	Cation Exchange (CE)	3 Vertical Pressure Vessels - 12" Gravel, 48" (212 CF) CE Resin	1999	15	UN	Good	8' Dia x 8' Sidewall Height Each	Surface Loading Rate: 4.3 GPM/SF @ 900 GPM	6.5 GPM/SF Max	Softening, Radium and Barium Removal; Resin change out programmed in 2014
	Backwash Holding Tank	Concrete Structure Below Treatment Room Floor	1999	15	UN	Good	UN	N/A	N/A	Gravity discharge to West WWTF; Backwash not metered
	Brine Pump	March Centrifugal Brine Feed Pump	1999	15	UN	Good	82 GPM @ 85' TDH; 2 HP	N/A	82 GPM	
	Pre-Chlorine Gas	Chemical Feed Equipment	1999	15	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added prior to Detention Tank to oxidize hydrogen sulfide and iron; Consider new scale
	Chlorine Gas Disinfection	Chemical Feed Equipment	1999	15	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added before entering distribution system; Consider new scale
	Hydrofluosilicic Acid	Chemical Feed Equipment	1999	15	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 0.42 GPH @ 140 PSI	N/A	N/A	Added before entering distribution system; Consider new scale
	Phosphate	Chemical Feed Equipment	1999	15	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1 GPH @ 110 PSI	N/A	N/A	Ortho/Poly blend For corrosion control and sequestering; Added before entering distribution system; Consider new scale
	Controls	AB PLC & OIT	UN	UN	2011	Good	N/A	N/A	N/A	1 Main PLC and 1 Softener PLC; New OIT's in 2011
	Emergency Electrical Supply	None								

Notes:

Design Loading Rates are per IEPA standards and/or published water treatment plant design manuals.

Highlighted cell indicates process has some deficiency or recommended improvements based on audit

2.3.4 Well No. 10 Water Treatment Plant (WTP) – Well No. 10 WTP was constructed in 2000 to treat water from deep Well No. 10. The process treatment train consists of pre-chlorine gas to oxidize iron and hydrogen sulfide followed by three (3) vertical cation exchange vessels. Before entering the system, the water is disinfected with gas chlorine. Blended phosphates are added for corrosion control and hydrofluosilicic acid is added for fluoridation. Regeneration water from the cation exchange vessels is captured in the below slab concrete backwash holding tank and then pumped into the sanitary sewer system. Emergency power consists of a 600 kW auto-start diesel generator that can operate Well No. 10 and all process equipment at the WTP. Exhibit 2-6 presents a flow diagram depicting Well No. 10 WTP unit processes. Table No. 2-6 provides summary information on Well No. 10 WTP unit processes.

An inventory and audit of each process identified some potential deficiencies or asset management elements that should be considered for the planning period.

- The cation exchange resin has not been changed in the WTP's 14 years of operation. The resin should be programmed for a change in 2015 or 2016;
- The chemical feed scales and readers are reaching their service life and should be considered for replacement;
- Staff has indicated a desire to replace the existing centrifugal brine pump with a positive displacement hose pump.

Exhibit 2-6: Well No. 10 Water Treatment Plant – TP 07 Process Flow Diagram

Village of Huntley, IL

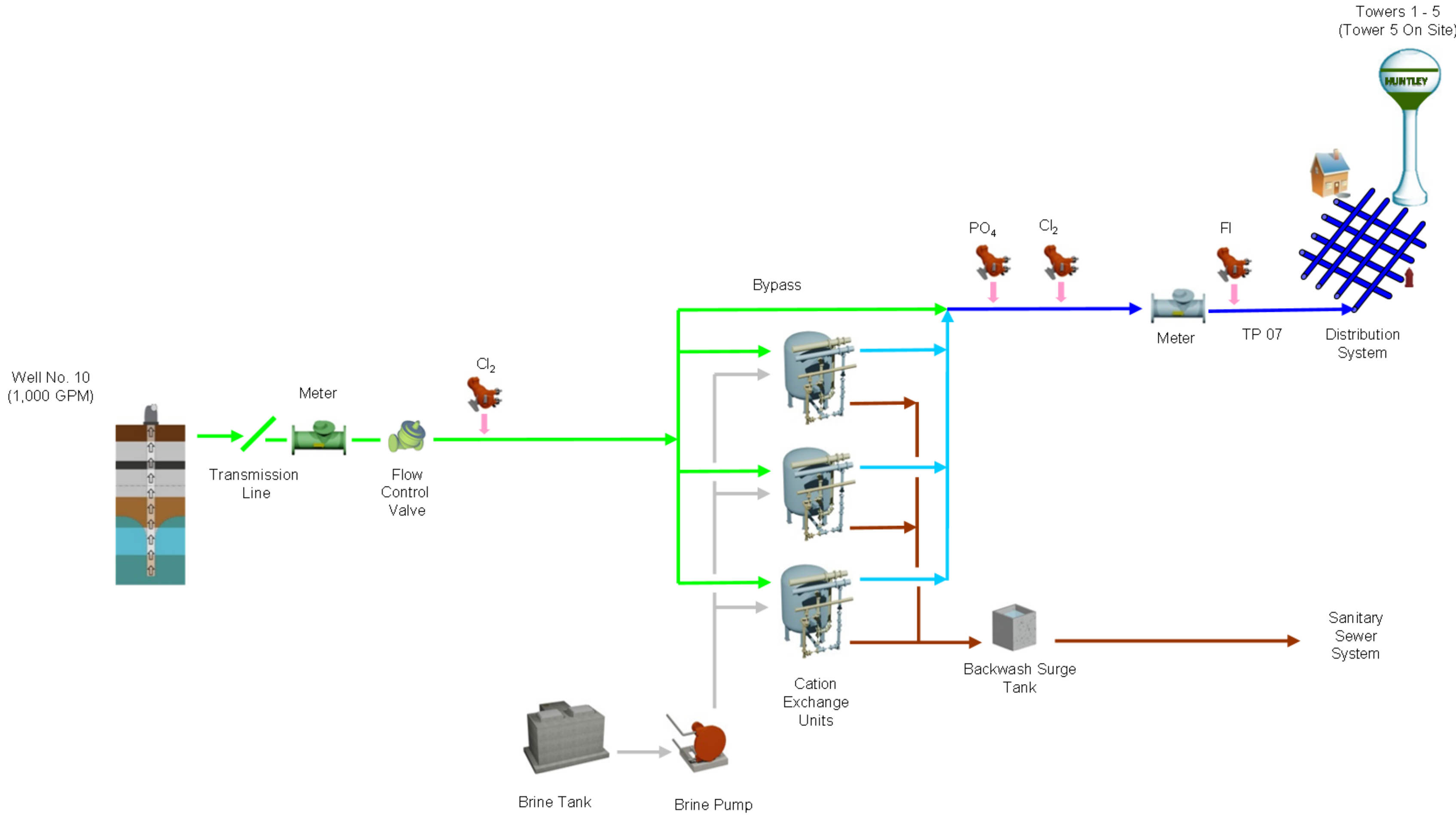


Table No. 2-6: Well No. 10 Water Treatment Plant Unit Process Summary

Village of Huntley, IL

Treatment Application Point No.	Process Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate *	Design Capacity	Comments and Recommendations
Well No. 10 Water Treatment Plant - 10770 Kreutzer Road										
TP 07 - Supply Well No. 10	Cation Exchange (CE)	3 Vertical Pressure Vessels - 12" Gravel, 48" (212 CF) CE Resin	2000	14	UN	Good	9' Dia x 8' Sidewall Height Each	Surface Loading Rate: 3.8 GPM/SF @ 1000 GPM	7.0 GPM/SF Max	Softening, Radium and Barium Removal; Resin approaching useful life consider change out in 2016
	Backwash Holding Tank	Concrete Structure Below Treatment Room Floor	2000	14	UN	Good	UN	N/A	N/A	2 Ebara centrifugal backwash pumps -- GPM @ -- TDH; --HP; Backwash not metered
	Brine Pump	March Centrifugal Brine Feed Pump	2000	14	UN	Good	82 GPM @ 85' TDH; 2 HP	N/A	82 GPM	
	Pre-Chlorine Gas	Chemical Feed Equipment	2000	14	UN	Good	Single Cylinder Scale, Booster Pump, Injector, Regulator and Valve	N/A	N/A	Added prior to Detention Tank to oxidize hydrogen sulfide and iron; Consider new scale
	Chlorine Gas Disinfection	Chemical Feed Equipment	2000	14	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added before entering distribution system; Consider new scale
	Hydrofluosilicic Acid	Chemical Feed Equipment	2000	14	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 0.42 GPH @ 140 PSI	N/A	N/A	Added before entering distribution system; Consider new scale
	Phosphate	Chemical Feed Equipment	2000	14	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1 GPH @ 110 PSI	N/A	N/A	Ortho/Poly blend For corrosion control and sequestering; Added before entering distribution system; Consider new scale
	Controls	AB PLC & OIT	UN	UN	2012	Good	N/A	N/A	N/A	1 PLC for entire WTP; New OIT's in 2012
	Emergency Electrical Supply	Diesel Generator	2000	14	Indeterminate	Good	600 kW w/ Autotransfer Switch	N/A	N/A	Located outside at WTP No. 10 site and operates Well No. 10 and WTP No. 10

Notes:

Design Loading Rates are per IEPA standards and/or published water treatment plant design manuals.

Highlighted cell indicates process has some deficiency or recommended improvements based on audit

2.3.5 Well No. 11 Water Treatment Plant (WTP) – The Well No. 11 Water Treatment Plant was constructed in 2007 to treat water from deep Well No. 11. Water from Well No. 11 is pumped to the WTP where it is introduced to pre-chlorine gas treatment for iron oxidation and hydrogen sulfide removal. The water then drops down into a 57,000 gallon detention tank and is re-pressurized by one of two horizontal split case high service pumps rated for 1,100 GPM each. The high service pumps send the water through three (3) vertical cation exchange vessels. Before entering the system, the water is disinfected with gas chlorine. Blended phosphates are added for corrosion control and hydrofluosilicic acid is added for fluoridation. Regeneration water from the cation exchange vessels is captured in the below slab concrete backwash holding tank and then pumped into the sanitary sewer system. Emergency power consists of a 600 kW auto-start diesel generator that can operate Well No. 11 and all process equipment at the WTP. Exhibit 2-7 presents a flow diagram depicting the treatment process at Well No. 11 WTP. Table No. 2-7 provides additional information on the unit processes.

An inventory and audit of each process identified some potential deficiencies or asset management elements that should be considered for the planning period.

- The cation exchange resin has not been changed in the WTP's 7 years of operation. The resin should be programmed for a change in 2019 after 12 service years;
- The chemical feed scales and readers are reaching their service life and should be considered for replacement;
- Staff has indicated a desire to replace the existing centrifugal brine pump with a positive displacement hose pump.

Exhibit 2-7: Well No. 11 Water Treatment Plant – TP 09 Process Flow Diagram

Village of Huntley, IL

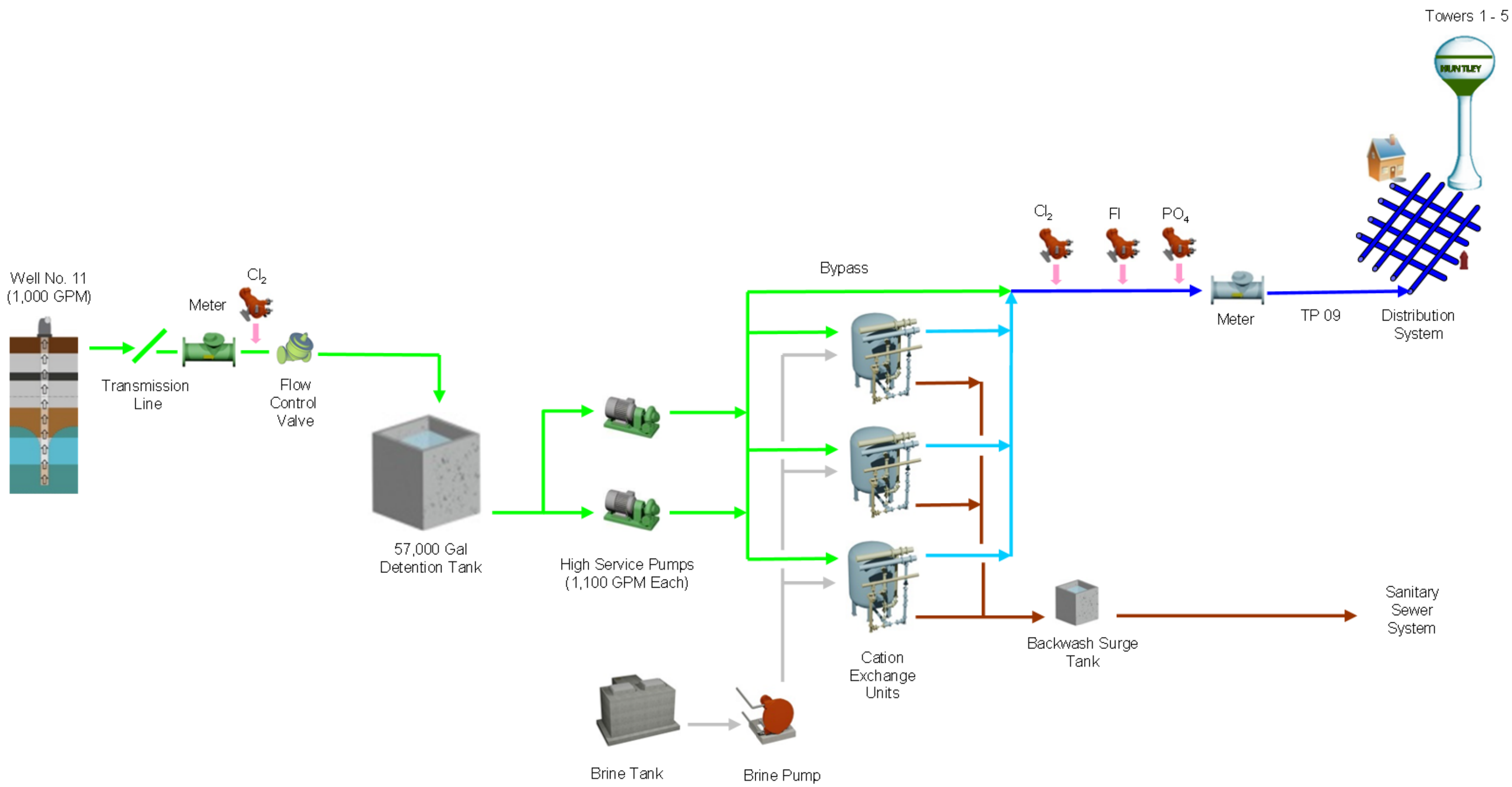


Table No. 2-7: Well No. 11 Water Treatment Plant Unit Process Summary

Village of Huntley, IL

Treatment Application Point No.	Process Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate *	Design Capacity	Comments and Recommendations
Well No. 11 Water Treatment Plant - 9250 S. Union Road										
	Detention Tank	Concrete Structure	2007	7	UN	Good	57,000 Gal	N/A	UN	
	High Service Pumps	2 Horizontal Split Case Centrifugal Pumps	2007	7	UN	Good	1,100 GPM @ 185' TDH; 75 HP	Firm Capacity 1,100 GPM	3.16 MGD	VFD's
	Cation Exchange (CE)	3 Vertical Pressure Vessels - 12" Gravel, 60" (318 CF) CE Resin	2007	7	UN	Good	9' Dia x 9' Sidewall Height Each	Surface Loading Rate: 4.5 GPM/SF @ 1,000 GPM	6.7 GPM/SF Max	Softening, Radium and Barium Removal; Program resin change out in 2020
	Backwash Holding Tank	Concrete Structure Below Treatment Room Floor	2007	7	UN	Good	UN	N/A	N/A	2 March centrifugal backwash pumps -- GPM @ -- TDH; --HP; Backwash not metered
	Brine Pump	March Centrifugal Brine Feed Pump	2007	7	UN	Good	125 GPM @ 85' TDH; 2 HP (est)	N/A	125 GPM (est)	Brine pump changed at start-up to increase capacity
	Pre-Chlorine Gas	Chemical Feed Equipment	2007	7	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added prior to Detention Tank to oxidize hydrogen sulfide and iron; Consider new scale
	Chlorine Gas Disinfection	Chemical Feed Equipment	2007	7	UN	Good	Dual Cylinder Scale, Booster Pump, Injector, Regulator and Dual Switch Over Valve	N/A	N/A	Added before entering distribution system; Consider new scale
	Hydrofluosilicic Acid	Chemical Feed Equipment	2007	7	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 0.83 GPH @ 250 PSI	N/A	N/A	Added before entering distribution system
	Phosphate	Chemical Feed Equipment	2007	7	UN	Good	1 Day Tank w/ Scale; 1 Feed Pump: 1.75 GPH @ 150 PSI	N/A	N/A	Ortho/Poly blend For corrosion control and sequestering; Added before entering distribution system
	Controls	AB PLC & OIT	UN	UN	UN	Good	N/A	N/A	N/A	1 PLC for entire WTP
	Emergency Electrical Supply	Diesel Generator	2007	7	UN	Good	600 kW w/ Autotransfer Switch	N/A	N/A	Located indoors at WTP No. 11 and operates Well No. 11 and WTP No. 11

Notes:

Design Loading Rates are per IEPA standards and/or published water treatment plant design manuals.

Highlighted cell indicates process has some deficiency or recommended improvements based on audit

2.4 Storage

As indicated previously, the Village's Water Department currently maintains 3.318 million gallons of water storage, of which 3.2 million gallons is elevated storage with spheroid type storage tanks and 0.118 million gallons is from ground storage detention tanks. The water storage components are distributed within one pressure zone which will be further discussed in Section 2.4.1. Since water demands can be highly variable across the distribution system, a control valve is located at each water tower to regulate the water flow direction and water pressure throughout the system. The Village SCADA system allows programmable and remote operation of the control valves for optimal system performance. Exhibit 2-1, presented in Section 2.1, identifies the locations of all of the storage tanks, and Table No. 2-8 provides the capacity, type of storage, and pertinent elevations for each tank.

2.4.1 Pressure Zone Overview – Pressures and pressure zones directly correspond to the ground elevations and hydraulic grade lines of the Water Works System. If elevated tanks are part of the system, the water level within the tank typically controls the hydraulic grade line. One (1) psi of pressure is equivalent to 2.31 feet of water (i.e. the elevation difference between the tank level and the ground elevation at any location). Targeted pressure ranges are based on several different standards including AWWA, Ten State Standards, and the USEPA. These ranges are listed in Table No. 2-9.

In areas of variable topography, multiple pressure zones can be created to maintain consistent and adequate pressures throughout the service area and to generally meet the pressure ranges defined above. If necessary, booster pump stations and pressure reducing valve stations are placed at pressure zone boundaries to allow transfer of water between the different zones. A booster pump allows water to be transferred from a lower pressure zone to a higher pressure zone. Alternately, a pressure reducing valve allows water to be transferred from a higher pressure zone to a lower pressure zone.

The ground elevations throughout the Huntley planning boundary range from approximately 850 feet (northern limits) to 920 feet (southern and western limits) above mean sea level (MSL). There are isolated areas on the western edge of the Village where the ground elevations peak to 930 feet above MSL. The South Branch of the Kishwaukee River flowing generally east to west through the center of the Village is largely responsible for shaping the local topography resulting in lower ground elevations in the moderate river valley that spans through the Village center. Towards the north planning area, north of Ackman Road, the surface elevation declines mainly due to the Kishwaukee Creek valley that orients east to west before the confluence with the South Branch of the Kishwaukee River. The southern planning limit is characterized by higher elevations mainly due to the fact that it borders the drainage divide between the Fox River and Kishwaukee River watersheds.

Table No. 2-8: Existing Water Storage Summary

Village of Huntley, IL

Site/ Tank Name	Pressure Zone	Type	Year Constr.	Capacity (Gallons)	Top of Foundation (Feet)	Headrange (Feet)	Overflow Elevation (Foot)	Comments
Elevated								
1	1	Elevated/ Spheroid	1970	300,000	895.75	1,008.25-1,038.25	1,038.25	Altitude Valve w/ Controller; Recoated in 2012
2	1	Elevated/ Spheroid	1994	1,000,000	906.50	998.25-1,038.25	1,038.25	Located at Well No. 7 Site; Altitude Valve w/ Controller; Recoated in 2009
3	1	Elevated/ Spheroid	1997	500,000	874.00	1,000.75-1,038.25	1,038.25	Located in Southwind Subdivision at Well No. 8 Site; Altitude Valve w/ Controller; Recoated in 2013
4	1	Elevated/ Spheroid	1999	1,000,000	874.00	998.25-1,038.25	1,038.25	Located at West WWTF Site (North of Well No. 9 WTP); Altitude Valve w/ Controller; Recoated in 2011
5	1	Elevated/ Spheroid	2000	400,000	887.50	1,000.75-1,038.25	1,038.25	Located in Wing Pointe Subdivision at Well No. 10 Site; Altitude Valve w/ Controller; Recoated in 2013
		Subtotal:		**3,200,000**				
Ground								
Well No. 9 Detention Tank	1	Ground	1999	61,000	862.83	UN	UN	
Well No. 11 Detention Tank	1	Ground	2007	57,000	882.50	UN-892.75	893.25	
		Subtotal:		**118,000**				
		TOTAL:		**3,318,000**				

UN = Unknown

Table No. 2-9: Recommended Pressures By AWWA, Ten State Standards, & USEPA

Village of Huntley, IL

Minimum Pressure	20 psi	All ground level points
	35 psi	All points within distribution system
Maximum Pressure	100 psi	All points within distribution system
Fire Flow Minimum	20 psi	All points within distribution system
Ideal Range	50 - 75 psi	Residences
	35 - 60 psi	All points within distribution system

Given the moderate elevation variances throughout the Village planning area, the Village is able to maintain adequate pressures with one pressure zone. Table 2-10 outlines the ground elevations throughout the pressure zone and the associated range of pressures at the corresponding ground elevation. From Table 2-10, the blue shaded area represents the ideal range of operating pressures (40-80 psi +/-) and the corresponding ground elevation. With a max hydraulic grade line at 1,038.25 feet, the ground elevation range for ideal pressures is 910' to 850'. As discussed, there are isolated areas currently served by the Village Water Works System that approach 930 feet in elevation. The yellow shaded area on Table 2-10 represents the operating pressures between ground elevations of 910 and 930 feet. To maintain minimum ideal pressures in these isolated high ground areas, staff maintains the elevated water storage tanks above mid-level such that the water pressure is always above 40 psi. Exhibit 2-8 provides the hydraulic profile for the exiting overall Water Works System.

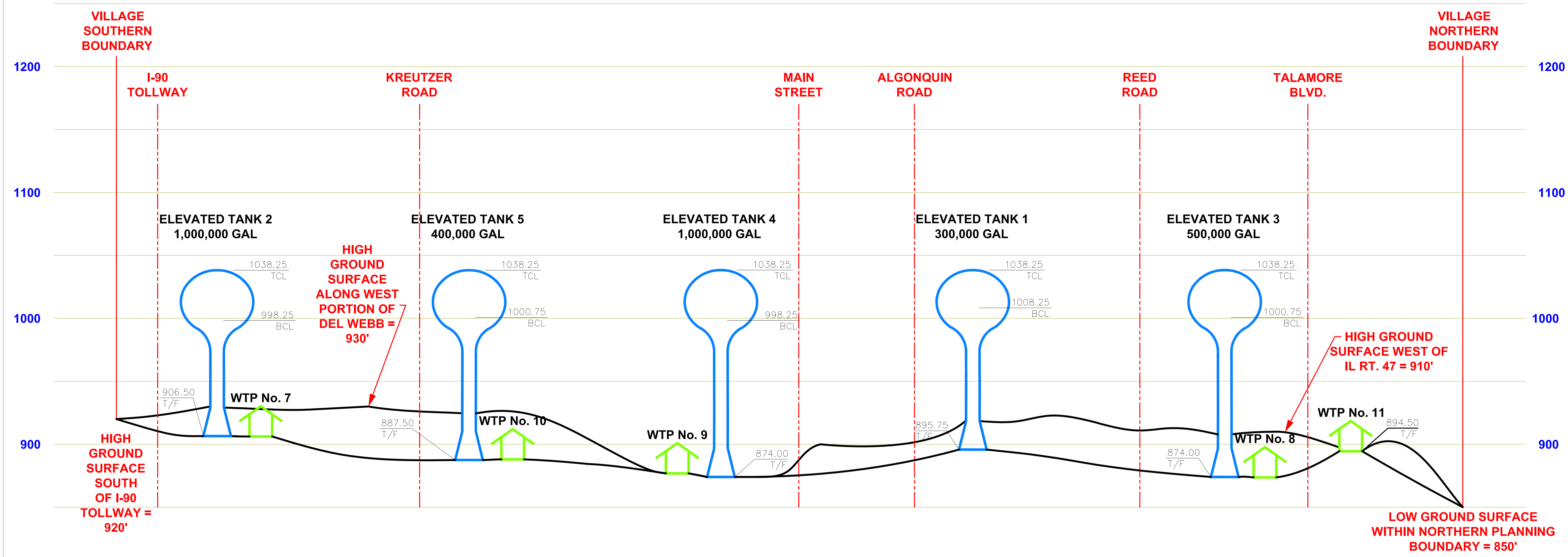
Table No. 2-10: Pressure Zone Summary

Village of Huntley, IL

	Hydraulic Grade Line			Ground	Static Pressure		
	High (Feet)	Mid (Feet)	Low Design (Feet)	Elevation (Feet)	High (Psi)	Mid (Psi)	Low Design (Psi)
Pressure Zone 1				950	38.2	31.7	20.9
EWST 1 (300,000 Gal)	1038.25	1023.25	1008.25	940	42.5	36.0	25.2
EWST 2 (1,000,000 Gal)	1038.25	1018.25	998.25	930	46.9	40.4	29.6
EWST 3 (500,000 Gal)	1038.25	1019.50	1000.75	920	51.2	44.7	33.9
EWST 4 (1,000,000 Gal)	1038.25	1018.25	998.25	910	55.5	49.0	38.2
EWST 5 (400,000 Gal)	1038.25	1019.50	1000.75	900	59.9	53.4	42.5
				890	64.2	57.7	46.9
				880	68.5	62.0	51.2
				870	72.9	66.4	55.5
				860	77.2	70.7	59.9
				850	81.5	75.0	64.2
				840	85.8	79.3	68.5
				830	90.2	83.7	72.9
				820	94.5	88.0	77.2
				810	98.8	92.3	81.5

Notes:
1) High Hydraulic Grade Line = Tank's TCL
2) Mid Hydraulic Grade Line = (Tank's TCL + Tank's BCL) / 2
3) Low Hydraulic Grade Line = Tank's BCL
4) If a zone has more than 1 tank, the static pressure is calculated at the lowest elevation
5) The blue shaded area represents the ideal range of operating pressures (40-80 psi +/-) and corresponding ground elevation served
6) The yellow shaded area represents ground surface elevations within Village service area that are marginally below ideal range; Mainly located along west edge of Del Webb and south of Tollway; EWST 2 and 5 should always be above mid level to properly service these areas

HYDRAULIC PROFILE / TOWER CROSS SECTION



LEGEND:

BCL = BOTTOM CAPACITY LINE
GAL = GALLONS
T/F = TOP OF FOUNDATION
TCL = TOP CAPACITY LINE
WTP = WATER TREATMENT PLANT

NOTES: (1) EXHIBIT NOT TO SCALE
(2) EXHIBIT REPRESENTS NORTH/SOUTH CROSS SECTION ALONG IL ROUTE 47

Pressure Zone Summary Table

	Hydraulic Grade Line High (Feet)	Hydraulic Grade Line Mid (Feet)	Hydraulic Grade Line Low Design (Feet)	Ground Elevation (Feet)	Static Pressure High (psi)	Static Pressure Mid (psi)	Static Pressure Low Design (psi)
Pressure Zone 1				950	38.2	31.7	20.9
EWST 1 (300,000 Gal)	1038.25	1023.25	1008.25	940	42.5	36.0	25.2
EWST 2 (1,000,000 Gal)	1038.25	1018.25	998.25	930	46.9	40.4	29.6
EWST 3 (500,000 Gal)	1038.25	1019.50	1000.75	920	51.2	44.7	33.9
EWST 4 (1,000,000 Gal)	1038.25	1018.25	998.25	910	55.5	49.0	38.2
EWST 5 (400,000 Gal)	1038.25	1019.50	1000.75	900	59.9	53.4	42.5
				890	64.2	57.7	46.9
				880	68.5	62.0	51.2
				870	72.9	66.4	55.5
				860	77.2	70.7	59.9
				850	81.5	75.0	64.2
				840	85.8	79.3	68.5
				830	90.2	83.7	72.9
				820	94.5	88.0	77.2
				810	98.8	92.3	81.5

Notes:

1) High Hydraulic Grade Line = Tank's TCL
2) Mid Hydraulic Grade Line = (Tank's TCL + Tank's BCL) / 2
3) Low Hydraulic Grade Line = Tank's BCL
4) If zone has more than one (1) tank, the static pressure is calculated at the lowest elevation
5) The blue shaded area represents the ideal range of operating pressures (40-80 psi+/-) and corresponding ground elevation served
6) The yellow shaded area represents the ground surface elevations within the Village service area that are marginally below ideal range; Mainly located along the west edge of Del Webb and south of Tollway; EWST 2 and 5 should always be above mid level to properly service these areas

APRIL 22, 2014

2.5 Distribution

The Village's water distribution system is an interconnected conveyance system that transfers water through approximately 143 miles of piping, ultimately providing water to the public for domestic, industrial, and fire protection uses. Depending on the well and WTP, either the well pumps or high service pumps pressurize the Water Works System and allow water to move throughout it. Since the system is served by one pressure zone, booster pump stations and pressure reducing valves are not necessary and have not been incorporated.

2.5.1 Water Main Network – The total amount of water main within the system is approximately 752,200± feet (143± miles) ranging in size from 4" to 16". According to the Village GIS, the system contains approximately 2,110 fire hydrants and 3,410 valves.

2.5.2 Lake in the Hills Interconnect – Interconnection(s) with a separate Water Works System(s) can provide the transfer of water from one system to the next in the event of an emergency due to a localized disturbance or service disruption. The Village of Huntley shares an emergency water supply interconnection with the Village of Lake in the Hills (LITH) for this purpose. The interconnection is located at the Village boundary line along Bordeaux Drive in the Southwind Subdivision. Both Village's maintain and operate a separate valve to open the interconnection. According to the Village of Huntley staff, there is no record of an instance where the interconnection has been opened for emergency use.

A hydraulic analysis was completed to confirm that the hydraulic grade line of the two systems is in the range that would allow the effective transfer of water that would be mutually beneficial to both systems. The top capacity line (TCL) of the LITH EWST's in the pressure zone at the interconnection was confirmed with LITH staff to be 1,050 feet above MSL. As previously identified, the TCL in Huntley is 1,038 feet above MSL. With proper coordination, the hydraulic grade lines could be operated such that the transfer of water could be accomplished from one system to the next in the event of an emergency. However, since there is only one interconnection, the beneficiaries of the shared connection will be localized due to difficulties of transferring a single source of water across an entire distribution system. Therefore, as the Village continues to expand its shared borders with other communities, it is recommended that additional water system interconnection opportunities be identified and installed. The more interconnections will equate to less vulnerability for a water system.

2.5.3 Historical Water Modeling Efforts – If properly constructed and calibrated, computer-aided hydraulic modeling of a distribution system can help predict the capabilities and pressure pipe flow behaviors under certain conditions such as steady state, extended period simulation and fire flow. Modeling can also be used to analyze the effects of modified or expanded infrastructure along with variable demands in the context of the entire water distribution system or sub-areas.

A water system model was first developed in Huntley using WaterCAD software as part of the 2002 Master Plan. The initial water modeling effort resulted in recommendations for distribution system enhancements including small diameter water main replacement (replace water main below 6" with minimum 8" main) and improvements to correct inadequate areas with fire flow. A full list of the recommended improvements can be found in the 2002 Master Plan and the 2005 Master Plan Update. The Village has implemented a water main replacement program to install the improvements in accordance with the recommendations and also plans to continue allocating available resources to advance this initiative.

The water model was updated in 2008 with a focus on the planning area south of I-90. The existing water system water model was converted from WaterCAD to WaterGEMs software and was then updated to include all of the wells, storage facilities and distribution components installed at that time. The model was used to analyze hydraulic behaviors of the system when considering extension of a 12-inch watermain south of I-90 with variable water demands. The conclusions of the model suggested that the existing system with Wells No. 7 – 11 and EWST's 1-5 in operation could distribute water through a 12-inch main crossing I-90 with an Average Day Demand of 524 GPM and a Maximum Day Demand of 1,200 GPM in that service area. The sustainable population equivalent of that service area was determined to be 6,800 P.E. It should be pointed out that over six years have passed since the model was last updated and calibrated and the Village water use patterns have changed since that time. It is recommended that the Village consider updating the model prior to additional system expansion including the area south of I-90.

2.6 Water Works and Lift Station SCADA System Overview

The Village of Huntley utilizes a Supervisory Control and Data Acquisition (SCADA) system to monitor the operation of the supply, treatment, storage, and distribution components of the water system. Because they are located remotely, similar to the water system components, the sanitary lift stations are a part of the water system SCADA system, as well.

The Water System and Lift Stations in Huntley share a common SCADA radio and server environment. In general, the Water/Lift Station SCADA environment consists of the following major components:

- SCADA Server and Thick Client PC
- Master Telemetry Unit (MTU) (PLC)
- Remote Telemetry Units (RTUs) (PLCs)
- Radio Communication Network

SCADA Server and Client: The Water/Lift SCADA Server is a Virtual Server located on the SCADA Virtual Host Server. The SCADA Software is Wonderware InTouch 2012. The SCADA Server is "headless", meaning the operations staff does not interact directly with the SCADA Server during normal operation. A SCADA

Thick Client PC is used for operator interface and 24x7 alarming. The Thick Client is a Dell OptiPlex 7010 workstation with Wonderware InTouch Client software and Win-911 Alarm software and a voice-grade telephony card. The Virtual Host Server and Thick Client are both located at the West WWTP. The SCADA server/client allow operations staff to view water and lift station system status and alarms, as well as make setpoint adjustments.

Master Telemetry Unit (MTU): The Water/Lift Station MTU consists of an Allen-Bradley SLC 5/05 Programmable Logic Controller (PLC) and radio located at the West WWTP. This PLC polls the water system and lift station sites sequentially using the serial DF-1 protocol through a radio system. The Wonderware InTouch SCADA Server uses a software I/O driver to provide read/write access to the SCADA data in the MTU PLC.

Remote Telemetry Units (RTUs): Each remote water system and lift station site includes a RTU which has an Allen-Bradley PLC and radio. Most of the RTUs use the “older” Allen-Bradley SLC series PLCs, while a few have “newer” MicroLogix Series PLCs. The RTU PLCs transmit local data to the MTU over the radio system.

Radio Communication Network: The MTU communicates with the RTUs using a point-to-multipoint, unlicensed 900MHz radio network that is approximately 15 years old. The radios are MDS/GE Model 9810. The communication protocol is serial DF-1. The Well 9 water tower near the West WWTP is used as a repeater point.

SECTION 3: EXISTING WASTEWATER SYSTEM

The Village of Huntley's Wastewater System consists of a wastewater conveyance system (sanitary sewers and lift stations) and two Wastewater Treatment Facilities (WWTFs). Both the conveyance system and the WWTFs are in excellent condition. It is clear the Village staff takes pride in maintaining the system for its long term use in the community. The purpose of this section of the report is to inventory the Wastewater System, so that any existing deficiencies can be identified. It also will provide the foundation for the discussion of future system expansion.

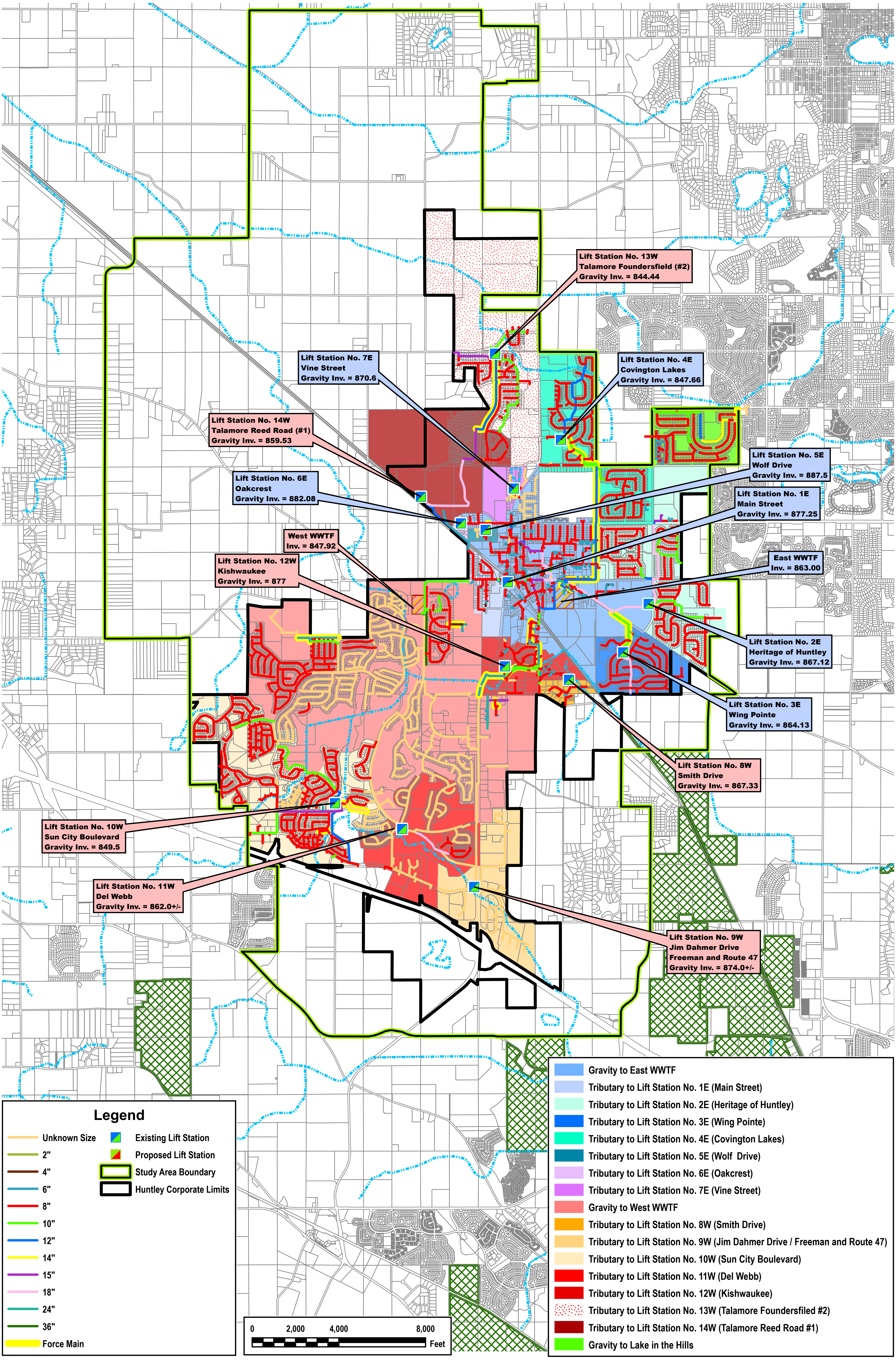
3.1 Overview

The Village of Huntley municipal wastewater collection, conveyance and treatment system was first installed in the late 1940's. The original WWTF was located east of Route 47, just south of the existing Main and Bakley Streets intersection. The sanitary sewer system has continued to broaden as areas within the Village have developed. The increase in flows required the original wastewater treatment facility, currently named the East WWTF, to expand several times. It's current Design Average Flow (DAF) capacity is 1.8 MGD. As the Village's planning boundaries continued to expand and the build out of the East WWTF property was in sight, the Village planned for a second WWTF. The West WWTF was originally constructed in 1999. It is located west of Route 47 near the southwest corner of the intersection of Main Street and Kreutzer Roads, and its current DAF capacity is 2.6 MGD.

3.2 Sanitary Sewer System

The Village's sanitary sewer network consists of sanitary sewer conveyance pipes ranging in size from 8" to 36". The majority of the original vitried clay pipe (VCP) network remains in service, but many pipe segments have been lined. Given the large amount of system expansion in the 1990s and 2000s, the majority of the sanitary sewer pipe network is polyvinyl chloride (PVC) pipe. Exhibit 3-1 provides an overview of the Village's existing sanitary sewer collection system. The exhibit includes pipe diameters for the currently identified pipe sizes. During the development of this report, the Village was in the process of updating their GIS. Some portions of the network have not been surveyed and pipe diameters recorded at the time of the writing of this report.

Exhibit 3-1 identifies all of the service areas tributary to the East WWTF in shades of blue, whereas all of the service areas tributary to the West WWTF are shaded in red. The one area of the Village where wastewater is transferred to the Lake in the Hills Sanitary District, the Southwind Subdivision, is shaded in green. As one would suspect, the combined service area tributary to the West WWTF is larger than the combined service area tributary to the East WWTF, because the West WWTF DAF is greater than the East WWTF.



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DATE:	DECEMBER 2014
PROJECT NO.:	HU1401
BY:	KKP
PATH:	H:\GIS\PUBLIC\HUNTLEYEY\HU1401\
FILE:	HU1401_EXH_3-1_PLANNING SYSTEM.MXD

COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 3-1
EXISTING COLLECTION SYSTEM

NORTH

While portions of the sanitary sewer network are more than 60 years old, Village staff has reported the sanitary sewer network is in good condition. The Village follows through on an annual sanitary sewer system maintenance program, which includes jetting, root cutting and televising portions of the system each year. As stated previously, the Village has lined several segments of the old VCP, and they also have rehabilitated old manholes. Staff has indicated the system does not contain an excessive amount of infiltration and inflow (I&I), which is no surprise given Staff's diligence with the annual maintenance and rehabilitation program.

The Village of Huntley sanitary sewer collection and conveyance system utilizes fourteen (14) lift stations to convey wastewater where an unimpeded gravity flow, cost effective route to one of the WWTFs was not an option. The collection system service areas, including the areas tributary to each lift station, are depicted on Exhibit 3-1. A summary of each of the lift stations is included in Table No. 3-1.

All of the lift stations are in good condition. Half of the lift stations have onsite backup electrical generators, whereas the other half have portable generator connection capabilities. Given the generally flat topography of the Village, it should not be too big of a surprise that the system contains so many lift stations. However, it would be appropriate to determine if new, or rerouted, sewer installations could cost effectively eliminate the need for some of the lift stations. The lift station reduction analysis is summarized in Section 9.1.

3.3 East WWTF

While there are limited records of the original WWTF construction, it would appear the original facility contained an Imhoff tank as the primary treatment process. Following the original construction of the East WWTF in 1950, trickling filters were added in 1960. In 1977, along with the presumed need to meet lower ammonia discharge standards, Rotating Biological Contactors (RBCs) were added to the facility. In 1988, the plant was expanded to 0.61 MGD. The 1988 improvements included the addition of two primary clarifiers, the northwest orbal configuration oxidation ditch, an additional final clarifier, the filter building, aerobic digestion improvements and a sludge storage area. In 2000, the plant was expanded to 1.2 MGD. The 2000 expansion added the screening, the northeast closed loop reactor oxidation ditches (after demolition of the primary clarifiers), two new secondary clarifiers and a RAS/WAS pump station upgrade. The facility was expanded to its current capacity of 1.8 MGD in 2002. The 2002 expansion added the west orbal configuration oxidation ditch, two additional secondary clarifiers, the ultraviolet disinfection system, a dewatered sludge storage pad and the north garage. An aerial overview of the East WWTF is included in Exhibit 3-2.

As stated, the East WWTF currently has a DAF capacity of 1.8 MGD. It currently treats approximately 1.1 MGD of wastewater on an average day. The Design Maximum Flow (DMF) of the East WWTF is 4.5 MGD. The East WWTF treatment train consists of fine screens, oxidation ditches, secondary clarification and ultraviolet disinfection. The facility contains two rapid sand filter basins, which are currently not in service.

TABLE NO. 3-1 LIFT STATION INVENTORY

Village of Huntley, Illinois

Lift Station No.	Lift Station Name	Ground Elevation (ft)	Bottom Elevation (ft)	Wet Well Diameter (ft)	Force Main Size (in)	Force Main Length (ft)	Gravity Sewer Inv. (ft)	Gravity Sewer Diameter (in)	Pump Number	Pump Vendor	TDH (ft)	Pump Rating (gpm)	Year Constructed	Building[f]	Building[e]	Generator?[e]
Tributary to East WWTF																
1E	Main Street	889.5	868.43	6'	6"	281'	877.25	6"	1	ABS			1977 or 1993?	Submersible	No	Yes - Portable
									2							
2E	Heritage of Huntley[b]	893.21	861.61	10'	10"[a]	113'[a]	867.12	18"	1	Wemco-Hidrostal	27'[a]	500[a]	2001	Submersible	No	Yes - On-site
									2	Wemco-Hidrostal	27'[a]	500[a]				
3E	Wing Pointe[c]	885.1	857.33	10'	10"[a]	2,480'[a]	864.13	16"	1	Wemco-Hidrostal E5K-S	47.5'[a]	900[a]	2000	Submersible	No	Yes - On-site
									2	Wemco-Hidrostal E5K-S	47.5'[a]	900[a]				
4E	Covington Lakes[d]	875	841.7	10'	10"[a]	9,400'[a]	847.66	12"	1	Wemco	98'[a]	865[a]	2003	Submersible	Yes	Yes - On-site
									2	Wemco	98'[a]	865[a]				
									3	Wemco	98'[a]	865[a]				
5E	Wolf Drive	901[l]	883.5	4'	2"[a]	262'[a]	887.5	6"	1	Barns	22.3'[a]	28[a]	1999	Submersible	No	Yes - On-site
									2		22.3'[a]	28[a]				
6E	Oakcrest	895.7	877.5	5'	3"[a]	281'[a]	882.08	6"	1	Hydromatic	28'[a]	30[a]	2003	Submersible	No	Yes - Portable
									2		28'[a]	30[a]				
7E	Vine Street	889[l]	867	6'	4"[a]	206'[a]	870.6	6"	1	Hydromatic	29'[a]	250[a]	1999	Submersible	No	Yes - Portable
									2		29'[a]	250[a]				
Tributary to West WWTF																
8W	Smith Drive	877[l]	862.9	5'	4"	19'	867.33	8"	1		10'[a]	125[a]	1992	Submersible	No	No
									2		10'a	125[a]				
9W	Jim Dahmer Drive (Freeman & 47)	895[l]	868.0±[g]	6'	6"[a]	11,000'[a]	874.0±[g]	8"[g]	1	Hydromatic	115'[a]	180[a]	1993	Submersible	No	Yes - Portable
									2		115'[a]	180[a]				
10W	Sun City	879[l]	845	10'	3"[a]	1,191'[a]	849.5	12"	1	Wemco	43'[a]	251[a]	1999	Submersible	No	Yes - Portable
									2		43'[a]	251[a]				
11W	Del Webb	880[l]	857	8"/12"	6" / 12"[a]	250' / 250'[a]	862	12"	1	Wemco	31' / 45'[a]	250 / 1100[a]	1999	Submersible	No	Yes - Portable
									2		31' / 45'[a]	250 / 1100[a]				
									3		31' / 45'[a]	250 / 1100[a]				
12W	Kishwaukee	897.6	871	6'		1890'	877'	12"	1	Hydromatic	140[a]	400[a]	1992	Submersible	Yes	Yes - On-site
									2		140a	400[a]				
13W	Talamore Foundersfield (Talamore #2)	877.00	838[j]	10'[j]	12"[j]	4100[j]	844.44[j]	8"12"[j]	1	Wemco	83'	1216[f]	2006	Submersible	Yes	Yes - On-site
									2		83'	1216[f]				
14W	Talamore Reed Road (Talamore #1)	873.4	853.93[j]	18.25'X29.75'[j]	12"[j]	2838'[j]	859.53[j]	8"/12"[j]	1	Wemco	68.5'	1200[f]	2006	Submersible	Yes	Yes - On-site
									2		68.5'	1200[f]				
									3	Future	68.5'	1200[f]				

[a] IEPA Permit is the source of this information

[b] Except as otherwise denoted, all information was obtained from Record Drawings for Heritage of Huntley Sanitary Lift Station and Forcemain dated 2/11/02.

[c] Except as otherwise denoted, all information was obtained from Record Drawings for Wing Pointe Off-site Sanitary and Water Main Improvements revised 6/7/02.

[d] Except as otherwise denoted, all information was obtained from Final Engineering Plans for Covington Lakes Sanitary Pumping Station and Forcemain revised 7/8/02.

[e] All Building and Generator Information provided in the last two columns was obtained from a list of the lift stations provided by the Village (Adrian provided the list and Jim Schwartz reviewed/confirmed it.

[f] Pump capacities were obtained from the Sanitary Sewer Master Plan Report - Draft dated November 2005 (Table 1).

[g] Invert and rim for the Jim Dahmer lift station was obtained from a partial profile and plan provided to EEI by the Village (it did not have a name or date on it).

[g] The permit for the Del Webb Boulevard Lift Station indicated that smaller pumps (250 gpm) were being installed, but it had the possibility the possibility to expand to 1,1100 gpm. It is not clear as to which condition the Village currently operates.

[c] Except as otherwise denoted, all information was obtained from Record Drawings for Huntley Sanitary Forcemain Improvements dated 11/20/2008 (no record drawing date).

[i] Ground elevation was obtained/estimated from Del Webb's Sun City Neighborhood No. 21 plans, Sheet 35.

Values obtained from field investigations by Village staff.

[j] Ground elevation was obtained/estimated from Talamore Lift Station plans

[k] Approximate lengths and invert were obtained from the Forcemain Improvement plans revised 11/20/08.

[l] Ground elevations were obtained from Google Earth.

Verification is required.

WEST WWTF

EAST WWTF

EEI 40 YEARS
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Sugar Grove, Illinois 60554
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VILLAGE OF HUNTLEY
10987 MAIN STREET
HUNTLEY, IL 60142

NO.	DATE	REVISIONS

COMPREHENSIVE WATER AND WASTEWATER SYSTEMS MASTER PLAN

EXHIBIT 3-2
WWTFs OVERVIEW

DATE:	MARCH 2015
PROJECT NO:	HU1401
FILE:	HU140050
SHEET 1	OF 1

Plotted: March 19, 2015 @ 3:39 PM By: Kris Pung – Tab: Master Plan 22x34

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Alum is currently fed within the treatment train to aid in the removal of barium from the liquid phase stream to meet the pertinent water quality standard. The biosolids treatment train consists of aerobic digestion and mechanical dewatering with the use of a belt filter press. The facility also has a gravity sludge thickener tank, which is currently not in service. Exhibit 3-3 is a process flow diagram of the facility.

The East WWTF discharges to the Huntley Branch of the Kishwaukee River under the National Pollutant Discharge Elimination System (NPDES) Permit No. IL0029238. A copy of the current NPDES permit for the facility is included in Appendix B. The effluent standards of the facility are consistent with other Northeastern Illinois WWTFs discharging to low flow streams, although the barium effluent limit of 2.0 mg/l is sometimes difficult to meet at this facility. It is a 10/12 facility with the Carbonaceous Biological Oxygen Demand (Five Day CBOD5) effluent limit in mg/l being the former and the Total Suspended Solids (TSS) in mg/l being the latter. The facility has a seasonal ammonia-nitrogen effluent standard range of 1.1 – 1.4 mg/l. As stated, dissolved oxygen, pH and fecal coliform standards are typical. The facility currently does not contain a Total Phosphorus effluent standard. However, with the near future finalization of nutrient reduction initiatives for the State of Illinois, it is quite possible the facility will receive a Total Phosphorus effluent standard in the near future. While current nutrient reduction initiatives for point dischargers appear to be primarily focused on Total Phosphorus, Total Nitrogen reduction is also being discussed. While it does not appear a Total Nitrogen effluent standard is imminent, the future potential should be considered when evaluating nutrient removal options at either of their facilities.

The East WWTF is well run and is generally in very good condition. Table No. 3-2 provides a summary of each of the unit processes' conditions and capacities. The oldest unit processes in the facility, the Excess Flow Raw Sewage Pumps, Northwest Oxidation Ditch, Secondary Clarifier No. 1, East RAS/WAS Pumping Station, Filter Building and two Aerobic Digesters, were originally constructed in the 1988 expansion. Other than the sand filter building, all of these 26+ year old unit processes remain in reasonable condition. However, given the age of each of these facilities, rehabilitation of some components are needed. For instance, the gates and valves in the Northwest Oxidation Ditch need to be replaced. The effluent valves in the Northeast Oxidation Ditch also need to be replaced.

While the operation of most of the components of the plant are seamless, the lack of versatility of sending flows from the Northwest Oxidation Ditch to Final Clarifiers No. 2 and 3 can sometimes be an issue. Therefore, this issue should be resolved. In addition, the non-potable water system at this facility needs to be replaced. While the replacement of the UV system, which was installed in the 2000 improvements, is not imminent, its continual use throughout the planning period of this report (up to 2040) is unlikely. Therefore, the replacement of this system should be planned over the next six (6) to fifteen (15) years.

Exhibit 3-3: East WWTF Process Flow Diagram

Village of Huntley, IL

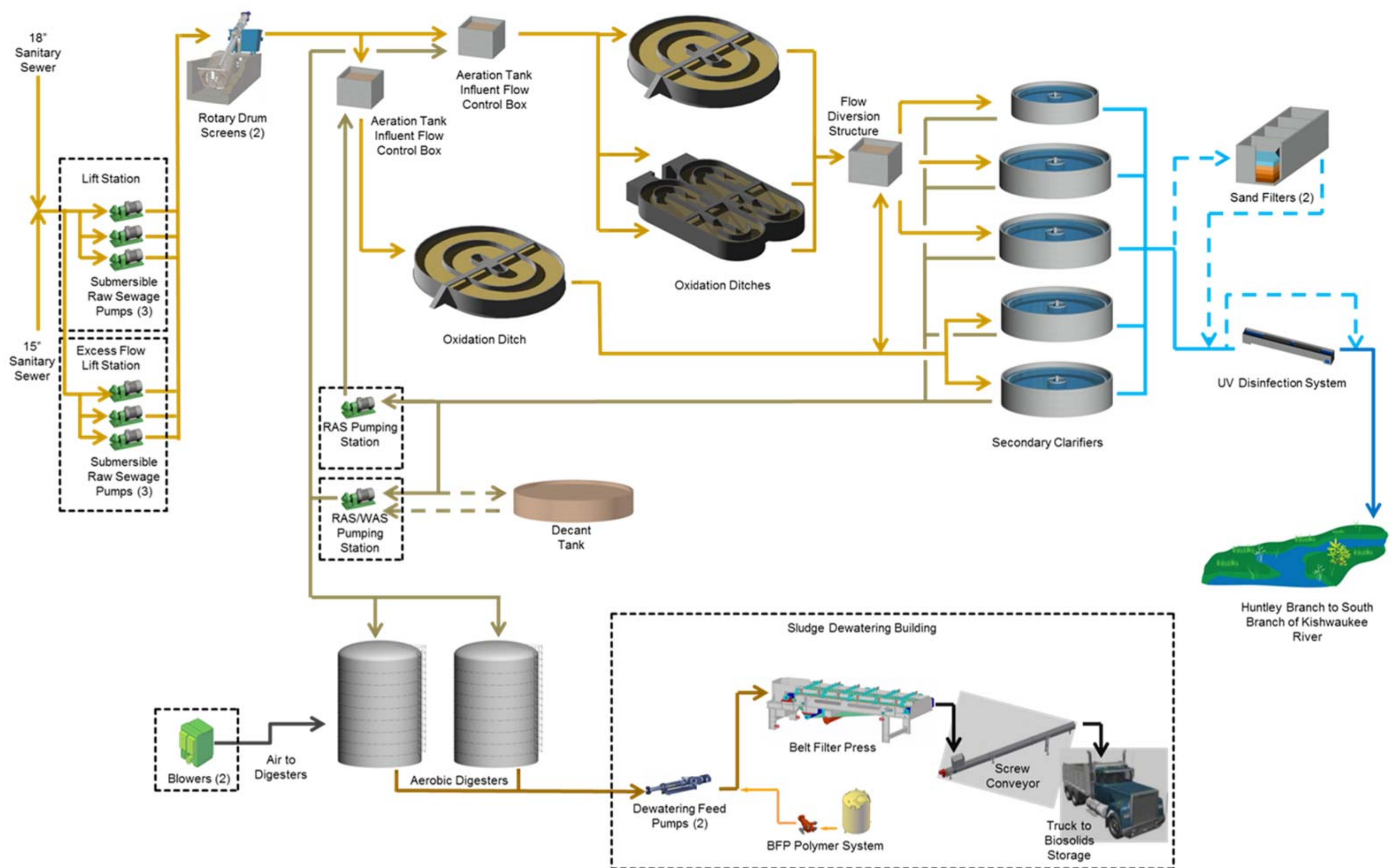


TABLE NO. 3-2: EXISTING TREATMENT UNITS CONDITIONS AND CAPACITIES - EAST WWTF

Village of Huntley, IL

Treatment Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate - IEPA Standards	Design Avg. Capacity* (MGD)	Comments and Recommendations
Headworks	Raw Sewage Pumps	2000	14	N/A	OK	3 @ 700 gpm	Meet PHF w/ Largest Out	1.68**	Undersized for PHF w/ Largest Out
	"Excess Flow" Raw Sewage Pumps	1988	26	2002 - 3 Pumps Replaced	OK	3 @ 700 gpm	Meet PHF w/ Largest Out		
	Manually-Cleaned Bypass Bar Rack Screens	2000	14	N/A	OK	1.25-inch Clear Spacing	-	1.33	Consider Continued Service
	Rotary Drum Screens - 2 Lakeside Rotomat Screens	2000	14	2008 - Rebuilt Screen & Valves	OK	7 mm Openings (1/4-inch)	< 2.5 ft/s at PHF	2.67 (1.33 Ea)	Consider Continued Service
		2002	12	2008 - Rebuilt Screen & Valves	OK	7 mm Openings (1/4-inch)			
Oxidation Ditches	West Oxidation Ditch - Envirex 2-Ring Orbal	2002	12	N/A	Good	72,000 ft^3	24 hr HRT @ DAF	1.82	Consider Adding VFD's
	Northwest Oxidation Ditch - Envirex 2-Ring Orbal	1988	26	2004 - Shaft Rebuilds	Good	30,700 ft^3	24 hr HRT @ DAF		Generally Only Used to Hold Excess Flows; Valve Replacements Required
	Northeast Oxidation Ditches (2) - Lakeside Closed Loop Reactors	2000	14	N/A	Good	140,800 ft^3	24 hr HRT @ DAF		Consider Continued Service
Secondary Clarification	Secondary Clarifier No. 1	1988	26	N/A	OK	1,257 ft^2 (40' Dia - 15'-4" SWD)	1000 $gal/ft^2/d$ @ PHF (w/ Tertiary Filters; 600 $gal/ft^2/d$ @ PHF w/o Tertiary Filters)	2.91	Not Req'd for IEPA Standards; Consider Alternate Use - Chemical Feed
	Secondary Clarifiers No. 2 and 3	2000	14	N/A	Good	6,637 ft^2 (65' Dia - 15'-4" SWD)	1000 $gal/ft^2/d$ @ PHF (w/ Tertiary Filters; 600 $gal/ft^2/d$ @ PHF w/o Tertiary Filters)		Consider Continued Service
	Secondary Clarifiers No. 4 and 5	2002	12	N/A	Good	6,637 ft^2 (65' Dia - 15'-4" SWD)	1000 $gal/ft^2/d$ @ PHF (w/ Tertiary Filters; 600 $gal/ft^2/d$ @ PHF w/o Tertiary Filters)		Consider Continued Service
RAS/WAS Pumping	West RAS Pumping Station - 2 Submersible Pumps	2002	12	N/A	Good	2 @ 510 gpm	100% DAF w/ Largest Out	2.26***	Consider Continued Service
	East RAS/WAS Pumping Station 2 RAS Subm. Pumps; 2 WAS Subm. Pumps	1988	26	N/A	OK	2 @ 550 gpm (RAS Pumps)	100% DAF w/ Largest Out		Consider Continued Service
		1988	26	N/A	OK	2 @ 350 gpm (WAS Pumps)			
Sand Filters	Two Filter Bays	1988	26	2002 - New Bridges and Equipment	Poor	2 @ 180 SF	5 gpm/sf @ PHF w/ Largest Out	1.30	Undersized to Handle PHF w/ Largest Out; Operationally Limited; Consider Alt. Use
UV Disinfection	Two Channels - 3 UV Banks Ea. Channel	2000	14	2002 - Added 2nd Channel & 3 UV Banks	Good	2 Channels @ 3.6 MGD Ea.	100% PHF	2.40	Consider Cont. Service, Hydraulics Limit Vertical UV Installation
Effluent Parshall Flume	One Flume w/ ULT	2000	14	N/A	Good	12-inches Throat Width	100% PHF	1.50****	Consider Replacing with 18-inch Flume
Sludge Decant Tank	One Tank	2002	12	N/A	OK	22 ft Diameter 12'-6" SWD	--	--	Operationally Limited; Consider Alternate Use
Aerobic Digesters	Aerobic Digester No. 1	1988	26	N/A	Good	44,179 ft^3 50 ft Diameter 22'-6" ft SWD	3.0 ft^3/P.E. (+ 25% VOL) (No Mech. Thickening)	1.88	Consider Continued Service
	Aerobic Digester No. 2	1988	26	N/A	Good	31,172 ft^3 42 ft Diameter 22'-6" ft SWD	3.0 ft^3/P.E. (+ 25% VOL) (No Mech. Thickening)		Consider Continued Service
Blowers	Two Positive Displacement Blowers	2013	1	N/A	Good	2 @ 1,208 scfm	30 cfm / 1000 ft^3 w/ Largest Out	0.96	Does Not Meet IEPA Regs, but Capacity Sufficient for Needs
Sludge Dewatering	One Belt Filter Press w/ Two PC Feed Pumps, Polymer Feed System, and Discharge Conveyor	2000	14	N/A	Good	1.5 Meter Press	--	1.80*****	Consider Continued Service
Sludge Storage	Sludge Storage Building	2000	14	N/A	Good	38,220 ft^3 (65' x 105' x 5.6')	150 days storage	1.80******	Consider Continued Service

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\WWTFs\[Treatment Units - East WWTF.xls]Summary

Notes:

WWTF Design Average Flow Capacity = 1.80 MGD; Design Maximum Flow (DMF) = 4.5 MGD; Peak Hourly Flow (PHF) = 5.40 MGD

* Design Average Flow (DAF) = Peak Hydraulic Flow (PHF) / 3.0 when PHF is Design Parameter

** 1.344 MGD DAF Capacity With Largest Out in Each of the Two Raw Pump Stations

*** 1.52 MGD DAF Capacity With Largest Out in Each of the Two RAS Pump Stations

**** Effluent Parshall Flume May Flood UV When Flows Exceed 4.5 MGD Due to Plant Hydraulics (1.44 ft Depth Available Upstream of Flume)

***** Based on Processing 19,060 GPD of Sludge from Digesters and Dewatering 5 Days/Wk (1% Solids from Digesters and Dewatering to 15%)

****** Based on Dewatering 5 Days/Wk and Producing 357 CF/Day

XXX Red Text Indicates Unit Process Is Operationally and Regulatory Deficient Or Is No Longer In Use

Highlighted Unit Processes are Unit Processes That Do Not Meet Operational and Regulatory Requirements

Based on current design standards, there are three unit processes that do not meet the current rated capacity of the facility. Each of these unit processes are highlighted in red within Table No. 3-2. The combined raw sewage pump/excess flow pumps currently cannot meet the peak hydraulic flow capacity with the largest pump out in each of the pump stations. With all pumps in service, or at least five of the six pumps in service, the peak hydraulic flows can be met. As influent flows to this facility rise, and/or when the current pumps reach the end of their useful lives, the pumps should be replaced with higher capacity units.

As stated, the sand filter building currently is not in operation. The facility has an excess amount of secondary clarifier capacity, therefore it has no issues meeting the total suspended solids effluent standard of 12 mg/l. In the event tertiary filtration is deemed to be needed in the future, such as if a Total Phosphorus standard of 0.5 mg/l is applied to the facility, then the tertiary filter building may be able to be repurposed and placed back into the treatment train. Given the evolution of filtration processes in recent years, the existing slow sand filter setup of the structure likely will not be an appropriate unit process for the future. However, given the reasonably good condition of the structure, it is likely it can be converted to an alternative filtration process.

The final unit process that currently does not meet the current rated capacity of the facility is the Effluent Parshall Flume. Based on the hydraulic profile of the facility, the flow through the UV channel into the Effluent Parshall Flume may be restricted by the current flume size. This may start to occur when peak flows at the facility get close to 4.0 MGD. Therefore, as flows get closer to the rated DMF of the plant of 4.5 MGD, the effluent parshall flume likely will need to be replaced with a larger unit.

While expansion of this facility is not expected in the future, due to the fact that the service area to this facility is expected to generate no more than the current DAF capacity of the facility, ongoing maintenance and some rehabilitation activities will need to occur. In addition, current unit process capacity issues or potential future nutrients standards could generate the need to modify the existing facilities and/or add new facilities. A summary of the needed improvements at this facility is as follows:

- Replace valves and gates in northwest orbal oxidation ditch.
- Replace effluent valves in northeast closed loop reactor oxidation ditch.
- Upgrade non-potable water system.
- Upgrade UV system.
- Replace 12-inch effluent parshall flume with 18-inch flume.
- Replace influent raw sewage pumps with larger capacity pumps.
- Demolish gravity sludge thickener tank and add gravity belt thickener within a building.
- Consider long term use of Secondary Clarifier No. 1 or demolish to make room for new facility.
- Convert existing Sand Filter Building to Chemical Feed Building or Tertiary Disk Filter Building.
- Install Variable Frequency Drives (VFDs) and a control system (w/ DO probes) for the oxidation ditch aerators to improve biological nutrient removal of the facility.

3.4 West WWTF

As stated, the West WWTF was originally constructed in 1998. An aerial overview of the West WWTF is included in Exhibit 3-2. The Phase 1 improvements, which combined together provided a DAF capacity of 0.65 MGD, included the 24" influent sewer, influent lift station and northern screening structure. Phase 1 also included Oxidation Ditch No. 1 (northern oxidation ditch), Secondary Clarifiers No. 1 and 2 (northern most clarifiers), Sand Filter Building A (northern sand filter building) and the attached UV System and the effluent parshall flume. The biosolids management approach in Phase 1 included the use of the outer ring of the three ring oxidation ditch for aerobic digestion, sludge dewatering with a belt filter press and then biosolids storage on a concrete pad. The current Administration/Laboratory building, which also included the blowers for the aerobic digestion process and the belt filter press, was constructed as part of Phase 1.

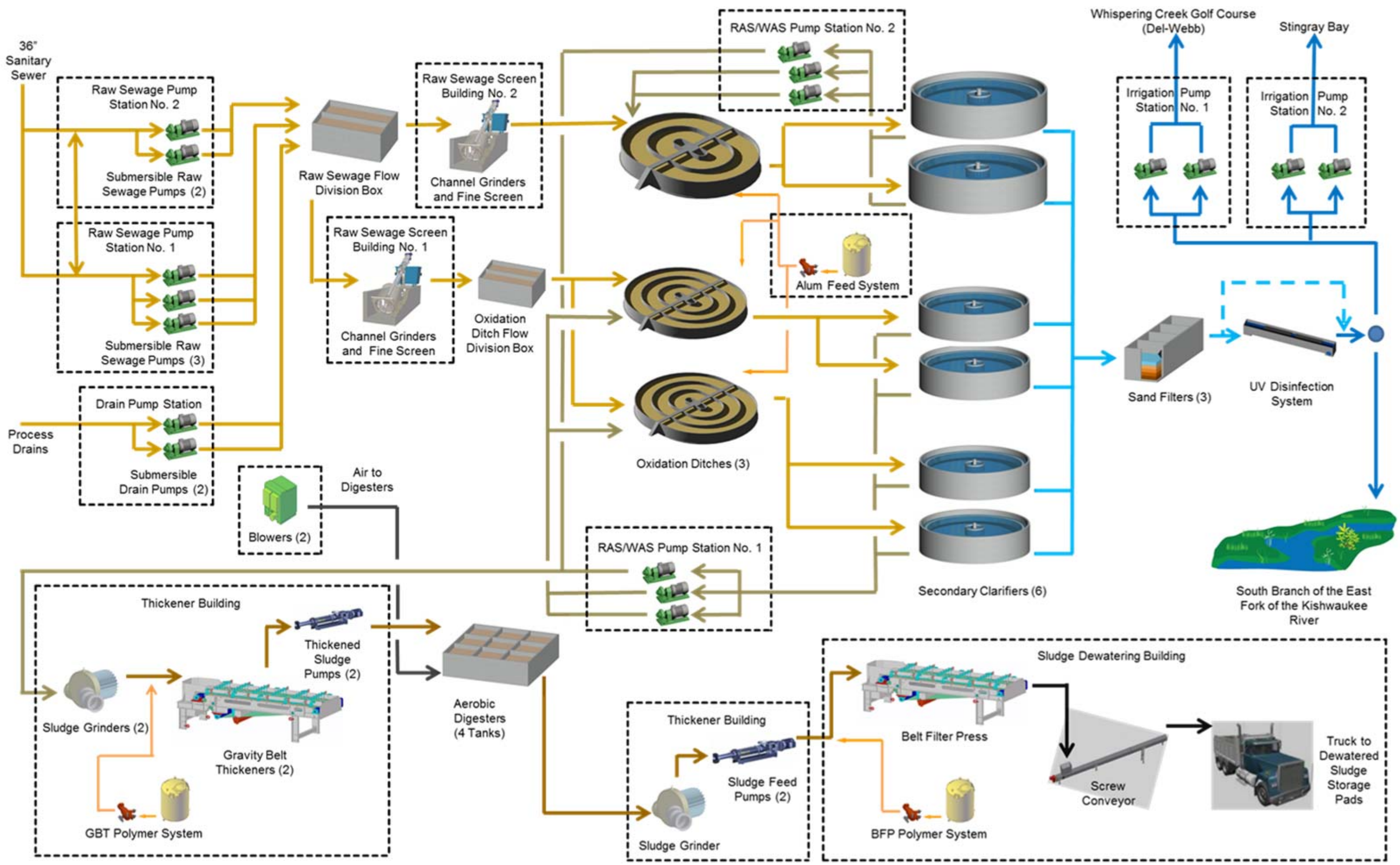
The Phase 2 improvements, which were completed in 2001, expanded the plant to a DAF of 1.6 MGD. Oxidation Ditch No. 2 (middle ditch) and Secondary Clarifier No. 3 were constructed as part of these improvements. Excess capacity in the other treatment processes that were constructed as part of Phase 1 allowed the plant to be rated for 1.6 MGD.

The Phase 3 improvements, where were completed in 2006, expanded the plant to a DAF of 2.6 MGD. The Phase 3 improvements included the construction of Raw Sewage Pump Station No. 2, the second screening building, the two ring Oxidation Ditch No. 3 (southern oxidation ditch), Secondary Clarifiers No. 3 – 5, Sand Filter Building B and the attached UV channel. The alum feed building was installed as part of this improvement due to the new Total Phosphorus standard of 1.0 mg/l being added to the NPDES permit at that time. A new bank of aerobic digesters was installed along with a new building that housed the gravity belt thickener and new blowers. Finally, the sludge storage pad was expanded to increase the biosolids storage capacity of the facility.

The Phase 3 expansion was the most recent expansion. Therefore, the West WWTF currently has a DAF capacity of 2.6 MGD and a DMF capacity of 6.5 MGD. It currently treats approximately 1.0 MGD of wastewater on an average day. The West WWTF treatment train consists of screening, oxidation ditches, secondary clarification, filtration and ultraviolet disinfection. Alum is currently fed within the treatment train to aid in the removal of barium and phosphorus from the liquid phase stream to meet the pertinent water quality standard. The biosolids treatment train consists of thickening with gravity belt thickeners, aerobic digestion, and mechanical dewatering with the use of a belt filter press. Based on the current and future tributary areas to the West WWTF, it is likely this facility will need to be expanded at some point during the planning period. Exhibit 3-4 is a process flow diagram of the facility.

Exhibit 3-4: West WWTF Process Flow Diagram

Village of Huntley, IL



The West WWTF is permitted to discharge to the South Branch of the Kishwaukee River under the National Pollutant Discharge Elimination System (NPDES) Permit No. IL0070688. A copy of the current NPDES permit for the facility is included in Appendix B. It only discharges during a portion of the year, because the effluent for the facility is land applied throughout the Del Webb community during the growing season (April – October). Consistent with the East WWTF, the West WWTF has 10/12 CBOD5/TSS effluent standards, as well. The West WWTF also has barium effluent standard of 2.0 mg/l. The seasonal ammonia-nitrogen effluent standards range from 1.2 – 1.5 mg/l at the west facility. The dissolved oxygen, pH and fecal coliform standards are typical, also. In contrast to the East WWTF, the West WWTF currently has a Total Phosphorus effluent standard of 1.0 mg/l.

The West WWTF also is well run and also is in very good condition. Table No. 3-3 provides a summary of the existing West WWTF treatment units' conditions and capacities. Due to the fact that the oldest components are only 15 years old, there is a limited amount of maintenance needed at the plant. However, there are a few improvements that will aid the efficient long term operation of the facility. Draining the oxidation ditches is currently limited by the capacity of the drain pumping station. This station receives flow from all process drains, including the oxidation ditches, but the pumping capacity is limited such that it can take days to fully drain certain processes. Oxidation ditch drainage would be drastically improved with the rerouting of the drainage piping to a raw sewage pump station. In addition, the mud valves on Oxidation Ditch No. 1, which allow the tanks to be drained, need to be replaced.

A lingering issue at the facility is the operation of Raw Sewage Pump Station No. 2. The effluent piping within the structure does not allow the pumps to properly seat. Village staff initiated the modifications to this structure during the development of the report. It is uncertain whether additional work will be needed on this station.

The operation of the existing aerobic digesters is limited by manual evaluation of the dissolved oxygen content within each of the digesters. The process can be significantly improved by adding dissolved oxygen probes within each of the four structures, connecting the probes to the digester control system and automating the blower output to optimize the digester operation. The automated process will reduce electricity costs, improve biosolids digestion and likely improve biosolids dewatering and reduce biosolids disposal costs.

The second screen that was installed at the facility has been an ongoing maintenance issue. While staff can work with the screen to keep it operational for some more years, its continual operation through the end of the planning period is doubtful. As flows continue to increase at the facility, the need for efficient, ongoing operation of this screen will become more important. Therefore, this screen should be replaced in the next 10 – 15 years. Given the fact that the first screen that was installed at the facility likely will be at the end of its useful life at that time, it should be replaced, as well.

TABLE NO. 3-3: EXISTING TREATMENT UNITS CONDITIONS AND CAPACITIES - WEST WWTF

Village of Huntley, IL

Treatment Unit	Components	Year Installed	Total Years in Operation	Last Modification	Condition	Size	Design Loading Rate - IEPA Standards	Design Avg. Capacity* (MGD)	Comments and Recommendations
Headworks	Raw Sewage Pump Station No. 1	1998	16	2010 - New Impellers	Good	3 @ 1,080 gpm	Meet PHF w/ Largest Out	2.75**	Consider Continued Service
	Raw Sewage Pump Station No. 2	2006	8	N/A	OK - Piping Issues	2 @ 2,500 gpm	Meet PHF w/ Largest Out		Consider Piping Upgrades
	Fine Screens - 2 JWC Screens w/ Augers and Channel Grinders	1998 2006	16 8	N/A N/A	OK OK	6 mm Openings (1/4-inch) 6 mm Openings (1/4-inch)	< 2.5 ft/s at PHF	3.90 (1.6 MGD Old + 2.3 MGD New)	Consider Replacing Comminutors/Screens in Near Future
Oxidation Ditches	Oxidation Ditch No. 1 (Northern) - Envirex 3-Ring Orbal	1998	16	2003 - Modified Piping	OK	158,000 ft^3	24 hr HRT	3.90	Replace Drain Plug Valves; Replace Motors & Add VFD's
	Oxidation Ditch No. 2 (Middle) - Envirex 3-Ring Orbal	2001	13	N/A	Good	158,000 ft^3	24 hr HRT		Replace Drain Plug Valves
	Oxidation Ditch No. 3 (Southern) - Envirex 2-Ring Orbal	2006	8	N/A	Good	205,600 ft^3	24 hr HRT		Consider Continued Service
Secondary Clarification	Secondary Clarifier Nos. 1 and 2	1998	16	N/A	OK	1,963 ft^2 (Ea.) (50' Dia - 14'-8" SWD)	1000 gal/ft^2/d @ PHF (w/ Tertiary Filters; 600 gal/ft^2/d @ PHF w/o Tertiary Filters)	3.84	Consider Continued Service
	Secondary Clarifier No. 3	2001	13	N/A	OK	1,963 ft^2 (50' Dia - 14'-8" SWD)	1000 gal/ft^2/d @ PHF (w/ Tertiary Filters; 600 gal/ft^2/d @ PHF w/o Tertiary Filters)		Consider Continued Service
	Secondary Clarifier No. 4	2006	8	N/A	Good	1,963 ft^2 (50' Dia - 14'-8" SWD)	1000 gal/ft^2/d @ PHF (w/ Tertiary Filters; 600 gal/ft^2/d @ PHF w/o Tertiary Filters)		Consider Continued Service
	Secondary Clarifiers Nos. 5 and 6	2006	8	N/A	Good	5,675 ft^2 (Ea.) (85' Dia - 15'-7" SWD)	1000 gal/ft^2/d @ PHF (w/ Tertiary Filters; 600 gal/ft^2/d @ PHF w/o Tertiary Filters)		Consider Continued Service
RAS/WAS Pumping	RAS/WAS Pumping Station No. 1 - 2 RAS Subm. Pumps 1 WAS Subm. Pump	1998	16	2006 - Added WAS Pump	OK	2 (RAS) @ 1,675 gpm 1 (WAS) @ 325 gpm	100% DAF w/ Largest Out	7.56***	Consider Continued Service
	RAS/WAS Pumping Station No. 2 - 2 RAS Subm. Pumps 1 WAS Subm. Pump	2006	8	N/A	Good	2 (RAS) @ 1,900 gpm 1 (WAS) @ 325 gpm	100% DAF w/ Largest Out		Consider Continued Service
Sand Filters	Sand Filter Building A - North	1998	16	N/A	OK	2 @ 575 SF	5 gpm/sf @ PHF w/ Largest Out	2.76	Consider Continued Service
	Sand Filter Building B - South	2006	8	N/A	OK	1 @ 575 SF			Not Operational Due to Bridge Issues - Runs Off Tracks
UV Disinfection	Two Channels - 2 UV Banks Ea. Channel	2006	8	N/A	Good	2 Channels @ 3.9 MGD Ea. Channel	100% PHF	2.60	Consider Continued Service
Effluent Parshall Flume	One Flume w/ ULT	1998	16	N/A	Good	12-inch Flume	--	3.48	Consider Continued Service
Sludge Thickening	Two Gravity Belt Thickeners w/ Two Sludge Grinders & Two PC Feed Pumps	2006	8	N/A	Good	Two 1.0 Meter GBT's	--	--	Consider Continued Service
Aerobic Digesters	4 Aerobic Digester Tanks	2006	8	2012 - Replaced Valves	Good	66,000 ft^3 4 @ 1,100 SF 15'-0" ft SWD	3 ft^3/P.E. (+ 25% VOL) (Thickening to 2% Solids)	1.76	Consider Adding 2 Tanks; Add Automated Controls
Blowers	Two Positive Displacement Blowers	2006	8	N/A	Good	2 @ 2,640 scfm	30 cfm / 1000 ft^3 w/ Largest Out	2.31****	Consider Adding One Blower With Digester Expansion
Sludge Dewatering	One Belt Filter Press w/ Two PC Feed Pumps, Polymer Feed System, and Discharge Conveyor	1998	16	2006 New PC Pumps & Grinder	OK	1.0 Meter Press	--	1.30*****	Consider Adding 1.5 Meter Press; Replace Conveyor Liner
Sludge Storage	Sludge Storage Beds	1998 2006	16 8	2006 N/A	OK Good	7,670 ft^2 (4 ft Sludge Hgt) 7,125 ft^2 (5.5 ft Sludge Hgt)	150 days storage	1.53******	Consider Doubling Storage Capacity
Alum Feed System	Pump Skid w/ 3 Metering Pumps; 1 Chem. Storage Tank	2006	8	N/A	OK	2 @ 5.3 GPH 1 @ 12.2 GPH 6436 Gal Tank	10 Days Storage	14.82*******	Consider Continued Service
Drain Pump Station	2 Pumps	1998	16	N/A	OK	2 @ 500 gpm	--	--	******** Undersized Pumps; Consider Alt. Ox Ditch Drainage Plan Using RS Pumps

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\WWTFs\[Treatment Units - West WWTF.xls]Summary

Notes:

WWTF Design Average Flow Capacity = 2.60 MGD; Design Maximum Flow (DMF) = 6.5 MGD; Peak Hourly Flow (PHF) = 7.8 MGD

* Design Average Flow (DAF) = Peak Hydraulic Flow (PHF) / 3.0 when PHF is Design Parameter

** 2.24 MGD DAF Capacity if One 1,080 gpm pump and One 2,500 gpm out of service

*** 5.14 MGD DAF Capacity if Largest in Each RAS Station Out of Service

**** 2,970 CFM Required for Digester Volume of 99,000 CF

***** Based on Processing 55,090 GPD of Thickened Sludge from Digesters and Dewatering 5 Days/Wk (2% Solids from Digesters and Dewatering to 19%)

****** Based on Dewatering 5 Days/Wk and Producing 1104 CF/Day

******* Assumes Phosphorus is Limiting Factor; Bio-P Removal to 2.0 mg/L and Chem-P Polishing to 0.5 mg/L

******** One Pump Running at Full 500 gpm would Drain Ox. Ditch #1 or #2 in 39.4 Hours, and Ox. Ditch #3 in 51.3 Hours; May also be limited by 8" drain lines from each Ditch

XXX Red Text Indicates Unit Process Is Operationally and Regulatory Deficient Or Is No Longer In Use

Highlighted Unit Processes are Unit Processes That Do Not Meet Operational and Regulatory Requirements

As previously stated, the current Administration/Laboratory building was constructed along with Phase 1 of the facility. The building includes a small laboratory, which also doubles as the staff office and break room. The washroom and shower cabinet are minimal, too. While the Administration/Laboratory portion of this building was sufficient for the initial operation of the facility, the staff needs will soon outgrow its current size. In addition to the need to provide larger administration and laboratory areas, there currently is no weather protected space for the staff to work on equipment. Therefore, it is recommended a new Adminstration/Laboratory/Garage building be constructed on the site to accommodate these needs.

While the majority of the unit processes at the facility have a capacity that is larger than the plant's rated DAF capacity of 2.6 MGD, there are some unit processes that have a capacity lower than 2.6 MGD. Inspection of Table No. 3, shows there are four unit processes highlighted in red. In general, all of the biosolids treatment train unit processes will need to be upgraded as flows increase toward the DAF capacity of the facility. A second belt filter press will be needed in the near future to meet average daily flows in excess of 1.3 MGD. Sludge storage will need to be expanded in the near future as average daily flows exceed 1.53 MGD. Additional aerobic digesters will need to be installed as the plant approaches average daily flows of 1.76 MGD. Lastly, blower capacity will need to be expanded when average daily flows exceed 2.31 MGD.

Based on the above discussion, a summary of the needed improvements at this facility is as follows:

- Improve the oxidation ditch drainage efficiency by connecting the drain lines to a raw sewage pump station.
- Replace the drain mud valves on Oxidation Ditch Nos. 1 and 2.
- Upgrades to Raw Sewage Pump Station No. 2 to resolve the piping issues (if the currently underway improvements are not sufficient).
- Automate the aerobic digester controls.
- Replace existing comminutors/screens with alternative screening approach.
- Construct new Administration/Laboratory/Garage Building to increase operational efficiencies at the facility.

3.5 Wastewater SCADA System Overview

The Village of Huntley utilizes a Supervisory Control and Data Acquisition (SCADA) system to monitor the operation of the wastewater system. The Wastewater Treatment Facility SCADA system consists of the following primary components:

- SCADA Server and Thick Client PC;
- West WWTP Control Panels;
- East WWTP Control Panels;
- Ethernet Communication Network;

SCADA Server and Client: The WWTP SCADA Server is currently being replaced by a Virtual Server located on the SCADA Virtual Host Server. The SCADA Software is Wonderware SystemPlatform. The SCADA Server is "headless", meaning the operations staff does not interact with the SCADA Server. A SCADA Thick Client is used for operator interface and alarming. The Thick Client is a Dell OptiPlex 7010 workstation with Wonderware InTouch Client software and Win-911 Alarm software. The Virtual Host Server and Thick Client are both located at the West WWTP. The SCADA server/client allow operations staff to view WWTP system status and alarms, as well as make setpoint adjustments.

West WWTP Control Panels: The West WWTP consists of a number of control panels throughout the plant that use Allen-Bradley CompactLogix Series Programmable Logic Controllers (PLCs). The PLCs communicate on a peer-to-peer Ethernet network to the SCADA server. The Wonderware System Platform SCADA Server uses a software I/O driver to provide read/write access to the SCADA data in each of the PLCs.

East WWTP Control Panels: Minimal information is currently tied into the SCADA server from the East WWTP. A PLC at the East WWTP communicates to the West WWTP Water/Lift MTU using the 900MHz wireless system. The data is read only, so no operational changes to the East WWTP can currently be made from the West WWTP.

Ethernet Communication Network: The PLCs at the West WWTP are connected using fiber optic and use Allen Bradley's newer Ethernet/IP protocol. The SCADA server is connected to this network and communicates directly to each PLC on the network (peer-to-peer topology).

Planned Improvements: Besides the West WWTP SCADA Server upgrade currently in process, the Village is also planning control system improvements at the East WWTP in 2015. These improvements include:

- Installing digester level transmitters;
- Installing RAS wet well level transmitters;
- Installing WAS wet well level transmitters;
- Automating the Digester Blowers;
- Integrating the above information into the West WWTP SCADA system.

SECTION 4: HISTORICAL WATER USE & WASTEWATER FLOWS

The Village of Huntley's historical water use and wastewater flow has intensified along with the Village's growth in population. The purpose of this section of the report is to first provide a summary of the Village's historical water production and use followed by a review of the historical wastewater flows and effluent quality.

4.1 Historical Water Use

The Village of Huntley Water Department tracks water production in daily, monthly and yearly increments. Water use by all of the Village of Huntley residents, businesses, industrial users and government/ institutions is tracked through monthly meter readings.

The historical total water use, or essentially the total amount of source water utilized in the production and distribution of potable water within the Village's Water Works System, was analyzed from January 1, 2009 – December 31, 2013. Table No. 4-1 summarizes the total raw water pumped by the Village's Water Department.

TABLE NO. 4-1: HISTORICAL WATER PRODUCTION

Village of Huntley, IL

YEAR	2009	2010	2011	2012	2013	AVG.
ESTIMATED POPULATION	23,754	24,291	24,624	24,965	25,446	
ANNUAL PUMPAGE	759,997,000 GAL	801,471,000 GAL	799,308,000 GAL	892,340,000 GAL	800,423,000 GAL	
MAXIMUM MONTHLY PUMPAGE	92,200,000 GAL	100,414,000 GAL	114,632,000 GAL	125,878,000 GAL	100,281,000 GAL	
MAXIMUM DRY WEATHER MONTH	JULY	JULY	JULY	JULY	AUGUST	
AVERAGE DAILY PUMPAGE	2,082,184 GAL	2,195,811 GAL	2,189,885 GAL	2,438,087 GAL	2,192,940 GAL	
MAXIMUM AVERAGE DAILY PUMPAGE	2,974,000 GAL	3,239,000 GAL	3,698,000 GAL	4,087,000 GAL	3,235,000 GAL	
MAXIMUM DAILY PUMPAGE	4,128,000 GAL	4,700,000 GAL	5,418,000 GAL	5,323,000 GAL	4,460,000 GAL	
COMPUTED MAXIMUM HOUR	344,000 GAL	391,667 GAL	451,500 GAL	443,583 GAL	371,667 GAL	
COMPUTED MAXIMUM HOUR	5,733 GPM	6,528 GPM	7,525 GPM	7,393 GPM	6,194 GPM	
AVG. GAL./PERSON/DAY	87 GPCD	90 GPCD	89 GPCD	98 GPCD	86 GPCD	90
RATIO OF MAX. DAY TO AVG. DAY	1.98	2.14	2.47	2.18	2.03	2.16

NOTES:

1. ESTIMATED POPULATION BASED ON 2008 SPECIAL CENSUS, 2010 US CENSUS, ESTIMATES FROM BUILDING PERMITS AND CMAP 2040 POPULATION PROJECTION DATA
2. ASSUMED RATIO OF MAX. HOUR TO MAX. DAY DEMAND (MHD:MDD) = 2.0

Inspection of this table indicates that the water use characteristics and metrics are fairly consistent with many northeastern Illinois communities during the same period. For instance, the maximum day demand to average day demand ratio (MDD:ADD) has averaged 2.16 for the past five years. It reached its maximum in 2011 at 2.47 which occurred during a summer when Illinois experienced below average rainfall in July and August. Coupled with above-average temperatures, the result was a rapidly developed drought that continued through 2012. The drought in turn led to extensive lawn irrigation and peak maximum day water use. The significance of the MDD:ADD ratio is that it is proportional to the amount of supply, treatment, and storage required for a municipality. A greater ratio results in greater supply, treatment, and storage requirements. The system must be designed to meet these requirements for every day of every year while the increased demand may be limited to just a few days of each year. Therefore, this value should be minimized as much as possible. In 2013, the MDD:ADD ratio stabilized in parallel with the normalizing temperature and precipitation trends which is likely indicative of decreased water use for landscaping activities. In addition to the climate, the rate of development can also impact the MDD:ADD ratio because seasonal construction water use for activities such as watering newly placed sod increases the maximum day use. Therefore, once the economy turns around and development reenergizes, or when the region experiences another drought, there is a potential that the MDD:ADD ratio could creep up again.

Another significant water use parameter to be mindful of is the average gallons (of water production) per person per day. A population equivalent (P.E.) is a unit of measure often utilized to determine the impacts of existing and additional water consumers to the system. For many northeastern Illinois communities, one P.E. is typically in the range of 75 – 120 gpd. Lower values are often times associated with established mainly residential communities that practice water conservation, while larger values are typically observed in developing communities that may have a significant commercial and industrial base that consumes a fair amount of water. Inspection of Table 4-1 shows that the historical average water use per P.E. per day in the Village of Huntley is approximately 90 gpcpd which is in the range of expected values for the community. It should be noted, this water use per P.E. also accounts for all consumer types including residential, commercial, industrial, government/industrial, etc. Similar to the MDD:ADD ratio, this value has a direct impact on the water system infrastructure and therefore, should be minimized when possible. Section 5 provides an overview of means to reduce the MDD:ADD ratio and the average gallons per person per day including water conservation goals and strategies, many of which the Village has already incorporated.

4.1.1 System Evaluation – The water supply and storage systems of the Village were evaluated for adequacy using five parameters which generally rate the strength of the supply and storage systems. The parameters used are as follows:

1. *Ultimate Source Capacity* - The ability of the system to supply the maximum day demand with the largest well out of service.

2. *Reliable Source Capacity* - The ability of the system to supply the maximum day demand with all wells operating 16 hours per day.

3. *Peak Hour Storage* - The ability of the system to have sufficient storage to meet the peak hour demand for 4 hours without depleting storage more than 50 percent.

4. *Fire Flow* - The ability of the system to meet a design fire flow rate for the design period and meet maximum day demand with the largest well out of service. A common design fire flow is 3,000 gpm for 3 hours.

5. *Emergency Supply* - The ability of the system to supply the average day demand using elevated storage and supply sources with standby power generator systems only. Normally 80% of storage tank capacity is assumed to be available.

Table No. 4-2 summarizes the system analysis for the previous five calendar years (2009 – 2013). Table No. 4-3 indicates the corresponding excess or required capacity needed to meet 100% of each of the parameters listed above. Tables No. 4-2 and 4-3 consider all existing active wells are on-line and that each water treatment plant is available to meet the Village's water demand.

For further clarification, a summary of the system analysis calculations using all active wells for calendar year 2011 follows (the year of the highest maximum daily demand over the analysis period).

<u>Test No. 1</u>: *Ultimate Source Capacity* – The 2011 maximum day demand was 5,418,000 gallons per day (gpd). The total supply capacity for the water system is 6,710,400 gpd. To obtain the *Ultimate Source Capacity* of the existing system, the capacity of the largest well (Well No. 9, 10 <u>or</u> 11 is 1,440,000 gpd) is subtracted from the total well capacity:

Total Well Capacity	=	6,710,400 gpd
Largest Well Capacity	=	<u>1,440,000 gpd</u>
Ultimate Source Capacity	=	5,270,400 gpd

Since the *Ultimate Source Capacity* (5,270,400 gpd) is less than the 2011 maximum day demand (5,418,000 gpd) the supply facilities are inadequate for Test No. 1.

TABLE NO. 4-2: WATER WORKS SYSTEM EVALUATION - *HISTORICAL ANALYSIS*

Village of Huntley, IL

TEST PARAMETERS		YEAR				
		2009	2010	2011	2012	2013
1.0	Ultimate Source Capacity	1,142,400 GAL	570,400 GAL	**-147,600 GAL**	**-52,600 GAL**	810,400 GAL
2.0	Reliable Source Capacity	345,600 GAL	**-226,400 GAL**	**-944,400 GAL**	**-849,400 GAL**	13,600 GAL
3.0	Peak Hour Storage	283,000 GAL	92,333 GAL	**-147,000 GAL**	**-115,333 GAL**	172,333 GAL
4.0	Fire Flow	2,257,200 GAL	2,185,700 GAL	2,095,950 GAL	2,107,825 GAL	2,215,700 GAL
5.0	Emergency Supply	5,842,616 GAL	5,728,989 GAL	5,734,915 GAL	5,486,713 GAL	5,731,860 GAL

TABLE NO. 4-3: WATER WORKS SYSTEM EVALUATION - *HISTORICAL ANALYSIS* CORRESPONDING AVAILABLE OR REQUIRED CAPACITY

Village of Huntley, IL

TEST PARAMETERS		YEAR				
		2009	2010	2011	2012	2013
1.0	Ultimate Source Capacity	793 GPM	396 GPM	**-103 GPM**	**-37 GPM**	563 GPM
2.0	Reliable Source Capacity*	360 GPM	**-236 GPM**	**-984 GPM**	**-885 GPM**	14 GPM
3.0	Peak Hour Storage	283,000 GAL	92,333 GAL	**-294,000 GAL**	**-230,667 GAL**	172,333 GAL
4.0	Fire Flow	2,257,200 GAL	2,185,700 GAL	2,095,950 GAL	2,107,825 GAL	2,215,700 GAL
5.0	Emergency Supply	5,842,616 GAL	5,728,989 GAL	5,734,915 GAL	5,486,713 GAL	5,731,860 GAL

* Assumes wells are operating 16 hours/day for Reliable Source Capacity.

Test No. 2: *Reliable Source Capacity* – The 2011 maximum day demand was 5,418,000 gpd. The *Reliable Source Capacity* is determined by calculating the maximum volume of water deliverable by the supply source(s) in 16 hours, or two-thirds of the daily well capacity (16 hours/day / 24 hours/day = 66%).

Total Well Capacity	=	6,710,400 gpd
16 Hour Pumping Capacity	=	6,710,400 gpd x $\frac{16 \text{ hours}}{24 \text{ hours}}$ = 4,473,600 gpd

The *Reliable Source Capacity* (4,473,600 gpd) is less than the 2011 maximum day demand (5,418,000 gpd), so the supply facilities are inadequate for Test No. 2.

Test No. 3: *Peak Hour Storage* – The 2011 peak hour demand is 451,500 gal/hr.

Peak Hour Demand	=	Max. Day Demand x 2 x $\frac{1 \text{ day}}{24 \text{ hours}}$
	=	5,418,000 gpd x 2 x $\frac{1 \text{ day}}{24 \text{ hours}}$
	=	451,500 gal/hr

The storage required to meet the peak hour demand for 4 hours is:

4-Hour, Peak Demand	=	451,500 gal/hr x 4 hrs = 1,806,000 gal

The total storage capacity of the existing facilities, at their current operating levels, is 3,318,000 gallons, and therefore 50% of the existing facilities is 1,659,000 gallons. Since the required *Peak Hour Storage* for 4 hours (1,806,000 gal) is greater than 50% of the existing facilities (1,659,000 gal), the storage facilities for Test No. 3 are inadequate.

Test No. 4: *Fire Flow* – The maximum day demand plus fire flow demands for 3 hours is 1,217,250 gallons.

Maximum Day Demand (3 Hours)	=	5,418,000 gpd x 3 hrs x $\frac{1 \text{ day}}{24 \text{ hours}}$ = 677,250 gal
Fire Flow Demand (3 Hours)	=	3,000 gpm X 60 min/hr X 3 hr = 540,000 gal
Maximum Day + Fire Flow	=	1,217,250 gal

The total flow rate available from the system with the largest supply out of service is 3,660 gpm. The total amount of water from the remaining wells over 3 hours is 658,800 gallons. If 80% of the 3,318,000 gallons from EWST storage is available, there is 2,654,400 gallons available from storage. The total supply available for 3 hours is then 3,313,200 gallons.

Storage	=	2,654,400 gal
Wells	= +	658,800 gal
		3,313,200 gal

Since the 3-hour maximum day demand plus fire flow (1,217,250 gal) is less than 80% of the available storage facilities and the available supply (3,313,200 gal), the facilities are adequate for Test No. 4.

Test No. 5: *Emergency Supply* – The 2011 average day demand is 2,189,885 gpd and 80% of the available storage is 2,654,400 gallons. With the exception of Well No. 9, the remaining wells are connected to an emergency generator and would be available for use during an emergency. Therefore, the total *Emergency Supply* is 5,270,400 gallons.

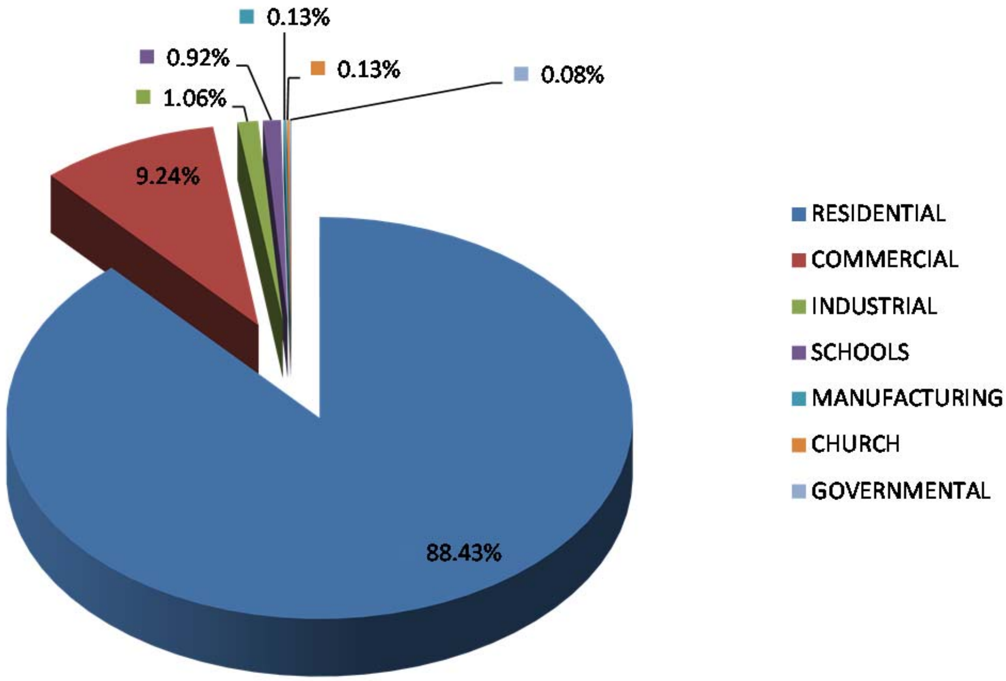
80% of Existing Storage	=	3,318,000 x 80% =	2,654,400 gal
Emergency Generator Supply	=		+ 5,270,400 gal
Total Emergency Supply	=		7,924,800 gal

Since the Total Emergency Supply (7,924,800) is greater than the Average Daily Demand (2,189,885), the system is adequate for Test No. 5, *Emergency Supply*.

Inspection of Tables No. 4-2 and 4-3 indicates that the water supply parameters, *Ultimate Source Capacity* and *Reliable Source Capacity* were inadequate during the dry weather years of 2011 and 2012. In the fairly regular precipitation years of 2009, 2010 and 2013, the water supply parameters were marginally adequate. Likewise, *Peak Hour Storage,* fluctuated over the period and fails in years 2011 and 2012, the 2 years with the highest MDD:ADD ratio. The system passed the *Fire Flow* and *Emergency Supply* analysis over the period analyzed in large part because of the amount of storage available and the number of generators connected to the water supply sources.

4.1.2 Water Consumption – The Village's 2013 annual billing records were reviewed based on the various water use classifications. Exhibit 4-1 presents the water usage by consumer type for 2013. Residential usage within the Village consumes the largest percentage of water at over 88%. Industrial and Commercial users account for over 10% of the total annual billed water. The remaining 1-2% of the total annual water usage is divided between Schools, Manufacturing, Church and Government, listed in the same order as the volume of water sold from highest to lowest.

Exhibit 4-1
2013 Water Consumption by Customer Class
Village of Huntley, IL



4.1.3 Water Audit – As defined in the AWWA Manual M36: Water Audits and Loss Control, 3rd Edition (2009), Non-Revenue Water is the difference between system input volume (water produced) and billed authorized consumption. It consists of the following:

- Unbilled Authorized Consumption (fire hydrant flushing, water treatment plant process water, municipal buildings whose water is not metered, etc.);
- Apparent Losses (non-physical losses such as unauthorized consumption (water theft), meter inaccuracies, systematic data handling errors, etc.) and;
- Real Losses (physical losses from the distribution system and storage tanks up to the point of connection to the customer meter).

Water loss in the system equates to lost revenue for the utility. It is critical to the success of any water utility to manage and minimize water loss. In response to the need for consistent water loss auditing and benchmarking, the AWWA released Version 5 of their free audit software in August 2014. This smart Microsoft Excel based audit program offers water utilities a tool to accurately and consistently identify, record, trend and benchmark the apparent and real losses in their water system. The audit provides a roadmap to help utilities reduce water waste and better prioritize infrastructure investments by identifying water losses that are viable to eliminate and economically recoverable. Another benefit of the audit is that it provides a yardstick by which to compare against past performance or other similar sized utilities. For instance, by completing the audit, several operational efficiency and financial performance indicators are calculated. A common operational efficiency performance indicator that many utilities refer to is the Infrastructure Leakage Index (ILI). The ILI is a comparison benchmark that focuses on real losses. The ILI score ranges from 1 to 10 with a lower score representing a more robust distribution system.

Over the last several years, the Village of Huntley has tracked their water loss using available resources. The data was recovered and input into the AWWA Version 5 audit program. Table No. 4-4 summarizes the basic water accounting completed from 2009 through 2013. The water used for treatment processes (unbilled & metered) over the last 5 years averaged approximately 1.4% whereas water used for purposes such as flushing, fire-fighting and main breaks (unbilled & unmetered) is estimated at approximately 1.5% over the same period. Made up of the apparent losses and real losses, the total water loss averaged about 17% for the last five years. Adding the unbilled water identified above to the total water loss provides the non-revenue water which averages about 20% of the pumped water supply. The ILI score averaged approximately 2 for this period, which is indicative of a fairly tight distribution system.

Currently, there are no water loss regulatory requirements or standards that apply to the Village of Huntley. However, in order to establish a reasonable goal for water loss, it is recommended that the benchmarking indicators of other utilities be reviewed for comparison. In 2011, as a result of a water audit data collection initiative, the AWWA Water Loss Control Committee created its first dataset of validated water audit data which has been posted for review by water utility stakeholders. The document is titled *Validated Water Audit Data For Reliable Utility Benchmarking.* Twenty one utilities provided their water audit data for review and careful validation by members of the Committee's Water Audit Software Subcommittee. Data from the entire group of utilities was assembled with results that document the first North American benchmark performance indicators using the AWWA water audit methodology. This is a significant step toward improving the level of accountability and the robustness of water audit data within North America.

Table No. 4-5 presents a comparison of the Village of Huntley's performance indicators alongside the North American Data set for utilities with less than 50,000 service connections. Review of this table suggests that the Village of Huntley is performing better than the average of the water utilities compared against. However, there is always room for improvement. Based on the water audit, the annual cost of apparent and real losses is over $200,000 as demonstrated in Table No. 4-5. Minimizing this lost revenue should be an incentive for continued water loss reduction. Understanding that a certain amount of water loss is unavoidable (i.e. leakage that cannot be detected, all meters have a certain level of inaccuracy, etc.), it is recommended the Village aim to achieve an economic level of water loss where the benefit of Water Works System Improvements to correct water loss is greater than or equal to the cost of the improvements. The Village has taken the first step in moving forward with this initiative simply by calculating how much water is being lost annually. Although it requires further investment of resources, the next step is to perform a more detailed water audit (component analysis) to identify and account for the major sources of the water loss. Continuous improvement in the water accounting will allow the Village to strategically implement controls for reducing water loss and lost revenue.

Table No. 4-4: Water Accounting

Village of Huntley, IL

Year	Water Supply		Water Billed	Water Unbilled		Water Unbilled		Authorized	Water Losses				Non-Revenue		Infrastructure
	Pumped	Treated	& Metered	& Metered		& Unmetered		Consumption	Apparent	Real	Total		Water		Leakage
								(C+D+F)		(A-H-I)	(I+J) or (A-H)		(D+F+K)		Index
	MG	MG	MG	MG	%	MG	%	MG	MG	MG	MG	%	MG	%	
Column	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
2009	759.64	747.35	614.07	12.291	1.62%	13.980	1.84%	640.34	22.806	96.495	119.30	15.71%	145.57	19.16%	1.65
2010	801.47	791.63	671.72	9.845	1.23%	11.385	1.42%	692.95	24.762	83.757	108.52	13.54%	129.75	16.19%	1.43
2011	799.13	788.19	661.61	10.931	1.37%	10.844	1.36%	683.38	24.452	91.292	115.74	14.48%	137.52	17.21%	1.56
2012	892.67	881.66	647.55	11.007	1.23%	12.410	1.39%	670.97	24.218	197.48	221.70	24.84%	245.12	27.46%	3.37
2013	800.42	789.22	650.52	11.199	1.40%	10.005	1.25%	671.73	24.093	104.60	128.70	16.08%	149.90	18.73%	1.78
Average	**810.66**	**799.61**	**649.09**	**11.055**	**1.37%**	**11.725**	**1.45%**	**671.87**	**24.066**	**114.73**	**138.79**	**16.93%**	**161.57**	**19.75%**	**1.96**

Notes:
1. Water Unbilled & Metered is WTP process (regeneration) water.
2. Water Unbilled & Unmetered is from PW records and includes water volume estimates for flushing, fire fighting, main breaks, etc.
3. Apparent Water Losses is estimated based on metering inaccuracies and systematic data handling errors.
4. Real Water Losses is calculated by subtracting the Authorized Consumption and Apparent Losses from the Water Pumped.

Table No. 4-5: Water Audit Summary and Comparison

Village of Huntley, IL

Key Performance Indicators	FY2013	North American Data Set (Average) [a]
Financial Indicators		
Non-Revenue Water as Percent by Volume of Water Supplied:	18.7%	24.1%
Annual Cost of Apparent Losses:	$ 158,588	N/A
Annual Cost of Real Losses:	$ 52,869	N/A
Operational Efficiency Indicators		
Apparent Losses Per Service Connection Per Day (gallons/connection/day):	5.2	10.4
Real Losses Per Service Connection Per Day (gallons/connection/day):	22.6	58.7
Water Audit Data Validity Score	76.0	70.4
Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.78	3.51

Notes:
a) Based on Service Connections < 50,000
b) NA = not available

4.2 Historical Wastewater Flows & Effluent Water Quality

The flows at each of the WWTFs were reviewed for calendar years 2009 – 2013. The water quality at each of the facilities also was reviewed for the same time period. A summary of the flow and water quality analysis is as follows.

4.2.1 East WWTF

Exhibit 4-2 summarizes the recorded Average Daily 3-Month Low Flow in relation to the Average Daily Flow, the East WWTF design capacity and the Critical Review threshold from 2009 – 2013. Exhibits 4-3 and 4-4 summarize the East WWTF monthly average daily flows compared to the facility capacity and recorded precipitation for 2012 and 2013, respectively. A review of exhibits 4-2 through 4-4 indicate flows to the East WWTF are well below the DAF capacity of the plant at 1.8 MGD and the critical review threshold (80% of DAF) of 1.44 MGD. The exhibits also indicate there is a minimal connection between increased precipitation and increased flows at the facility. Inspection of the data from 2013 indicates flows in the spring may be affected by snow melt and increased precipitation, but the increases are reasonable.

The East WWTF Monthly Discharge Monitoring Reports (DMR) were reviewed for the period 2009 – 2013 and are summarized in the tables within Appendix C. As the tables show, the facility is operating very well with regard to BOD, Total Suspended Solids (TSS) and Ammonia reduction. The effluent water quality met the BOD and TSS permit limits for all five years. There was only one month (October 2012) during the period where the total ammonia maximum standard was exceeded. It is assumed this was an anomaly and with continued careful monitoring of the biologic process, the Village does not anticipate any additional ammonia exceedances.

While the BOD, TSS and ammonia effluent levels almost always meet their respective standards, the facility was challenged to meet the effluent barium standard of 2.0 mg/l. There were one (1), two (2) and five (5) barium effluent standard exceedances in 2010, 2011 and 2012, respectively. However, there were no exceedances in 2013. The plant's ability to regularly meet the barium effluent standard is directly tied to the installation of a temporary alum feed system at the facility. After the multiple exceedances in the previous three years, the Village installed an alum feed pump and temporary tubing that carries alum from the north garage to the east oxidation ditch. The addition of the alum to the biological process reduced the barium levels in the effluent, most likely due to barium sulfate precipitation and then settling in the sludge. While the alum feed system appears to be the long term solution for barium compliance, a permanent, more reliable feed system should be installed at the facility. It should be noted the alum feed system also will help reduced the Total Phosphorus levels of the facility, which is likely going to be a component within the Village's next NPDES permit renewal.

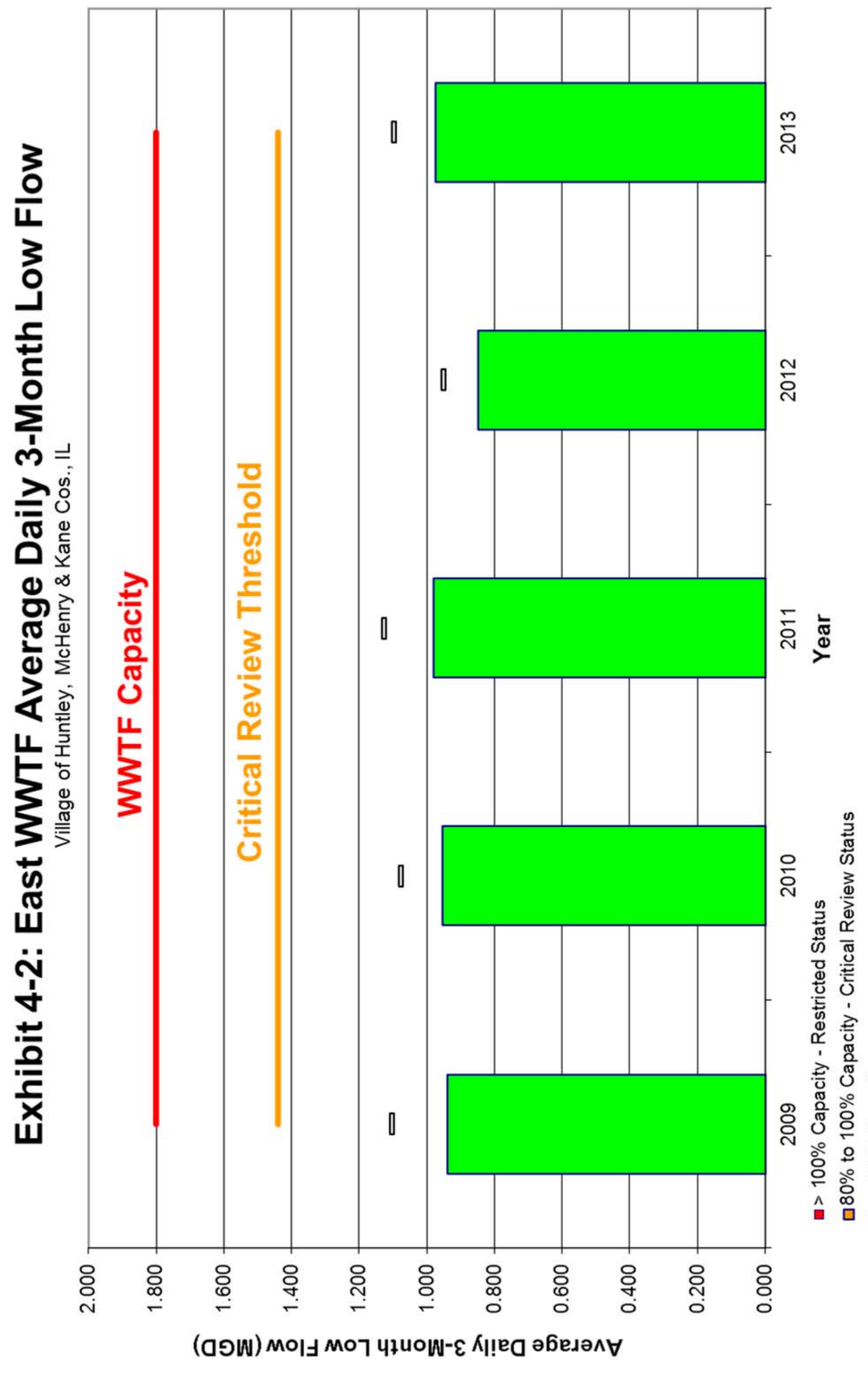


Exhibit 4-2: East WWTF Average Daily 3-Month Low Flow
Village of Huntley, McHenry & Kane Cos., IL
WWTF Capacity
Critical Review Threshold
Average Daily 3-Month Low Flow (MGD)
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
2009
2010
2011
2012
2013
Year
> 100% Capacity - Restricted Status
80% to 100% Capacity - Critical Review Status
<= 80% Capacity
Average Daily Flow

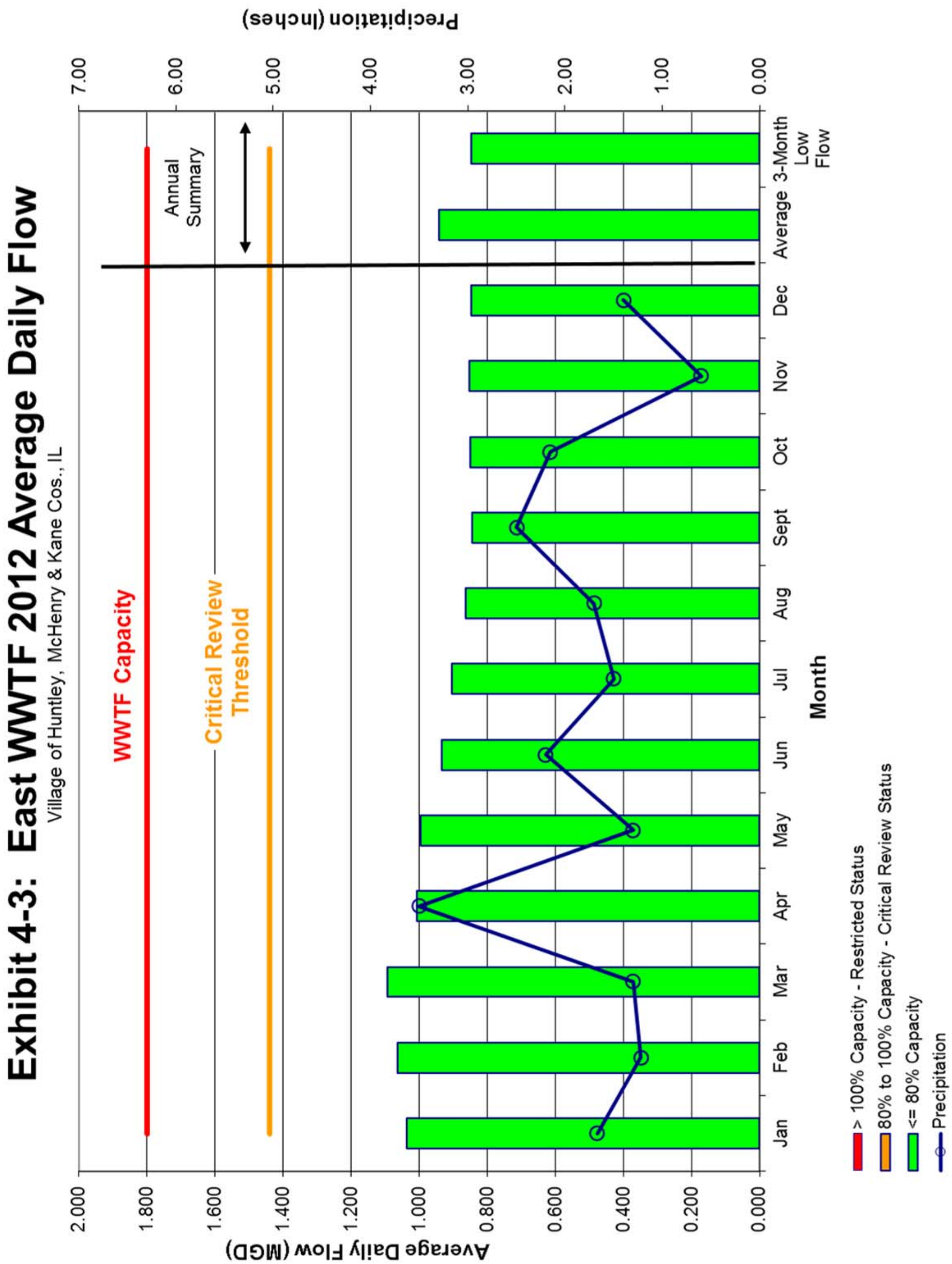


Exhibit 4-3: East WWTF 2012 Average Daily Flow
Village of Huntley, McHenry & Kane Cos., IL
WWTF Capacity
Critical Review Threshold
Annual Summary
Average Daily Flow (MGD)
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Precipitation (Inches)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Average
3-Month Low Flow
Month
> 100% Capacity - Restricted Status
80% to 100% Capacity - Critical Review Status
<= 80% Capacity
Precipitation

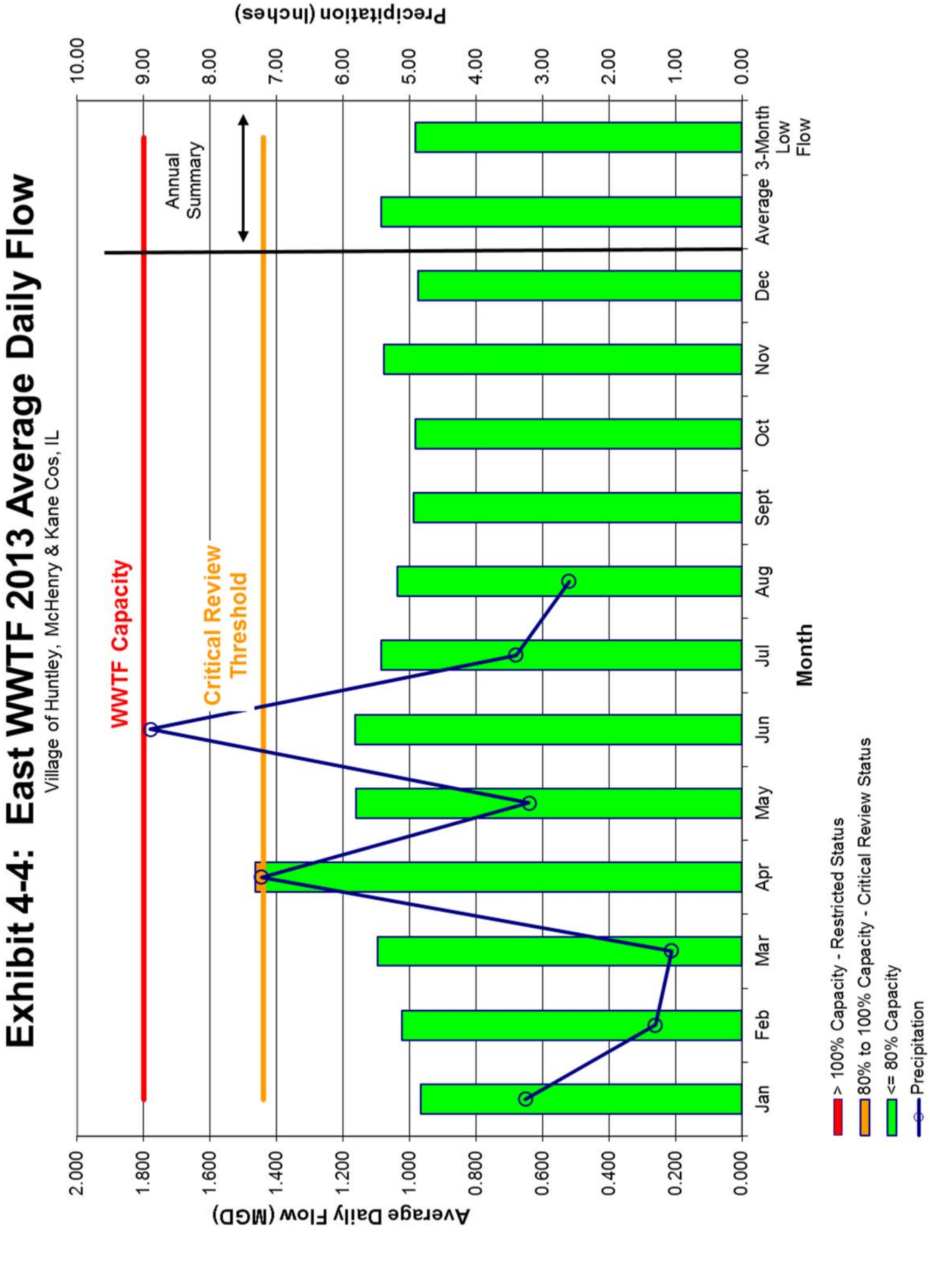


Exhibit 4-4: East WWTF 2013 Average Daily Flow
Village of Huntley, McHenry & Kane Cos, IL
WWTF Capacity
Critical Review Threshold
Annual Summary
Average Daily Flow (MGD)
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Precipitation (Inches)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Average
3-Month Low Flow
Month
> 100% Capacity - Restricted Status
80% to 100% Capacity - Critical Review Status
<= 80% Capacity
Precipitation

A review of the influent organic loading (BOD) for 2009 – 2013 indicates the Village was receiving loads significantly higher than typical domestic waste (typical domestic waste BOD concentration would be 200 – 250 mg/l). With an average BOD influent concentration of 389 mg/l and maximum of 660 mg/l over that time period, the East WWTF was receiving influent BOD loads near the design organic loading of the facility. Given the unbalanced hydraulic and organic loading of the facility, and the fact that the Village needed to free up capacity at the facility to take on additional growth within the community, the Village enacted a pretreatment ordinance in 2013. The Village then worked with the community's only significant industrial user, Dean's Foods, to work out a solution to their high strength dairy processing discharges. The solution was for Dean's Foods to install a pretreatment system. Following the installation of the pretreatment system in 2014, the influent organic loading to the East WWTF has receded to more common domestic discharge levels and the organic loading capacity of the facility is more in line with the hydraulic capacity.

The IEPA utilizes the average of the three low flow months in a 12 month period plus the capacity defined in the previous two years of sanitary sewer permits to determine the existing hydraulic load on a facility. Based on the average three month low flow values being just below 1.0 MGD, it can be assumed the East WWTF is currently loaded to around 55% - 60% of its DAF capacity. If we assume the sanitary sewer permits from the previous two years are minimal, and the total hydraulic loading is projected to be at 60% of the DAF, then the facility has 0.72 MGD, or 7,200 P.E., of unallocated capacity remaining at this time.

4.2.2 West WWTF

Exhibit 4-5 summarizes the recorded Average Daily 3-Month Low Flow in relation to the Average Daily Flow, the West WWTF design capacity and the Critical Review threshold from 2009 – 2013. Exhibits 4-6 and 4-7 summarize the West WWTF monthly average daily flows compared to the facility capacity and recorded precipitation for 2012 and 2013, respectively. A review of exhibits 4-5 through 4-7 indicate flows to the West WWTF are well below the DAF capacity of the plant at 2.6 MGD and the critical review threshold (80% of DAF) of 2.08 MGD. The exhibits also indicate there is virtually no connection between increased precipitation and increased flows at the facility. Therefore, it is reasonable to conclude there is very low I&I contributing to the sanitary sewer system tributary to the West WWTF. Given the fact that the majority of the sanitary sewer system tributary to the West WWTF is less than 20 years old, this conclusion also makes sense.

The West WWTF Monthly Discharge Monitoring Reports (DMR) were reviewed for the period 2009 – 2013 and are summarized in the tables within Appendix D. As the tables show, the facility is operating very well with regard to BOD, Total Suspended Solids (TSS) and Ammonia reduction. The effluent water quality met the BOD, TSS and Ammonia permit limits for all five years.

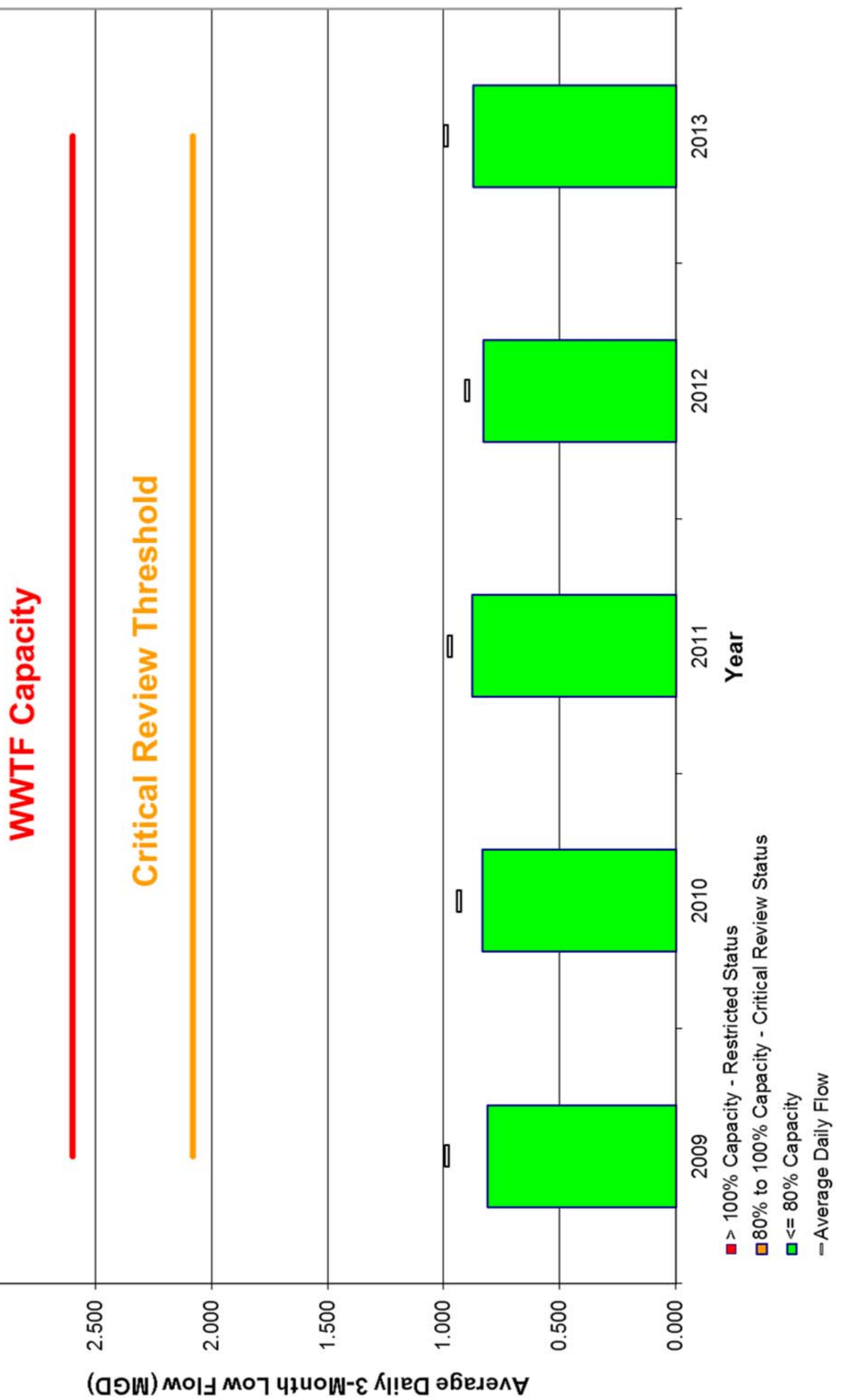


Exhibit 4-5: West WWTF Average Daily 3-Month Low Flow
Village of Huntley, McHenry & Kane Cos., IL

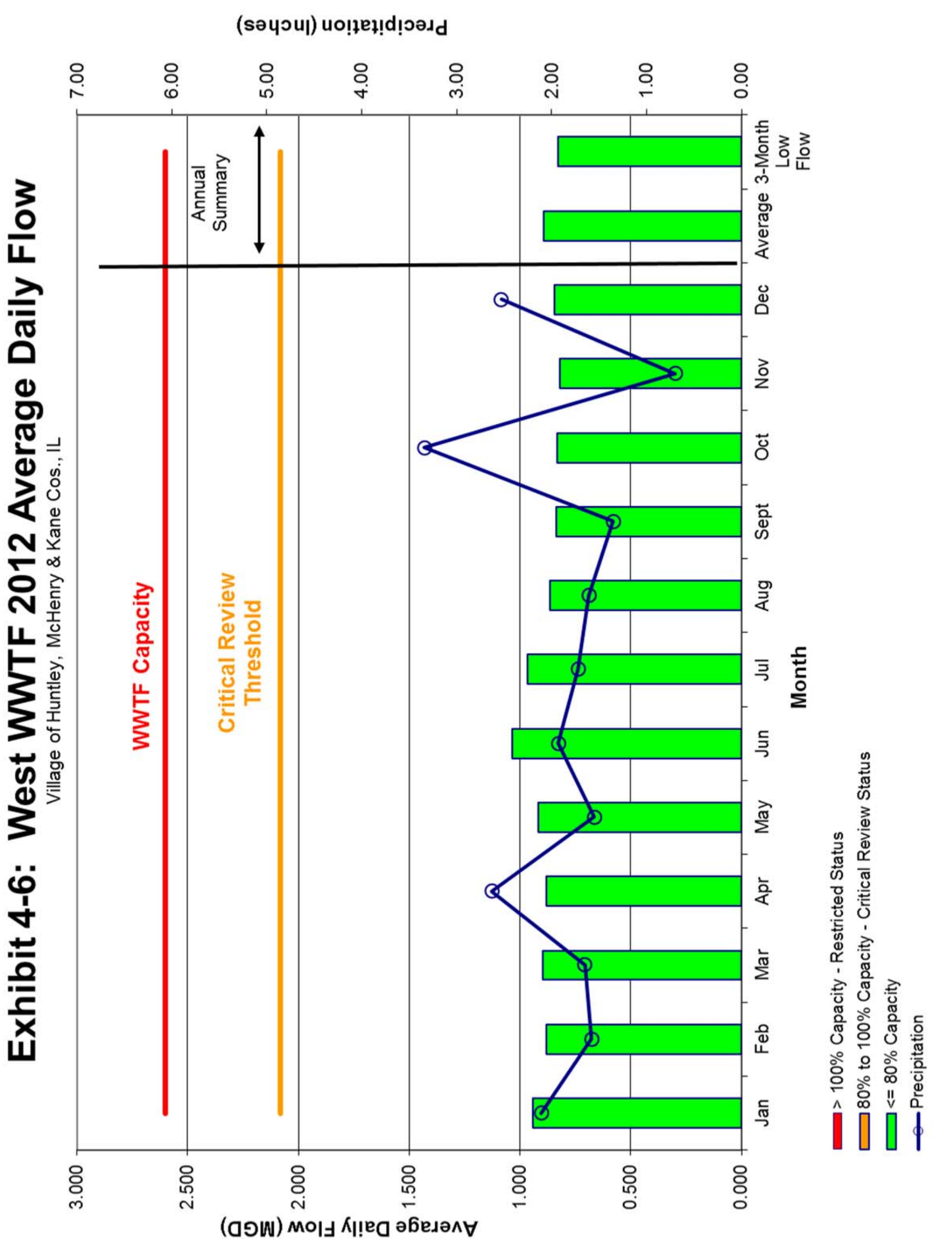


Exhibit 4-6: West WWTF 2012 Average Daily Flow
Village of Huntley, McHenry & Kane Cos., IL
WWTF Capacity
Critical Review Threshold
Annual Summary
Average Daily Flow (MGD)
3.000
2.500
2.000
1.500
1.000
0.500
0.000
Precipitation (Inches)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Average
3-Month Low Flow
Month
> 100% Capacity - Restricted Status
80% to 100% Capacity - Critical Review Status
<= 80% Capacity
Precipitation

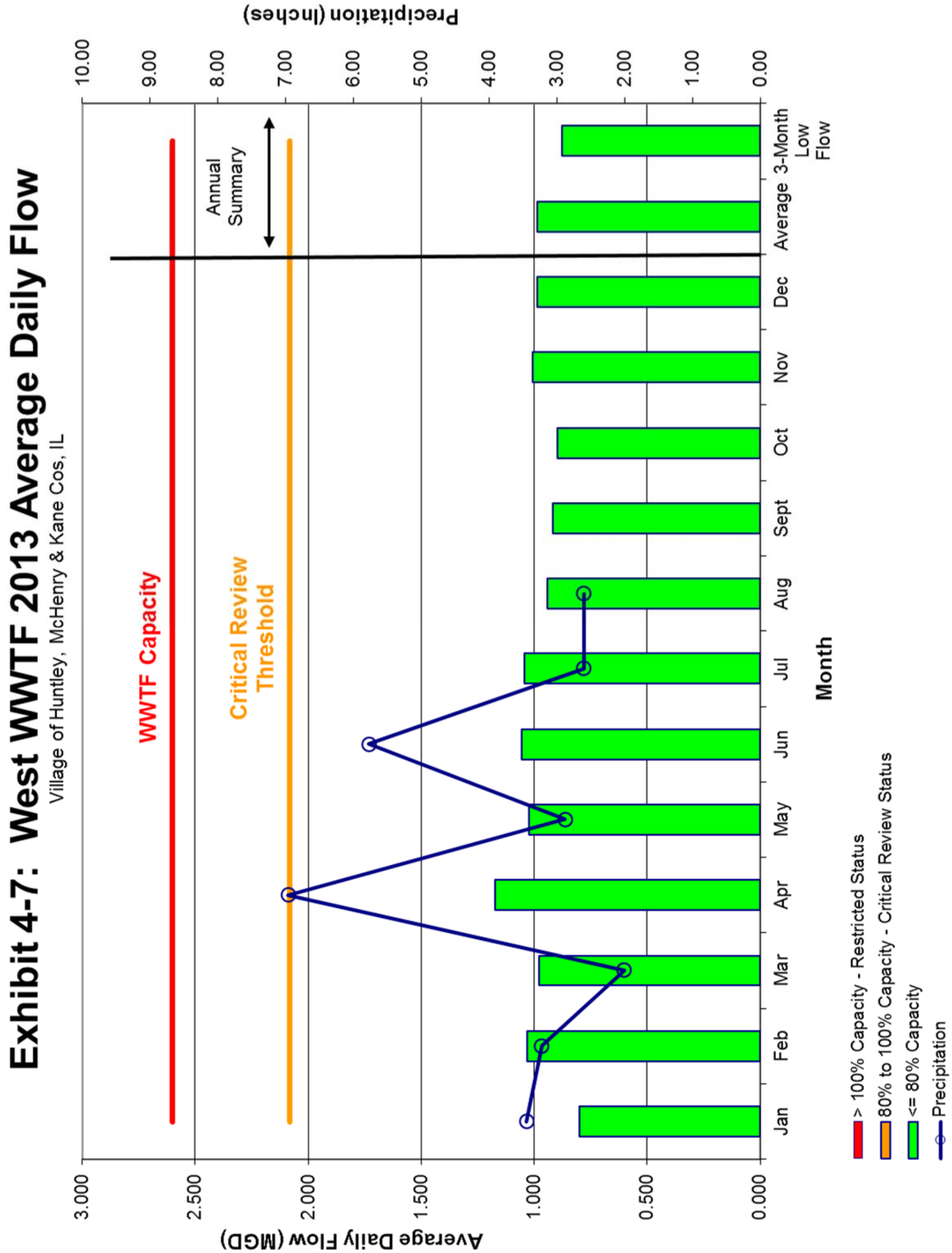


Exhibit 4-7: West WWTF 2013 Average Daily Flow
Village of Huntley, McHenry & Kane Cos, IL
WWTF Capacity
Critical Review Threshold
Annual Summary
Average Daily Flow (MGD)
3.000
2.500
2.000
1.500
1.000
0.500
0.000
Precipitation (Inches)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Average
3-Month Low Flow
Month
> 100% Capacity - Restricted Status
80% to 100% Capacity - Critical Review Status
<= 80% Capacity
Precipitation

Based on the average three month low flow values being just below 0.9 MGD, it can be assumed the IEPA would consider the West WWTF is currently loaded to around 35% - 40% of its DAF capacity. If we assume the sanitary sewer permits from the previous two years are minimal, and the total hydraulic loading is projected to be at 40% of the DAF, then the facility has 1.56 MGD, or 15,600 P.E., of unallocated capacity remaining at this time.

4.2.3 System-wide I&I Analysis

As stated in the previous section, the wastewater collection system appears to allow minimal I&I into the system. One way to visually determine the severity of I&I within the system is to compare the potable water use to the wastewater flows that arrive at the Village's WWTFs. Exhibit 4-8 provides this comparison. Exhibit 4-8 clearly shows the increase in water use for the community during the summer months. It should be noted the adjusted potable water use is developed by removing the estimated Southwind Subdivision (because the wastewater from the Southwind Subdivision is sent to the Lake in the Hills Sanitary District) water use and the estimated Water Works System water loss (estimated at 8%) from the potable water distributed from all of the WTPs. Exhibit 4-8 also shows the I&I contribution at the wastewater treatment plant is fairly constant with moderate increases during the spring. Lastly, it shows the percentage of flow at the WWTFs that is I&I is reasonable.

The wastewater generation values for 2009 – 2013 were broken down to determine the amount of base domestic wastewater flow in the sanitary sewer network, so that the I&I contribution could then be quantified. The base domestic wastewater flow was established by reviewing the water use during non-irrigation months (November – April). After establishing the average base flow for each of the non-irrigation months, the average monthly I&I could be established for those months by simply subtracting the monthly average total wastewater flows from the potable water (adjusted potable water use as discussed in the previous paragraph) that was distributed to the water users. Once the average I&I component was established for the non-irrigation months (0.643 MGD), it was utilized as the average I&I for each of the irrigation months (May – October).

The results of the total system analysis are summarized in Exhibit 4-9. Exhibit 4-9 also shows the I&I contributions are minimal throughout the year. There is a minimal increase in I&I during Spring and then a gradual decrease into the Fall. Overall, I&I makes up about 30% of the influent flow at the WWTFs. While there certainly is some opportunity to continue to reduce this amount of extraneous flow that takes up capacity in the sanitary sewer network and at the WWTFs, it is a relatively small amount of the flow stream when compared to many other Northeastern Illinois communities. It is recommended the Village continue the efforts to rehabilitate the older portions of the Village's sanitary sewer network, but the investment should be targeted and can most likely be implemented over time.

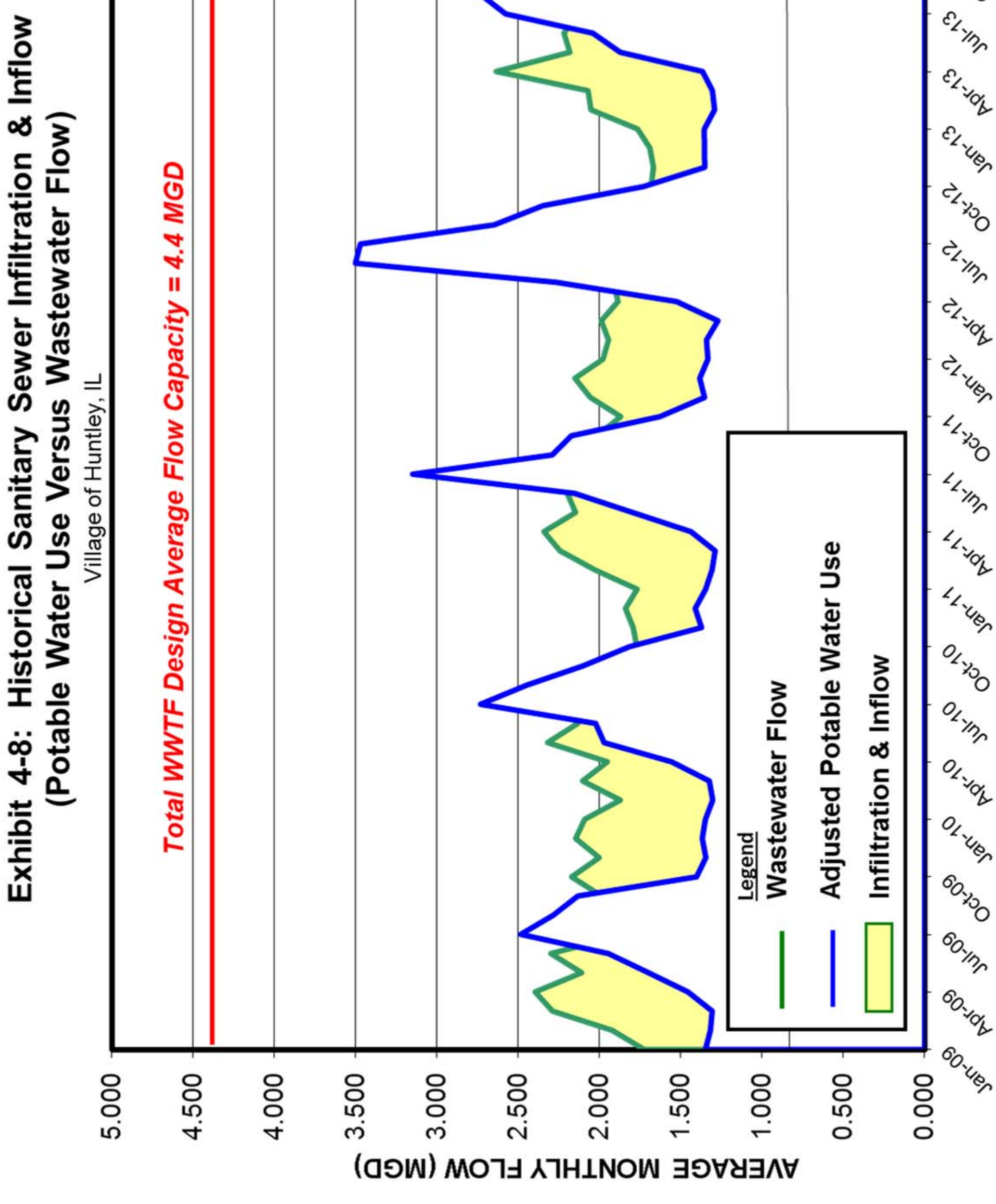


Exhibit 4-8: Historical Sanitary Sewer Infiltration & Inflow
(Potable Water Use Versus Wastewater Flow)
Village of Huntley, IL
Total WWTF Design Average Flow Capacity = 4.4 MGD
Legend
Wastewater Flow
Adjusted Potable Water Use
Infiltration & Inflow
AVERAGE MONTHLY FLOW (MGD)
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Apr-10
Jul-10
Oct-10
Jan-11
Apr-11
Jul-11
Oct-11
Jan-12
Apr-12
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Jan-13
Apr-13
Jul-13
Oct-13

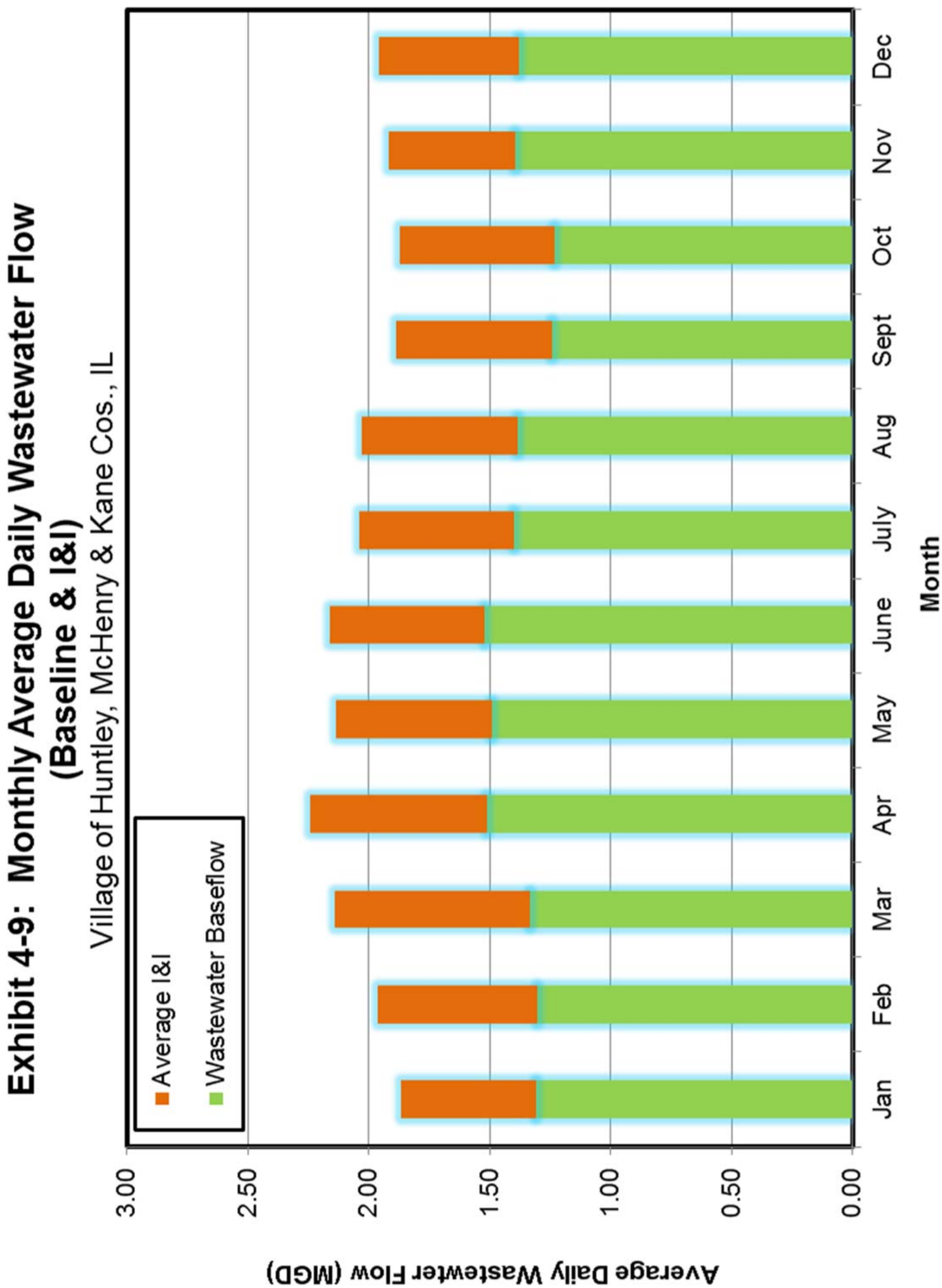


Exhibit 4-9: Monthly Average Daily Wastewater Flow
(Baseline & I&I)
Village of Huntley, McHenry & Kane Cos., IL
Average I&I
Wastewater Baseflow
Average Daily Wastewater Flow (MGD)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
Oct
Nov
Dec
Month

4.3 Historical Water Use & Wastewater Flow Summary

The Village's total water consumption was relatively constant from 2009 – 2013. The average daily water use ranged from 2.1 MGD – 2.4 MGD, and the average water use per person for the five year period was approximately 90 gpcd. The maximum day water use fluctuated more with the weather. The lowest maximum day demand was in 2009 at 4.1 MGD, whereas the highest demand was 5.4 MGD in the relatively dry year of 2011. The MDD:ADD ratio ranged from 1.98 – 2.47, and averaged 2.16 for the five year period.

The needs assessment calculations for the historical period indicate the Village's demand is near the Village's water supply and treatment capacity. In addition, there is minimal surplus water storage capacity. Additional supply, treatment and storage capacity will be needed if water demands increase at the current trend.

The wastewater flows to the Village's WWTFs averaged approximately 89 gpcd. While I&I is minimal in the system, it averaged about 28 gpcd for the five year period. The total unallocated capacity remaining for the two WWTF's, based on the IEPA's criteria for calculating the hydraulic loading of a WWTF, is approximately 2.28 MGD or 22,800 P.E. Therefore, the Village's WWTFs have a fair amount of rated capacity remaining in the system. As summarized in Table No. 3-3, many of the unit processes at the West WWTF have capacity greater than the rated capacity of the facility. Therefore, not all of the unit processes would require improvements to increase the rated capacity of that facility.

Table No. 4-6 provides a summary of the Village's historical water use and wastewater flows from 2009 – 2013.

Table No. 4-6: Existing Water Use & Wastewater Flow Summary (2009 - 2013)

Village of Huntley, McHenry & Kane Cos., IL

Parameter	Definition	Value
Average Daily Water Use	Annual Daily Average Water Use	2.221 MGD
Average Daily Water Use	Annual Daily Average Water Use	88.8 gpcd
- Average Daily Indoor Water Use	Daily Average Water Use During Non-Irrigation Months (November - April)	1.725 MGD
> Annual Baseline Water Use	Average Daily Indoor Water Use For Entire Year	630.1 MG
- Average Daily Outdoor Water Use	Increase In Daily Average Water Use During Irrigation Months (May - October)	0.978 MGD
> Annual Irrigation Water Use	Increased Water Use Over Annual Baseline For May - October	179.8 MG
> Irrigation Water Use % Of Total Use	Total Annual Irrigation Water As Percentage of Total Annual Water Use	22.2 %
Average Daily Total Wastewater Flow	Annual Daily Average Wastewater Flow	2.019 MGD
Average Daily Total Wastewater Flow	Annual Daily Average Wastewater Flow	89.3 gpcd
- Average Daily East WWTF Flow	Annual Daily Average Wastewater Flow To East WWTF	1.066 MGD
- Average Daily West WWTF Flow	Annual Daily Average Wastewater Flow To West WWTF	0.953 MGD
- Average Daily Wastewater Baseflow	Annual Daily Average Domestic/Commercial/Industrial Wastewater Flow To WWTFs Excluding I&I	1.376 MGD
- Average Daily Wastewater Baseflow	Annual Daily Average Domestic/Commercial/Industrial Wastewater Flow To WWTFs Excluding I&I	60.9 gpcd
- Average Daily Total I&I	Annual Daily Average I&I Within Sanitary Sewer Network	0.643 MGD
- Average Daily Total I&I	Annual Daily Average I&I Within Sanitary Sewer Network	28.4 gpcd

Notes:

Wastewater gpcd based on a population of 22,600 (total village population of approximately 25,000 minus approximately 2,400 people in Southwind Subdivision)

SECTION 5: PROJECTED WATER USE AND WASTEWATER FLOWS

As indicated in Section 1.6, this Comprehensive Master Plan is being prepared for an approximate 25 year planning period through the year 2040. The population of the Village of Huntley is anticipated to grow at an annual rate of 3.0%. In addition to the residential growth, the Village also expects commercial and industrial properties to continue to develop at a steady rate thereby increasing the water demand during the next 25 years. With this growth, the water demand and the wastewater flows of the Village's Water Works and Wastewater Systems are expected to grow also.

5.1 Projected Water Use

Understanding that water resources are limited and water use trends are likely to change during the next 25 years, two different water demand scenarios were investigated as part of this Master Plan. The first scenario is based on the Current Trends (CT) of the existing Water Works System, reflecting current demand conditions and recent trends in development. The second scenario is the Less Resource Intensive (LRI) water demand projection, which is based on potential intervention by the municipality to optimize water use through water conservation.

5.1.1 Current Trends (CT) Water Use Projection & System Evaluation – In Section 1.6, the population projections for the planning period were summarized. The next step is to equate the population to a water use demand per capita. Table No. 5-1 summarizes the total projected CT water use for incremental P.E. increases to the year 2040 population projection of 58,997 (+33,551 P.E.).

As previously identified, the estimated historical average water use per person per day in the Village of Huntley is approximately 90 gpcpd. Therefore, for the CT projected water use analysis, a water use per capita per day of 90 gallons was used to project the demand to 2040. This projection assumes the proportion of the residential water use to all other types of water users will remain the same into the future. The CT MDD and MHD for the planning period were established utilizing the previously discussed MDD:ADD ratio of 2.16 and a MHD:MDD ratio of 2.0.

Table No. 5-2 summarizes the CT projected water capacity analysis for the same incremental P.E. increases to the year 2040 population projection. Table No. 5-3 indicates the corresponding excess or required capacity needed to meet 100% of each of the test parameters. Tables No. 5-2 and 5-3 consider all existing active wells are on-line and that each water treatment plant is available to meet the Village's water demand.

TABLE NO. 5-1: PROJECTED WATER USE - *CURRENT TREND*
Village of Huntley, IL

YEAR ESTIMATED POPULATION	2013 *25,446*		FUTURE *30,446*		FUTURE *35,446*		FUTURE *42,946*		FUTURE *50,446*		FUTURE *58,997*	
ADDITIONAL POPULATION EQUIVALENTS	--		*+5000*		*+10000*		*+17500*		*+25000*		*+33551*	
ANNUAL PUMPAGE	800,423,000	GAL	*1,000,151,100*	GAL	*1,164,401,100*	GAL	*1,410,776,100*	GAL	*1,657,151,100*	GAL	*1,938,051,450*	GAL
MAXIMUM MONTHLY PUMPAGE	100,281,000	GAL										
MAXIMUM DRY WEATHER MONTH	AUGUST											
AVERAGE DAILY PUMPAGE	*2,192,940*	GAL	*2,740,140*	GAL	*3,190,140*	GAL	*3,865,140*	GAL	*4,540,140*	GAL	*5,309,730*	GAL
MAXIMUM AVERAGE DAILY PUMPAGE	*3,235,000*	GAL										
MAXIMUM DAILY PUMPAGE	4,460,000	GAL	*5,918,702*	GAL	*6,890,702*	GAL	*8,348,702*	GAL	*9,806,702*	GAL	*11,469,017*	GAL
COMPUTED MAXIMUM HOUR	*371,667*	GAL	*493,225*	GAL	*574,225*	GAL	*695,725*	GAL	*817,225*	GAL	*955,751*	GAL
COMPUTED MAXIMUM HOUR	*6,194*	GPM	*8,220*	GPM	*9,570*	GPM	*11,595*	GPM	*13,620*	GPM	*15,929*	GPM
AVG. GAL./PERSON/DAY	*86*	GPCD	*90*	GPCD	*90*	GPCD	*90*	GPCD	*90*	GPCD	*90*	GPCD
RATIO OF MAX. DAY TO AVG. DAY	*2.03*		*2.16*		*2.16*		*2.16*		*2.16*		*2.16*	

NOTES:
1. WATER CONSUMERS (POPULATION) ESTIMATED BASED ON 2008 SPECIAL CENSUS, 2010 US CENSUS, ESTIMATES FROM BUILDING PERMITS AND CMAP 2040 POPULATION PROJECTION DATA
2. ASSUMED RATIO OF MAX. HOUR TO MAX. DAY DEMAND (MHD:MDD) = 2.0

Inspection of Tables No. 5-2 and 5-3 indicates that additional P.E. exacerbates the deficit for the water supply parameters, *Ultimate Source Capacity and Reliable Source Capacity,* as well as, the water storage parameter *Peak Hour Storage.* By 2040 the *Reliable Source Capacity* water supply deficit is estimated at approximately 7,300 GPM whereas the *Peak Hour Storage* deficit is estimated at over 4.3 million gallons. The system continues to be adequate for the *Fire Flow* and *Emergency Supply* analysis for the planning period.

<u>5.1.2 Water Conservation Goals & Strategies</u> – As part of the Master Plan, the Village of Huntley (Village) is interested in understanding the potential reduction in future water system capital improvements resulting from a Less Resource Intensive (LRI) demand scenario for the Village. The LRI demand scenario is calculated based on water conservation practices that are judged to be suitable for the Village based on a variety of factors including regional climate, and political and social appropriateness.

To define a reasonable LRI demand scenario, a systematic process was used to efficiently review available information, select relevant water conservation strategies, and calculate estimated savings. The resulting water demand savings are applied to the baseline water use projections developed for the Master Plan and the LRI demand scenario can be established.

5.1.2.1 *Water Use Review* – In the first step, baseline water use was reviewed and further analyzed to better understand the allocation of water across the Village's customer base and categories relevant to water conservation planning.

TABLE NO. 5-2: WATER WORKS SYSTEM EVALUATION - *CURRENT TREND*

Village of Huntley, IL

TEST PARAMETERS	YEAR	POPULATION EQUIVALENT INCREASE				
	2013	+5000	+10000	+17500	+25000	+33551
1.0 Ultimate Source Capacity	810,400 GAL	-648,302 GAL	-1,620,302 GAL	-3,078,302 GAL	-4,536,302 GAL	-6,198,617 GAL
2.0 Reliable Source Capacity	13,600 GAL	-1,445,102 GAL	-2,417,102 GAL	-3,875,102 GAL	-5,333,102 GAL	-6,995,417 GAL
3.0 Peak Hour Storage	172,333 GAL	-313,901 GAL	-637,901 GAL	-1,123,901 GAL	-1,609,901 GAL	-2,164,006 GAL
4.0 Fire Flow	2,215,700 GAL	2,033,362 GAL	1,911,862 GAL	1,729,612 GAL	1,547,362 GAL	1,339,573 GAL
5.0 Emergency Supply	5,731,860 GAL	5,184,660 GAL	4,734,660 GAL	4,059,660 GAL	3,384,660 GAL	2,615,070 GAL

TABLE NO. 5-3: WATER WORKS SYSTEM EVALUATION - *CURRENT TREND* CORRESPONDING AVAILABLE OR REQUIRED CAPACITY

Village of Huntley, IL

TEST PARAMETERS	YEAR	POPULATION EQUIVALENT INCREASE				
	2013	+5000	+10000	+17500	+25000	+33551
1.0 Ultimate Source Capacity	563 GPM	-450 GPM	-1,125 GPM	-2,138 GPM	-3,150 GPM	-4,305 GPM
2.0 Reliable Source Capacity	14 GPM	-1,505 GPM	-2,518 GPM	-4,037 GPM	-5,555 GPM	-7,287 GPM
3.0 Peak Hour Storage	172,333 GAL	-627,802 GAL	-1,275,802 GAL	-2,247,802 GAL	-3,219,802 GAL	-4,328,011 GAL
4.0 Fire Flow	2,215,700 GAL	2,033,362 GAL	1,911,862 GAL	1,729,612 GAL	1,547,362 GAL	1,339,573 GAL
5.0 Emergency Supply	5,731,860 GAL	5,184,660 GAL	4,734,660 GAL	4,059,660 GAL	3,384,660 GAL	2,615,070 GAL

* Assumes wells are operating 16 hours/day for Reliable Source Capacity.

The first water use breakdown focused on defining the Village's water use in the categories of indoor use, outdoor use and non-revenue water. These categories are important because they represent the most common three areas where water conservation strategies can be applied to reduce water use in any community.

Outdoor water use as a percentage of annual water use is calculated by first estimating the average water use during cool weather months from November through April. This average water use can be considered the baseline indoor use because air temperature and precipitation in the Midwestern United States between November and April timeframe limits the need for outdoor water use. This calculation was performed for the period of 2009 through 2013. Based on this calculation, the average amount of outdoor water use from 2009-2013 was 22.2% of the total water use. Exhibit 5-1 summarizes the monthly analysis for the time period.

In any water utility, there is a difference between the amount of source water obtained and the total amount of water that the utility can reasonably account for in terms of customer billing and estimates. This water is often referred to as non-revenue water. As previously discussed in Section 4.1.3, an analysis of the Village's annual water production was performed and it was estimated that the real losses associated with the distribution system is on average approximately 14% of the annual water pumpage. In terms of water conservation, this number reflects the baseline amount of water loss that the Village can work to decrease through utility best management practices.

The second analysis focused on a review of the Village's water use by customer class. As shown previously in the Village's 2013 Water Consumption by Customer Class, single- and multi-family residential customers account for approximately 88.4% of the total annual billed water. Industrial and commercial users account for 10.3%. The remaining 1.3% of the total annual water usage is divided between schools, manufacturing, church and government.

Because the Village's water is used predominately by residential customers, significant water savings can be realized from conservation programs that specifically address residential water use. To better understand potential areas for water savings inside residential properties, a review was performed of typical indoor water uses in a non-conserving home. Exhibit 5-2 illustrates how the average residential household in the United States uses water, with an approximate 31% of their water use for outdoor use and 69% for indoor use. While an annual average outdoor water use is approximately 31%, outdoor water use in the Midwest likely is much lower than that value. It is unknown whether a study has evaluated the Midwest or Illinois outdoor water use, but past master plans completed by EEI have determined average outdoor water use in the City of Elgin and Village of Algonquin are 10% and 6%, respectively. At 22%, the Village of Huntley's outdoor water use is below the national average, however, it is well above some of its regional neighbors. Given the high amount of outdoor water use, there certainly is an opportunity to conserve water by reducing a portion of the outdoor water use that is wasted.

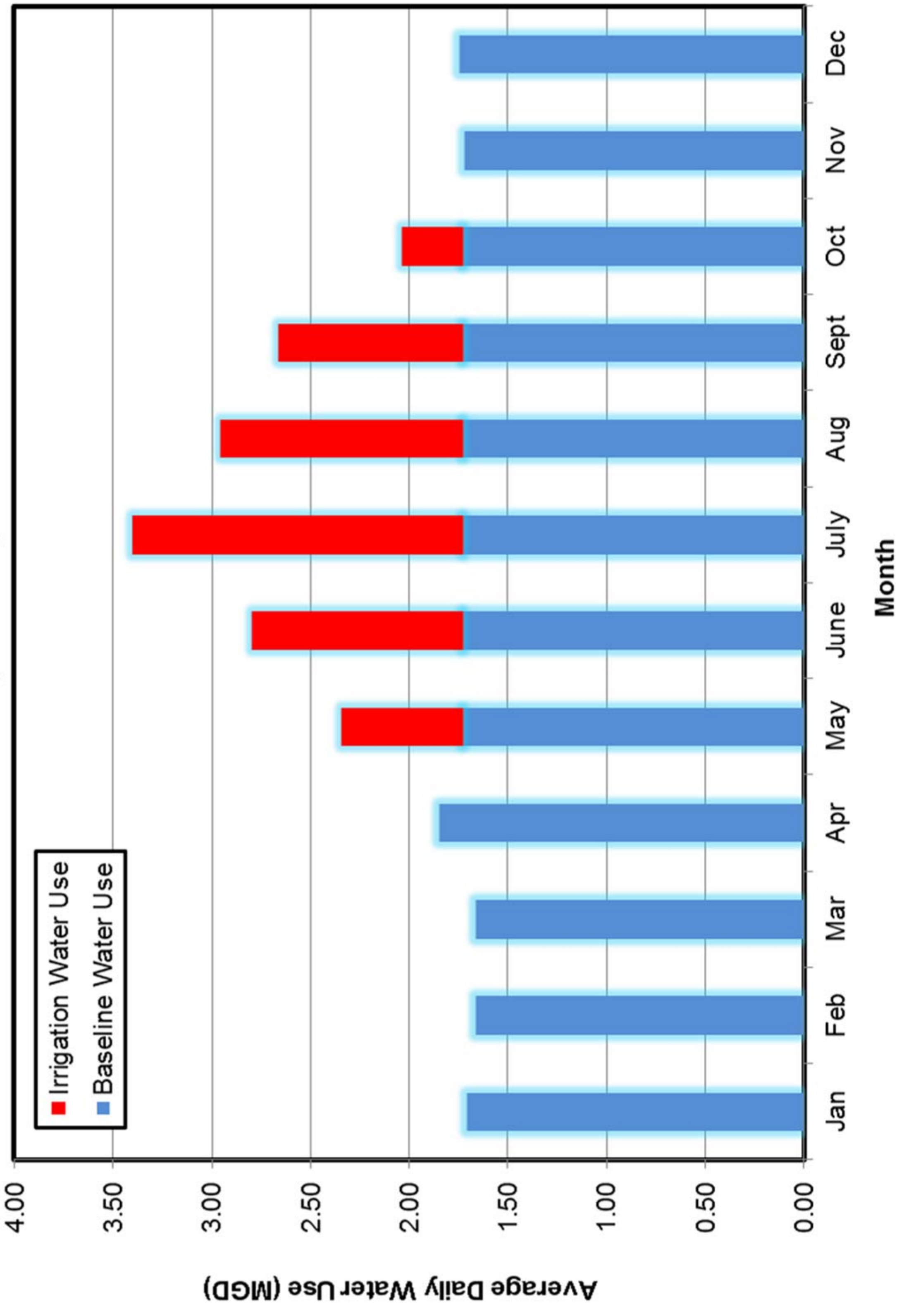


Exhibit 5-1: Average Daily Water Use - Baseline & Irrigation (2009 - 2013)
Village of Huntley, IL

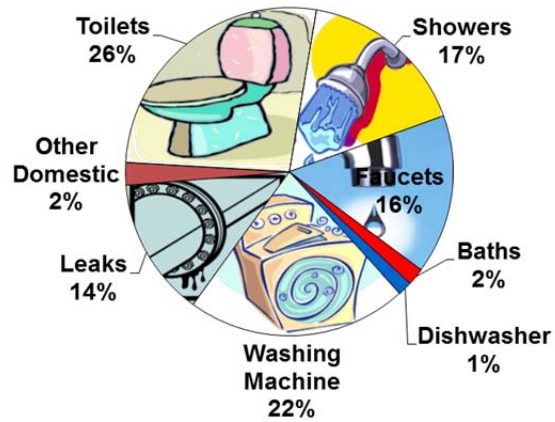
Exhibit 5-2:
Average Indoor and Outdoor Water Use in a Residential Non-Conserving Home

National Average

Average Indoor and Outdoor Water Use

- 80 – 90% of the outdoor component of residential water use goes to watering lawns, plants, and gardens
- Nonresidential outdoor water use is largely devoted to turf irrigation

Average Indoor Water Use



Source: Vickers, Amy. "Handbook of Water Use and Conservation" WaterPlow Press, 2001

Indoor use data based on average use in a nonconserving home – 69.3 gallons per capita per day

In addition to water savings on the outdoor water use side, there also are some opportunities where additional water conservation approaches on indoor water use can make an impact on overall water use. For instance, Exhibit 5-2 shows the estimated indoor water use breakdown, which indicates toilets and washing machines are the top two indoor water users with approximately 26% and 22% of indoor water use, respectively.

Several conclusions relevant to potential water use reductions from water conservation were made from this analysis. First, because the Village's customer base is mainly residential, significant water savings can be realized from conservation programs that specifically address residential water use. In addition, outdoor water use on average is approximately 22% of total annual water use. Since it is likely a portion of the outdoor water use is wasted and the fact that outdoor water use drives the maximum day demands on the Water Works System, it would seem reductions in outdoor water use could make a big effect on the total water use within the community and create a considerable cost savings. Finally, real losses for the Village are estimated at 14% and the Village could realize water savings in this category by further implementing utility best management practices.

5.1.2.2 BMP Overview – In the second step, drivers, goals, and criteria for evaluating potential water conservation programs are evaluated and an inventory is made of all potential water saving measures or strategies.

The current drivers for implementing water conservation in the Village of Huntley are a combination of stewardship and cost savings. In recent years, the Village has taken a proactive approach to increasing their focus on sustainability across all parts of the Village's operation. Water is a finite and precious resource and water conservation is an area that the Village has a significant opportunity to influence leadership provided by the Water Department. Therefore, as part of this Master Plan, a goal was established to calculate potential water savings that could be achieved with conservation strategies relevant to Huntley.

The Village also wanted to understand the potential reduction in future water system capital requirements that would result from a Less Resource Intensive (LRI) demand scenario for the Village in the planning year of 2040. Water conservation has been demonstrated as a cost effective strategy to reduce capital expenditures by deferring system improvements associated with expanding infrastructure to meet increasing water demands. With this information, the Village would be able to further justify spending resources to implement water conservation programming if there were savings identified in future capital expenditures using the LRI demand scenario.

The Village's current philosophy regarding water conservation is that education is a key first step in creating awareness around the Village's finite water supply and has been involved with student and adult outreach in this area. The next logical step in promoting water conservation is selection and implementation of water conservation programs that can result in measurable water savings.

Potential water savings estimated for the LRI scenario should be determined by selecting water conservation best practices that would result in measurable water savings, are relevant to the Village of Huntley and would be reasonably accepted by the local community.

A review of best management practices in water conservation was performed with the goal of creating a consolidated list of the potential options to use as a basis for the estimated water savings for the Village's LRI demand scenario. In the context of water conservation, a Best Management Practice (BMP) consists of generally accepted conservation measures or incentives that directly or indirectly result in proven, beneficial, and cost-effective water savings. BMP's vary depending on local or regional water-use characteristics and demand reduction needs.

While water conservation has recently become more relevant in the Midwestern United States, other parts of the country including California have experienced decades of drought and have applied water conservation to help address serious water supply challenges. The most popular set of water conservation BMP's were developed as part of The California Memorandum of Understanding (MOU) Regarding Urban Water

Conservation in California. The document has been signed by more than 260 water utilities, public advocacy organizations, and other interested groups who are members of the California Urban Water Conservation Council and are committed to ensuring adequate water supply to residents of California. A set of 14 BMP's are outlined in the MOU and provide guidelines on the expected water savings and requirements for program implementation.

The BMP's developed for the California MOU were selected because they have proven significant conservation benefits, are technically and economically feasible, are environmentally and socially acceptable, and are not otherwise unreasonable for most water suppliers to carry out.

These BMP's have been adopted by water utilities across the United States and recently were evaluated and adopted by the Chicago Metropolitan Agency for Planning (CMAP) document titled *Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan* (CMAP Plan). CMAP, the official regional planning agency for northeastern Illinois, released their Water Supply and Demand Plan in March of 2010, which includes a set of 13 water conservation measures and recommendations for demand management. These recommendations are based on the BMP's developed for the California MOU.

Table No. 5-4 provides a summary of the 13 recommendations from the CMAP Plan which were determined to be relevant for the Northeastern Illinois region. These BMP's address each of the main categories of water use within the Village including indoor, outdoor, and non-revenue water as well as a variety of customer classes such as residential and non-residential customers. An evaluation was performed to assess the relevance of these BMP's to the Village of Huntley and their ability to address the main categories of water use within the Village.

The BMP's presented in the CMAP Plan represent demonstrated, successful water conservation programs each with specific water conservation measures and incentives that contribute to the program's success. A *water conservation measure* is a device or practice that results in a more efficient use of water and reduces water demand. A *water conservation incentive* increases customer awareness about the value of reducing water use and motivates water users to implement conservation or efficiency measures. Successful water conservation programs appropriately match measures with incentives to drive reduction in water use.

5.1.2.3 BMP Selection – During the third step, the BMP's and other conservation measures are evaluated for their relevance to the Village of Huntley and potential water savings are estimated.

Table No. 5-4: Evaluation of Best Management Practices (BMPs) for Water Conservation

Village of Huntley, IL

Conservation Program Description	RWSP Number	California MOU Number	Utility	All Customers	Residential	Non-Residential	Purpose/Description	Description of Basis for Water Savings	Low Estimate from RWSP (mgd)	High Estimate from RWSP (mgd)	Program Cost	Implementation Obstacles
System Water Audits, Leak Detection and Repair	6	1	x				To perform a water audit by the water utility which consists of compiling the consumptive uses and losses of water managed in a single system; losses can be either apparent (paper losses due to metering and billing errors) and real losses (physical losses including leakage from distribution mains, customer service lines and overflows from distribution system tanks to storage facilities).	A leak-free water system is not a technically feasible or an economic objective, but a good rule of thumb is that losses should not constitute more than 10% of the total volume of water entering the system.	5.9	29.7	Varies for each utility based on the amount of water loss and reduction goal	Utility staff capacity
Metering with commodity rates for all new connections and retrofit of existing connections	7	2	x				To bill customers for the volume of water they use which is measured by meters for each customer; require that each new connection is metered and provide meters to all existing connections without a meter; maintain a record of all meters including testing, repair and replacement schedule and status.	Assume meter retrofits and volumetric rates combined will result in a 20% reduction in demand for retrofitted accounts.	30.3	31.5	Utility: meter purchase, meter installation	Utility investment cost
Retail Conservation Pricing	11	3		x			To provide economic incentives (a price signal) to customers to use water efficiently. Because conservation pricing requires a volumetric rate, metered water service is a necessary condition of conservation pricing; can include a uniform rate, seasonal rate, tiered rate or allocation-based rate.	Not quantified			Utility: administrative; Customer: increased water bill	Utility staff capacity, political will
Water Waste Prohibition for residential and non-residential customers	8	4		x			Standard Accounts: To enact and enforce measures prohibiting gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative fountains. Large-Landscape: To provide non-residential customers with support and incentives to improve their landscape water use efficiency; should include landscape water use analysis/surveys, voluntary water use budgets, and when cost effective, include the following: installation of dedicated landscape meters, training in landscape maintenance and irrigation design, and financial incentives such as loans, rebates, or grants for the purchase and/or installation of water efficient irrigation systems. Regular-Landscape: To provide residential customers with clear information and guidelines on when to water outdoor landscapes and provide a financial incentive (fine or additional fee) when water schedules are broken.	Not quantified Assume landscape surveys and assistance will result in a 15% reduction in demand for landscape water use by accounts that participate in survey/assistance programs.	12.1	60.3	Political will (i.e. ordinance creation); Utility: enforcement Utility: survey/budget calculation; Customer: hardware investment	Political will (i.e. ordinance creation); Utility staff capacity for enforcement Investment cost, social mindset
Conservation Coordinator	1	5		x			To designate a water conservation coordinator (and support staff if necessary) whose duties would include the following: coordination and oversight of conservation programs and BMP implementation; preparation and submittal of annual implementation report; communication and promotion of water conservation issues to utility management, operations and planning staff; preparation of annual conservation budget; and coordination with other regional utility conservation specialists. Agencies jointly operating regional conservation programs are not intended to have staff duplication and redundant conservation coordinator positions.	Not quantified	na	na	Utility: variable	Utility staff capacity
School Education Programs	13	6		x			To educate students in the service area about water conservation and efficient water use; program examples include: working with school districts and private schools to provide instructional assistance, education materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Education materials shall meet the state education framework requirements, and grade appropriate materials shall be distributed to grade levels K-3, 4-6, 7-8, and high school.	Not quantified	na	na	Variable depending on the scale, frequency and type of public programs; school district: administrative; government advocates: programmatic	Already full classroom curriculum
Public Information Programs	12	7		x			To promote and educate customers about water conservation and water conservation benefits; program examples include: providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gallons per day for the last billing period compared to the same period the year before; providing public information to promote water conservation practices; and coordinating with other government agencies, industry groups, public interest groups and the media.	Not quantified	na	na	Variable depending on the scale, frequency and type of public programs	Difficult to quantify cost/benefits; investment cost
Water Survey for Residential Customers	2	8			x		To conduct on-site survey and assessment of water-using hardware, fixtures, equipment, landscaping, irrigation systems and management practices to determine the efficiency of water use and to develop recommendations for improving indoor and outdoor water-use efficiency for residential customers.	Dependent on house age, device, leaks, etc. customers to see 3 - 20 gpcpd reduction in indoor water use and 10% reduction in outdoor water use if they implement the recommendations from the survey	0.1	0.7	Utility: hardware, administrative; customer: lead repair	Utility staff capacity, investment cost, customer cooperation
Residential Plumbing Retrofit	3	9			x		To provide assistance and resources to residential customers to help them change, alter, or adjust plumbing fixtures or other equipment or appliances to save water or make them operate more efficiently; typically includes the replacement of shower heads and sink faucets	Assume between 2.9 - 7.2 gpcpd water savings from low-flow showerhead retrofit and 1.3 gpcpd water savings for toilet retrofit	5.2	26.0	Utility: administrative/programmatic (rebate); Customer: cost or retrofit equipment	Utility staff capacity, investment cost of retrofit equipment, customer cooperation, rebate program funding
High-Efficiency Clothes Washing Machine Financial Incentive Replacement	5	10			x		To encourage the replacement and purchase of high-efficiency clothes washing machines by providing incentives (such as rebates, bill credits, and tax incentives) to water customers; Could include partnering with energy utilities or government organizations; applies to residential customers.	Water use by clothes washers is typically the second largest source of indoor residential water demand, representing 21.7% of indoor water use. Assume 4,200 gal/year/household of water savings for each high-efficiency clothes washing machine replacement.	3.2	16.1	Sponsor: rebate offer; Customer: purchase price minus rebate	Utility staff capacity, organization support from regional/county agency

Table No. 5-4: Evaluation of Best Management Practices (BMPs) for Water Conservation

Village of Huntley, IL

Conservation Program Description	RWSP Number	California MOU Number	Utility	All Customers	Residential	Non-Residential	Purpose/Description	Description of Basis for Water Savings	Low Estimate from RWSP (mgd)	High Estimate from RWSP (mgd)	Program Cost	Implementation Obstacles
Residential Ultra Low Flush Toilet Replacement Program	4	11			x		To encourage the replacement and purchase of Ultra Low Flush Toilets (1.6 gal or less) by providing incentives (such as rebates, bill credits, and tax incentives) to water customers; Could include partnering with energy utilities or government organizations; applies to residential customers.	Water use by toilets is typically the largest source of indoor residential water demand, representing 26% of indoor water use for the average non-conserving household. Assume 4,000 - 11,000 gal/year/household of water savings for each ultra low flow toilet replacement.	15.0	74.8	Sponsor: rebate offer; Customer: purchase price minus rebate	Utility staff capacity, organization support from regional/county agency
Conservation Programs for Commercial, Industrial, and Institutional Accounts	10	12				x	To provide assistance and incentives to commercial, industrial and institutional customers to encourage them to improve indoor and outdoor water-use efficiency; program can include replacement of existing toilets with ultra-low-flush toilets, water-use surveys, incentives and performance targets.	Savings is variable, depending on action taken	5.0	25.2	Utility: survey administration; Customer: hardware investment	Utility staff capacity; Customer cooperation, feasibility
Efficient Water Use Landscaping for Large Landscape Areas	9	13				x	To provide non-residential customers with support and incentives to improve their landscape water use efficiency; should include landscape water use analysis/surveys, voluntary water use budgets, and when cost effective, include the following: installation of dedicated landscape meters, training in landscape maintenance and irrigation design, and financial incentives such as loans, rebates, or grants for the purchase and/or installation of water efficient irrigation systems.	Assume landscape surveys and assistance will result in a 15% reduction in demand for landscape water use by accounts that participate in survey/assistance programs.	1.0	5.1	Utility: survey/budget calculation; Customer: hardware investment	Investment cost, social mindset

Adapted from the Memorandum of Understanding regarding Urban Water Conservation in California and the CMAP Plan

Table No. 5-5 presents a summary of the evaluation of CMAP Plan BMP's with respect to their relevance for the Village of Huntley. All of these BMP's were determined to be relevant for the Village and could be reasonably relied on for measurable water savings with proper implementation. The BMP's address all the areas that were previously identified as high potential water savings for the Village including residential water use, outdoor water use and non-revenue water. Potential water savings for each BMP were calculated and are discussed in more detail in this section. Because the CMAP Plan recommended BMP's are comprehensive and include programs that address each of the areas of water savings within the Village, no additional water conservation measures were selected for incorporation into the LRI water demand scenario.

As indicated in Table 5-5, all of the CMAP Plan recommended BMP's are relevant for the Village of Huntley. The Village is already metering all of their customers based on the volume of water that each customer uses. This practice is fundamental to water conservation program success because volumetric metering allows customers to see the impacts of their behaviors and changes in hardware. It is recommended that the Village continue to follow this practice. Another key output of the BMP evaluation is that baseline education and public outreach activities are essential elements to support all other water conservation programs. The Village has already taken steps to implement education and public outreach programs and should continue to do so to increase these activities as the Village moves forward with other conservation programming.

Potential water savings associated with each of the BMP's listed in Table No. 5-5 were calculated for use in the LRI demand scenario. The estimated water savings were calculated using information provided in the CMAP Plan and the California MOU. A summary of key assumptions related to potential water savings calculated for each BMP are listed in Table No. 5-6. The LRI water saving calculations are presented in Appendix E.

Potential water savings for each BMP are presented in Table No. 5-7. Based on the assumptions outlined previously, the Village could implement water conservation BMP's and realize approximately 14% of water use reduction from the 2040 base demands. The two largest categories of water savings would be realized from outdoor water use and utility focused programs, which make up 39% and 42% of the water reduction respectively. The remainder of the water savings is provided through indoor residential and Commercial, Industrial and Institutional focused programs.

5.1.2.4 Implementation – The final step in the process is to implement the chosen conservation programs by integrating them into the Village's current operation and programs. The potential water savings will only be achieved by proper investment into the implementation of the water conservation programs. Developing an implementation plan and investment budget for the Village was not in the scope for this Master Plan; however this would be the next required step to realize the future potential water savings.

Table No. 5-5:
Summary of BMP Evaluation for the Village of Huntley LRI Water Demand Scenario

Village of Huntley, IL

Conservation Program Description	Sector Focus	Recommendations for Huntley
System Water Audits, Leak Detection and Repair	Utility	●
Metering with commodity rates for all customers	Utility	○
Retail Conservation Pricing	All Customers	○○
Water Waste Prohibition for residential and non-residential customers	All Customers	●
Conservation Coordinator	All Customers	
School Education Programs	All Customers	□
Public Information Programs	All Customers	
Water Survey for Residential Customers	Residential	□
Residential Plumbing Retrofit	Residential	●
High-Efficiency Clothes Washing Machine Financial Incentive Replacement	Residential	●
Residential Ultra Low Flush Toilet Replacement Program	Residential	●
Conservation Programs for Commercial, Industrial, and Institutional Accounts	Non-residential	●
Efficient Water Use Landscaping for Large Landscape Areas	Non-residential	□

Legend	
Symbol	**Symbol Description**
●	Recommended for the Village of Huntley. Potential water savings estimated for the LRI water demand scenario
○	Currently being completed by the Village of Huntley. No additional water savings estimated.
○○	Recommended for the Village of Huntley. No additional water savings estimated due to political nature of item.
□	Recommended for the Village of Huntley Considered to be a baseline educational component or part of another program; no water savings estimated

Table No. 5-6:
Potential Water Savings Calculation Assumptions by BMP
Village of Huntley, IL

Best Management Practice	Key Assumptions
High Efficiency Toilet Replacement	Assume 90% of Households Upgrade to HET by 2040
High Efficiency Clothes Washing Machines	Assume 100% of Households Replace Washing Machines
Faucet and Showerhead retrofits	Assume 90% of Households Replace Faucets & Showerheads
Water Conservation for Commercial, Industrial and Institutional	13.5% Reduction for All Accounts Based on No. of Employees
	Employees use 11.6% of Huntley's Daily Demand
	Assume 50% of Employee Participation
Water waste prohibition programs –	50% of Outdoor Water used is Wasted (EPA)
Existing Properties	Assume 50% Reduction of Outdoor Waste
New Construction	Assume 5% New Landscape Water Waste Reduction
Efforts to reduce system losses	14% of Water Supply Loss from Unidentified Losses
	Assume 50% Reduction in Unidentified Losses
Baseline Education Efforts: Conservation Coordinator, School Education Programs and Public Information Programs	Assumed to be a baseline component of any water conservation program; no specific water savings calculated from these programs.

Table No. 5-7: Potential Estimated Water Savings From Water Conservation and Efficiency
Village of Huntley, IL

Category		Water Saved (MGD)	% Of Total (%)
Outdoor	All Customers	0.295	5.6%
	New Landscape	0.029	0.6%
Utility Water - System Losses		0.372	7.0%
Indoor Residential	High Efficiency Toilets (HET)	0.038	0.7%
	High Efficiency Washing Machines (HEWM)	0.014	0.3%
	Retrofits	0.025	0.5%
Commercial, Industrial, and Institutional Customers		0.041	0.8%
	Total Estimated Savings =	**0.815**	**15%**

5.1.3 Less Resource Intensive (LRI) Water Use Projection Evaluation – As discussed in Section 5.1.2.3, successful implementation of the water conservation strategies could result in meeting a 15% reduction goal in water use by the year 2040. Table No. 5-8 summarizes the total projected LRI water use for incremental P.E. increases to the year 2040 population projection of 58,997 (+33,551 P.E.).

TABLE NO. 5-8 PROJECTED WATER USE - *LESS RESOURCE INTENSIVE*

Village of Huntley, IL

YEAR ESTIMATED POPULATION	2013 25,446		FUTURE 30,446		FUTURE 35,446		FUTURE 42,946		FUTURE 50,446		FUTURE 58,997	
ADDITIONAL POPULATION EQUIVALENTS	--		+5000		+10000		+17500		+25000		+33551	
ANNUAL PUMPAGE	800,423,000	GAL	850,128,435	GAL	989,740,935	GAL	1,199,159,685	GAL	1,408,578,435	GAL	1,647,343,733	GAL
MAXIMUM MONTHLY PUMPAGE	100,281,000	GAL										
MAXIMUM DRY WEATHER MONTH	AUGUST											
AVERAGE DAILY PUMPAGE	2,192,940	GAL	2,329,119	GAL	2,711,619	GAL	3,285,369	GAL	3,859,119	GAL	4,513,271	GAL
MAXIMUM AVERAGE DAILY PUMPAGE	3,235,000	GAL										
MAXIMUM DAILY PUMPAGE	4,460,000	GAL	4,075,958	GAL	4,745,333	GAL	5,749,396	GAL	6,753,458	GAL	7,898,223	GAL
COMPUTED MAXIMUM HOUR	371,667	GAL	339,663	GAL	395,444	GAL	479,116	GAL	562,788	GAL	658,185	GAL
COMPUTED MAXIMUM HOUR	6,194	GPM	5,661	GPM	6,591	GPM	7,985	GPM	9,380	GPM	10,970	GPM
AVG. GAL./PERSON/DAY	86	GPCD	77	GPCD	77	GPCD	77	GPCD	77	GPCD	77	GPCD
RATIO OF MAX. DAY TO AVG. DAY	2.03		1.75		1.75		1.75		1.75		1.75	

NOTES:
1. WATER CONSUMERS (POPULATION) ESTIMATED BASED ON 2008 SPECIAL CENSUS, 2010 US CENSUS, ESTIMATES FROM BUILDING PERMITS AND CMAP 2040 POPULATION PROJECTION DATA
2. ASSUMED RATIO OF MAX. HOUR TO MAX. DAY DEMAND (MHD:MDD) = 2.0

With the LRI adjustment, the average water use per person per day in the Village of Huntley is projected to be reduced from 90 gpcpd under the CT scenario to 76.5 gpcpd under the LRI scenario. The Village of Huntley's anticipated average day demand in 2040 is reduced from 5.31 MGD under the CT scenario to 4.51 MGD under the LRI scenario. As stated previously, outdoor water use makes up a large portion of the Village's total water use, and it has a large effect on the maximum day water use within the community. With enforcement of existing water conservation programs focused on wiser outdoor water use along with spreading out the water demand (i.e. odd/even lawn sprinking requirements), the MDD:ADD ratio should come down. Therefore, the LRI MDD:ADD ratio was established at 1.75 (the CT MDD:ADD average ratio was 2.16) and a MHD:MDD ratio of 2.0 (same as CT). Mature communities with minimal growth will often experience MDD:ADD ratios between 1.3 – 1.5. Given the Village of Huntley's growth potential, a ratio higher than 1.5 was deemed appropriate.

Table No. 5-9 summarizes the LRI projected water capacity analysis for incremental P.E. increases to the year 2040 population projection. Table No. 5-10 indicates the corresponding excess or required capacity needed to meet 100% of each of the test parameters. Tables No. 5-9 and 5-10 consider that all existing active wells are on-line and that each water treatment plant is available to meet the Village's water demand.

TABLE NO. 5-9: WATER WORKS SYSTEM EVALUATION - *LESS RESOURCE INTENSIVE*

Village of Huntley, IL

TEST PARAMETERS	YEAR	POPULATION EQUIVALENT INCREASE				
	2013	+5000	+10000	+17500	+25000	+33551
1.0 Ultimate Source Capacity	810,400 GAL	1,194,442 GAL	525,067 GAL	**-478,996 GAL**	**-1,483,058 GAL**	**-2,627,823 GAL**
2.0 Reliable Source Capacity	13,600 GAL	397,642 GAL	**-271,733 GAL**	**-1,275,796 GAL**	**-2,279,858 GAL**	**-3,424,623 GAL**
3.0 Peak Hour Storage	172,333 GAL	300,347 GAL	77,222 GAL	**-257,465 GAL**	**-592,153 GAL**	**-973,741 GAL**
4.0 Fire Flow	2,215,700 GAL	2,263,705 GAL	2,180,033 GAL	2,054,526 GAL	1,929,018 GAL	1,785,922 GAL
5.0 Emergency Supply	5,731,860 GAL	5,595,681 GAL	5,213,181 GAL	4,639,431 GAL	4,065,681 GAL	3,411,530 GAL

TABLE NO. 5-10: WATER WORKS SYSTEM EVALUATION - *LESS RESOURCE INTENSIVE* CORRESPONDING AVAILABLE OR REQUIRED CAPACITY

Village of Huntley, IL

TEST PARAMETERS	YEAR	POPULATION EQUIVALENT INCREASE				
	2013	+5000	+10000	+17500	+25000	+33551
1.0 Ultimate Source Capacity	563 GPM	829 GPM	365 GPM	**-333 GPM**	**-1,030 GPM**	**-1,825 GPM**
2.0 Reliable Source Capacity	14 GPM	414 GPM	**-283 GPM**	**-1,329 GPM**	**-2,375 GPM**	**-3,567 GPM**
3.0 Peak Hour Storage	172,333 GAL	300,347 GAL	77,222 GAL	**-514,931 GAL**	**-1,184,306 GAL**	**-1,947,482 GAL**
4.0 Fire Flow	2,215,700 GAL	2,263,705 GAL	2,180,033 GAL	2,054,526 GAL	1,929,018 GAL	1,785,922 GAL
5.0 Emergency Supply	5,731,860 GAL	5,595,681 GAL	5,213,181 GAL	4,639,431 GAL	4,065,681 GAL	3,411,530 GAL

* Assumes wells are operating 16 hours/day for Reliable Source Capacity.

Inspection of Tables No. 5-9 and 5-10 indicates that while the *Ultimate Source Capacity, Reliable Source Capacity and Peak Hour Storage* continue to fail with additional P.E. increases, the water supply and storage deficits are generally cut in half under the LRI scenario when compared to the CT scenario by the end of the planning period.

5.1.4 Projected Water Use Summary –

Table No. 5-11 summarizes the comparison between the CT and LRI scenarios demonstrating a 15% water use reduction between the CT scenario to LRI scenario by the year 2040. The 15% reduction will occur incrementally over the next 25 years. Exhibit 5-3 further illustrates the significance water conservation can have based on the LRI scenario. By reducing water use, capacity improvements in the Water Works System can be delayed or deffered. This concept will be discussed in detail in Section 8.

Table No. 5-11: Water Use Projection Summary

Village of Huntley, IL

Year / Increment	Population Projection	ADD$^{\upsilon}$ Water Use Projection		MDD$^{\zeta}$ Water Use Projection		MHD$^{\pi}$ Water Use Projection	
		CT (MGD)	LRI (MGD)	CT (MGD)	LRI (MGD)	CT (MGD)	LRI (MGD)
2013	25,446	2.19	2.19	4.46	4.46	8.92	8.92
+5,000	30,446	2.74	2.33	5.92	4.08	11.84	8.15
+10,000	35,446	3.19	2.71	6.89	4.75	13.78	9.49
+17,500	42,946	3.87	3.29	8.35	5.75	16.70	11.50
+25,000	50,446	4.54	3.86	9.81	6.75	19.61	13.51
+30,000	58,997	5.31	4.51	11.47	7.90	22.94	15.80

Notes

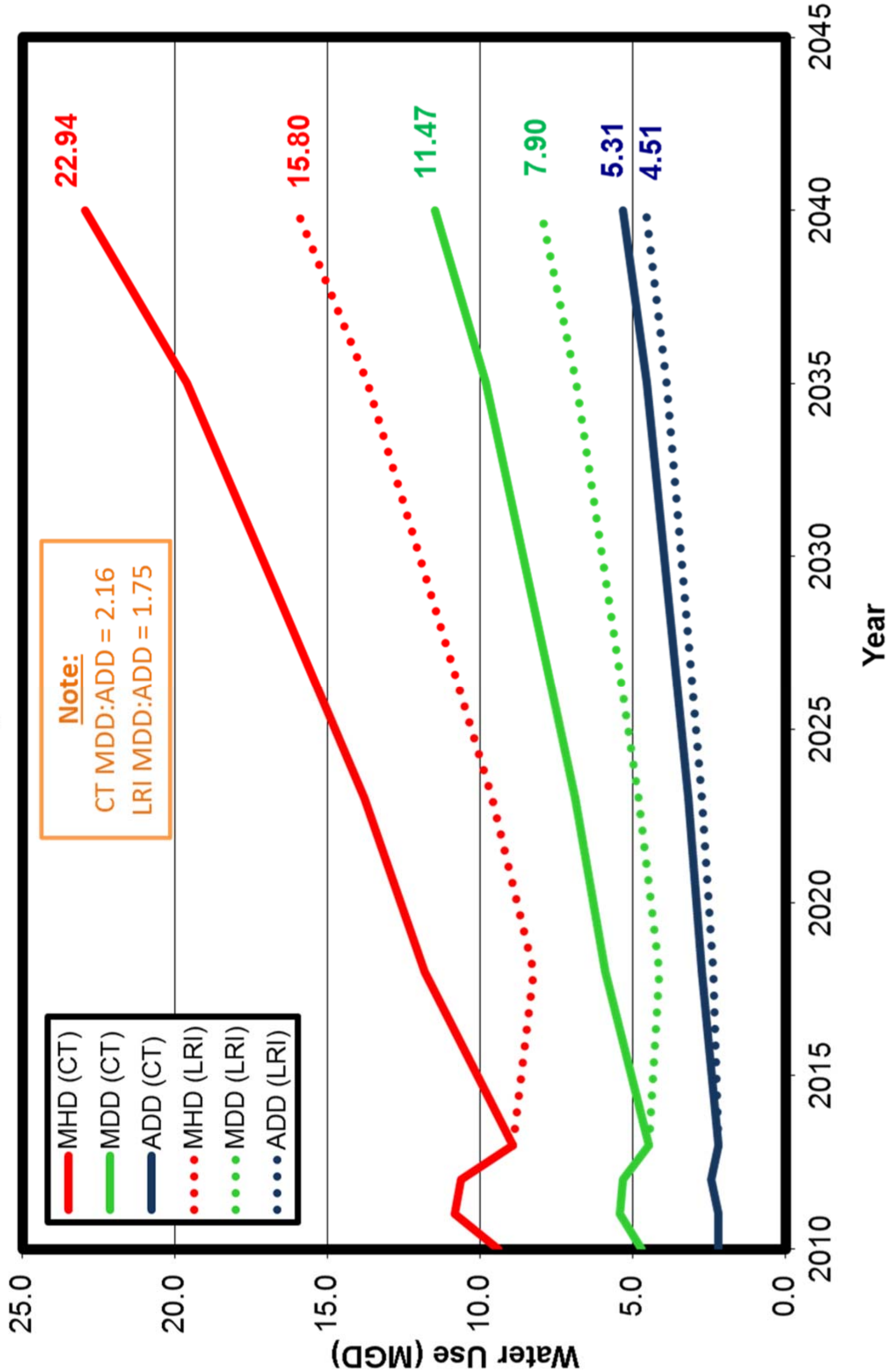
ADD = Average Day Demand; MDD = Maximum Day Demand; MHD = Maximum Hour Demand

$^{\upsilon}$ CT ADD based on 90 gpcd; LRI ADD based on 76.5 gpcd

$^{\zeta}$CT MDD:ADD = 2.16; LRI MDD:ADD = 1.75

$^{\pi}$MHD:MDD = 2.00

Exhibit 5-3: Historical and Projected Water Use Summary
Village of Huntley, IL



5.2 Projected Wastewater Flows

As summarized within Section 4.3 and specifically Table No. 4-6, the current Village of Huntley wastewater flows average 89 gpcd. Assuming the Village will grow in similar fashion to the current mix of land use, then the CT wastewater flow increases are simply the increase in population times the 89 gpcd. Due to the fact that the industry standard for wastewater flow projections is 100 gpcd, and the fact that the Village has a minimal amount of I&I within the sanitary sewer network, the use of 89 gpcd to project CT wastewater flows seems appropriate. Based on a total population of 58,997 in 2040 and a total existing average daily flow at the two WWTFs of 2.02 MGD, the 2040 CT total average daily flow (ADF) wastewater projection is 4.69 MGD. If we assume the maximum daily flow (MDF) is 2.5 times the ADF, then the 2040 CT MDF can be projected to be 11.72 MGD.

As described in the previous section, water use can be reduced significantly through water conservation efforts. The two main areas of water use reduction for the Village of Huntley to achieve a LRI water use were determined to be outdoor water conservation and utility system water loss reduction. Due the fact that neither outdoor water use nor utility water losses were entering the sanitary sewer system to start with, their reduction has no effect on the projected wastewater flows. On the other hand, the two remaining water conservation/efficiency categories that were evaluated, namely: 1) indoor residential water conservation and 2) commercial, industrial and institutional customer water use reduction, would. That being said, the reduction in water use for these two categories is projected to result in a 0.118 MGD water savings over the planning period.

If we assume the LRI 2040 total wastewater generation projection is 4.57 MGD (CT projection of 4.69 MGD minus 0.118 MGD), then the 30,000 of additional population equivalents beyond the 2013 population would generate 85 gpcd under the LRI scenario. At a MDF:ADF ratio of 2.5, the MDF LRI projection would be 11.42 MGD. A summary of the CT and LRI projections for the full planning period is included in Table No. 5-12.

As was discussed in Section 3, the two WWTFs have a combined rated capacity of 4.4 MGD. It is assumed no further buildout of the East WWTF will take place. Therefore, the West WWTF would need a nominal 0.3 MGD capacity to meet the projected CT wastewater demands. Due to the fact that the LRI ADF wastewater projection of 4.57 MGD is greater than the combined capacity of the Village's two WWTFs, the capacity of portions of the West WWTF would need to be expanded under the LRI scenario, as well.

Table No. 5-12: Wastewater Flow Projection Summary

Village of Huntley, IL

Year / Increment	Population Projection	ADF$^{\upsilon}$ Wastewater Projection		MDF$^{\zeta}$ Wastewater Use Projection	
		CT (MGD)	LRI (MGD)	CT (MGD)	LRI (MGD)
2013	25,446	2.02	2.02	5.05	5.05
+5,000	30,446	2.46	2.44	6.16	6.11
+10,000	35,446	2.91	2.87	7.27	7.17
+17,500	42,946	3.58	3.51	8.94	8.77
+25,000	50,446	4.24	4.14	10.61	10.36
+30,000	58,997	4.69	4.57	11.72	11.42

Notes

ADF = Average Daily Flow; MDF = Maximum Daily Flow

$^{\upsilon}$ CT DAF based on 89 gpcd; LRI DAF based on 85 gpcd

$^{\zeta}$CT DMF:DAF = 2.5; LRI DMF:DAF = 2.5

SECTION 6: REGULATORY REVIEW

Under the Safe Drinking Water Act (SDWA), USEPA sets legal limits on the levels of certain contaminants in drinking water. The legal limits reflect both the level that protects human health and the level that water systems can achieve using the best available technology. Besides prescribing these legal limits, USEPA rules set water testing schedules and methods that water systems must follow. The rules also list acceptable techniques for treating drinking water. SDWA gives individual states the opportunity to set and enforce their own drinking water standards if the standards are at least as strong as EPA's national standards. The Illinois Environmental Protection Agency (IEPA) directly oversees the water systems within Illinois. The USEPA also administers federal water quality initiatives, such as compliance with the Clean Water Act, and more specifically the National Pollutant Discharge Elimination System permit process. For NPDES permits issued in the State of Illinois, the USEPA delegates NPDES permit review authority to the IEPA. The purpose of this section of the report is to evaluate the Village's current compliance with existing, near future and potential future regulations relative to Water Works and Wastewater Systems.

6.1 Existing Regulations

USEPA has drinking water regulations for more than 90 chemical and microbiological contaminants. Table No. 6-1 presents the recent and near future drinking water regulations that could apply to the Village of Huntley's water treatment systems. Table No. 6-1 also presents the Village's status with regard to compliance with the regulations. A brief description of the regulations is presented below.

6.1.1 Surface Water Treatment Rule – The Surface Water Treatment Rule (1989) seeks to prevent waterborne diseases caused by viruses, *Legionella*, and *Giardia lamblia*. These disease-causing microbes are present at varying concentrations in most surface waters. The rule requires that water systems filter and disinfect water from surface water sources to reduce the occurrence of unsafe levels of these microbes.

6.1.2 Total Coliform Rule – The current Total Coliform Rule (TCR) (published in 1989) continues to be the only microbial drinking water regulation that applies to all public water systems. Systems are required to meet legal limits (i.e. Maximum Contaminant Levels (MCL)) for total coliforms, including fecal coliforms, as determined by monthly monitoring. The TCR specifies the frequency and timing of the monthly microbial testing by water systems based on population served. The rule also requires public notification as indicated by monitoring results.

6.1.3 Lead and Copper Rule – The Lead and Copper Rule (LCR) (1991) requires systems to monitor drinking water at customer taps. If lead concentrations exceed an action level of 15 ppb or copper concentrations exceed an action level of 1.3 parts per million (ppm) or milligrams per liter (mg/L) in more than 10% of customer taps sampled, the system must undertake a number of additional actions to control corrosion. If the

Table No. 6-1: Drinking Water Regulation Compliance Summary

Village of Huntley, IL

Regulation	Year Enacted	In Compliance?		Compliance Status
		Yes	No	
Surface Water Treatment Rule	1989	N/A		Only applies to surface water and GWUDI systems
Total Coliform Rule (TCR)	1989	💧		System is routinely monitored as required
Lead and Copper Rule	1991	💧		System is routinely monitored as required
Unregulated Contaminant Monitoring Rule	1998	💧		System is routinely monitored as required
Interim Enhanced Surface Water Treatment Rule	1998	N/A		Only applies to surface water and GWUDI systems
Stage 1 Disinfectant / Disinfection Byproducts Rule	1998	💧		System is routinely monitored as required
Radionuclides Rule	2000	💧		System is routinely monitored as required
Arsenic Rule	2001	💧		System is routinely monitored as required
Filter Backwash Recycling Rule	2001	💧		System is routinely monitored as required
Long Term 1 Surface Water Treatment Rule	2002	N/A		Only applies to surface water and GWUDI systems with fewer than 10,000 customers
Long Term 2 Surface Water Treatment Rule	2005	N/A		Only applies to surface water and GWUDI systems
Stage 2 Disinfectant / Disinfection Byproducts Rule	2005	💧		IDSE Completed; Compliance Monitoring Plan submitted to IEPA
Ground Water Rule	2006	💧		System is routinely monitored as required
Total Coliform Rule (TCR 2010)	2010	💧		System is routinely monitored as required
Radium Treatment Residuals Rule	2011	💧		IEMA registration required for WTP's and the WWTF sludge disposal; Monitoring and reporting required for WWTF biosolids disposal
Radon Rule	Proposed	N/A		Proposed rule would set MCL at 300 pCi/L or 4,000 pCi/L with a multimedia mitigation program to address radon in indoor air

action level for lead is exceeded, the system must also inform the public about steps they should take to protect their health and may have to replace lead service lines under their control.

6.1.4 Unregulated Contaminant Monitoring Rule – EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) (1988) program to collect data for contaminants suspected to be present in drinking water, but that do not have health-based standards set under the Safe Drinking Water Act. Every five years EPA reviews the list of contaminants, largely based on the Contaminant Candidate List.

6.1.5 Interim Enhanced Surface Water Treatment Rule – The Interim Enhanced Surface Water Treatment Rule (IESWTR) (1998) amends the existing Surface Water Treatment Rule to strengthen microbial protection, including provisions specifically to address *Cryptosporidium,* and to address risk trade-offs with disinfection byproducts. The final rule includes treatment requirements for waterborne pathogens, e.g., *Cryptosporidium*. In addition, systems must continue to meet existing requirements for *Giardia lamblia* and viruses.

6.1.6 Stage 1 Disinfectant/Disinfection Byproducts Rule – The Stage 1 Disinfectant/Disinfection Byproducts Rule (Stage 1 DBPR) (1998) establishes maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs) for three chemical disinfectants – chlorine, chloramines, and chlorine dioxide. It also establishes maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for total trihalomethanes, haloacetic acids, chlorite and bromate.

6.1.7 Radionuclides Rule – The Radionuclides Rule (2000) retained the existing MCLs for combined radium-226 and radium-228, gross alpha particle radioactivity, and beta particle and photon activity. The rule regulated uranium for the first time. The current combined radium MCL is 5 pCi/L.

6.1.8 Arsenic Rule – The Arsenic Rule (2001) reduced the MCL for drinking water from 50 parts per billion (ppb) or micrograms per liter (ug/L) to 10 ppb. Water systems had to comply with this standard by January 23, 2006.

6.1.9 Filter Backwash Recycling Rule – The Filter Backwash Recycling Rule (FBRR) (2001) requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

6.1.10 Long Term 1 Surface Water Treatment Rule – The Long Term 1 Surface Water Treatment Rule (2002) does not apply to Huntley. This rule is only for systems with less than 10,000 customers.

6.1.11 Long Term 2 Surface Water Treatment Rule – The Long Term 2 Surface Water Treatment Rule (LT2SWTR) (2005) requires systems to monitor their source water, calculate and average Cyrptosporidium concentration, and use those results to determine if their source is vulnerable to contamination and may require additional treatment.

6.1.12 Stage 2 Disinfectant/Disinfection Byproducts Rule – The Stage 2 Disinfectant/Disinfection Byproducts Rule (Stage 2 DBPR) (2005) requires some systems to complete an initial distribution system evaluation (IDSE) to characterize DBP levels in their distribution systems and identify locations to monitor DBPs for Stage 2 DBPR compliance. The Stage 2 DBPR bases TTHM and HAA5 compliance on a locational running annual average (LRAA) calculated at each monitoring location. A Compliance Monitoring Plan was due April 1, 2012. The plan includes the compliance monitoring locations, dates, and compliance calculation procedures.

6.1.13 Ground Water Rule – The Ground Water Rule (GWR) (2006) establishes a risk-targeted approach to identify groundwater systems (GWSs) susceptible to fecal contamination and requires corrective action to correct significant deficiencies and source water fecal contamination in all public GWSs.

6.1.14 Total Coliform Rule – The proposed revisions to the TCR (2010) will require public water systems that are vulnerable to microbial contamination to identify and fix problems, and establish criteria for systems to qualify for and stay on reduced monitoring.

6.1.15 Radium Treatment Residuals Rule – In 2011, the Illinois Emergency Management Agency (IEMA) provided the leadership for the revisions to Title 32 of the Illinois Administrative Code, Section 330.40(d). With these revisions, entities handling water and wastewater treatment residuals containing radium must register with IEMA and meet the disposal standards specified in the rule. The rule only applies to Water Treatment Plants and Wastewater Treatment Facilities who are part of a 'system' where deep sandstone aquifers known to contain radium are used as a water supply source.

6.2 Near Future Regulations

The SDWA includes a process that USEPA follows to identify and list unregulated contaminants which may require a national drinking water regulation in the future. USEPA must periodically publish this list of contaminants (called the Contaminant Candidate List or CCL) and decide whether to regulate at least five or more contaminants on the list (called Regulatory Determinations). EPA uses this list of unregulated contaminants to prioritize research and data collection efforts to help determine whether a specific contaminant should be regulated. Based on the current discussion relative to these proposed rules, it is anticipated the Village of Huntley will have no compliance concerns with meeting them.

6.2.1 Radon Rule – The U.S. EPA proposed new regulations for radon in drinking water. The proposed regulations provide flexibility in how to limit exposure to radon by focusing efforts on the greatest public health risks from radon - those in indoor air - while also reducing the highest risks from radon in drinking water. The proposed rule provides for a multimedia approach to address risks from radon in drinking water and radon in indoor air from soil. The Safe Drinking Water Act directs the EPA to propose and finalize a maximum contaminant level (MCL) for radon in drinking water, but also to make available an alternative approach: a higher alternative maximum contaminant level (AMCL) accompanied by a multimedia mitigation (MMM) program to address radon risks in indoor air. The proposed rule would set the MCL at 300 pCi/L or 4,000 pCi/L for a system with a MMM program.

6.2.2 Lead and Copper Rule Revisions – The U.S. EPA proposed revisions to the LCR to enhance the implementation of the LCR in the areas of monitoring, treatment, customer awareness, and lead service line replacement and to improve compliance with the public education requirements of the LCR and ensure drinking water consumers receive meaningful, timely, and useful information needed to help them limit their exposure to lead in drinking water.

6.2.3 Contaminant Candidate List – As noted above, SDWA includes a process that USEPA must follow to identify and list unregulated contaminants which may require a national drinking water regulation in the future. The contaminants on the CCL are not regulated by existing national primary drinking water regulations, are known or anticipated to occur in public water systems, and may require regulation. In preparing the 2009 CCL, USEPA evaluated approximately 7,500 chemicals and microbes and selected 104 chemicals or chemical groups and 12 microbiological contaminants for the Final CCL3.

6.3 Potential Future Regulations

USEPA has identified three additional chemical contaminants through the CCL and UCMR process that are currently being considered for regulation. These are MTBE (methyl-t-butyl ether), Perchlorate, and Sulfate. No schedule for regulatory action has been presented by USEPA. Based on the current discussion relative to these potential rules, it is anticipated the Village of Huntley will have no compliance concerns with meeting them.

6.3.1 MTBE – MTBE is a member of a group of chemicals commonly known as fuel oxygenates. Oxygenates are added to fuel to increase its oxygen content. MTBE is used in gasoline throughout the United States to reduce carbon monoxide and ozone levels caused by auto emissions. MTBE has replaced the use of lead as an octane enhancer since 1979. Releases of MTBE to ground and surface water can occur through leaking underground storage tanks and pipelines, spills, emissions from marine engines into lakes and reservoirs, and to some extent from air deposition.

6.3.2 Perchlorate – Perchlorate is both a naturally occurring and man-made chemical that is used to produce rocket fuel, fireworks, flares, and explosives. Perchlorate can also be present in bleach and in some fertilizers. Perchlorate may have adverse health effects because scientific research indicates that this contaminant can disrupt the thyroid's ability to produce hormones needed for normal growth and development.

6.3.3 Sulfate – Sulfate is a substance that occurs naturally in drinking water. Health concerns regarding sulfate in drinking water have been raised because of reports that diarrhea may be associated with the ingestion of water containing high levels of sulfate. Of particular concern are groups within the general population that may be at greater risk from the laxative effects of sulfate when they experience an abrupt change from drinking water with low sulfate concentrations to drinking water with high sulfate concentrations.

Sulfate in drinking water currently has a secondary maximum contaminant level (SMCL) of 250 milligrams per liter (mg/L), based on aesthetic effects (i.e., taste and odor). This regulation is not a federally enforceable standard, but is provided as a guideline for States and public water systems. USEPA estimates that about 3% of the public drinking water systems in the country may have sulfate levels of 250 mg/L or greater.

6.4 Capacity, Management, Operation & Maintenance (CMOM) Plan

The Village's separate sanitary sewer system collects and conveys wastewater generated by the residential, commercial, industrial and institutional land uses connected to the system. Proper operation and maintenance of the system allows for continued collection and conveyance without service interruption to the users. A properly maintained sanitary sewer system minimizes the amount of extraneous flows (I&I) entering the system, so that its capacity to convey domestic wastewater remains intact. Conversely, poorly operated and maintained sanitary sewer networks can cause service interruptions and sewer system overflows (SSOs) that negatively affect the users and the environment.

In 2001, the USEPA first published the proposed CMOM rules. According to The O&M in CMOM: "Operation & Maintenance", A Reference Guide For Utility Operators, as published by the WEF Collection Systems Committee, USEPA's CMOM standard permit condition for municipal sanitary sewer collection systems would contain five general performance standards. The permittee would need to:

1. Properly manage, operate and maintain, at all times, the parts of the collection system that the permittee owns or over which it has operational control.
2. Provide adequate capacity to convey base flows and peak flows.
3. Take all feasible steps to stop, and mitigate the impact of, sanitary sewer overflows.
4. Provide notification to parties with a reasonable potential for exposure to pollutants associated with the overflow event.
5. Develop a written summary of their CMOM program and make it, and required program audits, available to the public upon request.

After many years of discussion relative to the proposed federal rule, the federal rulemaking process has stalled, primarily due to challenges from interested stakeholders. While the regulation has not been promulgated, many guidance documents have been created to describe the CMOM process. One such document is the *Guide for Evaluating Capacity Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems*, as published by the USEPA in January 2005. Some utilities have utilized the available guidance documents to develop a CMOM plan on their own.

In recent years, the IEPA has started to require CMOM plans from communities that have a high amount of sanitary sewer overflow (SSO) incidents. Often the SSO's are caused by poor operation and maintenance procedures and/or a high amount of I&I within the collection system. In recent months, the IEPA has developed a new policy to require CMOM plans from all major WWTFs (WWTF with a DAF capacity of 1.0 MGD or greater), regardless of the amount of I&I in the system or SSO's reported. Therefore, it is assumed the Village will receive a CMOM plan requirement in the next permit cycle.

6.5 Wastewater Treatment Facility Receiving Stream Review

The Village of Huntley's East WWTF discharges into the Huntley Ditch and the Village's West WWTF discharges into the South Branch of the Kishwaukee River. The Huntley Ditch starts near the East WWTF, flows south and then west where it drains into the South Branch of the Kishwaukee River approximately ½ mile east of Route 47. The South Branch of the Kishwaukee River (South Branch) starts southeast of the Village and flows in a northwesterly direction. It crosses Kreutzer Road east of Route 47 near Kruetzer Road's intersection with the railroad tracks. After combining with the Huntley Ditch, the South Branch flows west and crosses Route 47 just north of the Kreutzer Road/Route 47 intersection. In the northeastern portion of the Del Web Sun City Development, Eakin Creek discharges into the South Branch about 3,500 feet south of the West WWTF. The South Branch crosses under Main Street just east of the Harmony Road and Main Street intersection. It then continues to flow to the northwest where it eventually discharges into the Kishwaukee River.

The Village of Huntley WWTF's are permitted to discharge into their respective receiving streams under their respective NPDES permits. The effluent standards established in the two NPDES permits are based on the defined use and then corresponding water quality standards applied to each of the receiving streams. The state of the receiving stream bears heavily on the standards established in the permit. Therefore, as a starting point to predict future regulatory compliance, the receiving systems existing conditions must first be defined.

<u>6.5.1 Huntley Ditch</u> – At the point of discharge of the East WWTF, the Huntley Ditch has a 7Q10 (lowest seven day flow received in a ten year period) of 0 cfs. It is obviously a low flow stream. The IEPA has established its designated use is to support aquatic life. The stream is channelized and has minimal areas of high quality habitat. It accepts surface drainage from portions of the east and central parts of the Village.

The IEPA currently lists Huntley Ditch as an impaired waterway. The causes for impairment, as summarized in Illinois' 2014 303(d) List, are barium, chloride, copper, hexachorobenzene, total phosphorus, sedimentation/siltation and zinc. Due to the fact that the Huntley Ditch is impaired, the Clean Water Act generally state's the IEPA must work to reduce the causes of impairment, such that the stream will return to its designated use. Of the seven causes of impairment, four could potentially be attributed to the Village's East WWTF, namely: 1) barium, 2) copper, 3) total phosphorus and 4) zinc. The East WWTF NPDES permit currently contains a barium effluent standard. After continual operation of the facility meeting that effluent standard, it is presumed barium will no longer be a reason for impairment. It is quite likely the Village's next NPDES permit will contain a total phosphorus (Total P) standard. The East WWTF NPDES permit does not include a copper or zinc standard, and they have given no indication that one will be applied. Therefore, it is reasonable to assume the IEPA has determined the East WWTF is not the source of the elevated copper and zinc levels in the stream.

6.5.2 South Branch Kishwaukee River (East Fork) – At the point of discharge of the West WWTF, the South Branch of the Kishwaukee River has a 7Q10 of 0.9 cfs. While it does have some baseflow, it is considered a low flow stream, as well. The portions of the stream southeast of the Village primarily drain agriculture fields. The portion of the stream within the Village's corporate boundaries accepts surface water drainage from developed areas in the central and eastern parts of the Village. Its designated use is to support aquatic life, also.

The IEPA currently lists many segments of the South Branch of the Kishwaukee River as impaired. The stream segment the Village's West WWTF discharges to and the segment that starts a short distance downstream of the outfall are listed as impaired. The cause for impairment for the segment the plant discharges to is total phosphorus. The causes for impairment of the segment just downstream of the outfall are chloride, copper, dissolved oxygen and total phosphorus. The West WWTF NPDES permit currently contains a total phosphorus standard. The West WWTF NPDES permit does not include a copper standard, and the IEPA has given no indication that one will be applied. Therefore, it is reasonable to assume the IEPA has determined the West WWTF is not the source of the elevated copper levels in the stream. The West WWTF has no issues meeting its dissolved oxygen effluent standard. The low dissolved oxygen levels in the stream likely are attributed to excess nutrients and algae. Given the land uses within the watershed, it is likely nonpoint sources contribute a fair amount of nutrient loading to the stream.

It is important to note that since the South Branch of the Kishwaukee River is listed as an impaired stream, antidegradation requirements state no additional loads can be applied for the potential cause of the impairment. While an expansion of the Village's West WWTF is not expected for as many as two decades, if the stream remains impaired for constituents within the Village's West WWTF, stricter discharge requirements could be applied on those constituents. In addition, if the impairment persists, the IEPA could apply lower effluent standards at an NPDES permit renewal (NPDES permits are renewed every five years) if they deem the reduced loading on the stream is needed to remove the impairment.

6.6 Wastewater Treatment Facility Regulations Summary

As stated previously, the Village's WWTFs are permitted to discharge into the adjacent receiving streams through their respective NPDES permits. Both of the facilities have no issues meeting the standards established in the permits. In this section of the report, a brief explanation of the Village's ability to meet the existing regulations established in their NPDES permits will be provided, then a review of the state of nutrient standards will be provided. Lastly, a discussion of standards relative to the Village's biosolids disposal program will be summarized.

6.6.1 Existing Regulations – As previously stated, both of the Village's WWTFs contain 10 mgl/ BOD and 12 mg/l TSS monthly average effluent limitations. Both facilities have seasonal ammonia-nitrogen monthly average effluent limitations ranging from 1.1 – 1.5 mg/l. Both facilities also have a monthly average effluent limitation for barium of 2.0 mg/l. The West WWTF NPDES permit currently contains a Total P monthly average effluent limitation of 1.0 mg/l. The East WWTF NPDES permit currently does not contain a Total P effluent standard, but during the development of this report, a draft of the reissued permit did. It seems quite likely that the finalized reissued permit for the East WWTF will contain a Total P effluent standard of 1.0 mg/l. The permit also should contain a compliance schedule to allow the Village sufficient time to plan, design and construct the improvements needed to meet the newly applied standard. Both permits contain typical effluent limitations for dissolved oxygen, pH, and fecal coliform and standard special conditions for major WWTFs.

As was presented in Section 3 and documented in Appendices C and D, both WWTFs have no issues meeting the existing effluent limitations contained within their respective NPDES permits. It is assumed that the continued focused operation and maintenance procedures applied at the facilities will keep the facilities in permit compliance into the future.

6.6.2 Nutrients – Federal and statewide nutrient regulations have been discussed for many years, even decades. In the last decade they have generally only been applied to WWTF discharge permits undergoing a plant expansion in Illinois. However, in recent years there has been heightened focus on developing statewide nutrient standards from the national and state level. The statewide efforts, along with recent results from Total Maximum Daily Load (TMDL) studies, have provided the momentum for the Illinois Environmental Protection Agency (IEPA) to add nutrient standards to WWTF National Pollutant Discharge Elimination System (NPDES) renewals.

Under the direction of the Clean Water Act, the United States Environmental Protection Agency (USEPA) has been charged with evaluating the deleterious effects of nutrients, amongst other constituents, on waters of the United States. USEPA efforts to develop nutrient regulations to reduce impairments caused by nutrients within inland and coastal waters have been ongoing for decades. Within the Midwest, USEPA's primary motivation for nutrient reduction is to reduce and control hypoxia in the Gulf of Mexico. Gulf Hypoxia is an area within the Gulf of Mexico, currently estimated to be the size of the state of Massachusetts, where dissolved oxygen levels are so low that the waterbody cannot sustain most marine life. It is believed that nutrient loads within the Mississippi Watershed contribute to the Gulf Hypoxia problem. The Gulf Hypoxia Task Force Action Plan has established a goal of 45% reduction in nutrient loads from the Mississippi River Watershed.

While several research studies have struggled to define the cause/effect relationship between phosphorus levels and impairment in Illinois streams, federal nutrient reduction initiatives have forced the state to proceed with the development of nutrient standards. In May of 2011, the IEPA moderated a nutrient summit where stakeholders were informed of the results of research to date, existing statewide nutrient management initiatives and federal programs for nutrient management. In the beginning of 2012, four workgroups, namely: 1) narrative water quality standard, 2) technology based effluent standards, 3) determining significant sources of phosphorus, and 4) low phosphorus waters, began the process of meeting each workgroup's goal toward nutrient management. Each of the workgroups made progress toward their goal, but have generally been put on hold until the Illinois Nutrient Loss Reduction Strategy is finalized.

On March 11, 2013, the IEPA and Illinois Department of Agriculture initiated the development of an Illinois Nutrient Loss Reduction Strategy. The statewide strategy will be Illinois' plan to meet the goals established in the Gulf Hypoxia Task Force Action Plan. This two tiered approach, scientific assessment and then policy development, likely will result in statewide phosphorus and nitrogen standards.

The draft Illinois Nutrient Loss Reduction Strategy report was issued at the end of last year. The public comment period ended in January of 2015. As of the writing of this report, the IEPA was continuing to work through the public comments. They are targeting to finalize the plan in the summer of 2015.

The general results of the plan suggest the highest nitrogen loads are predominately from nonpoint sources, whereas high phosphorus loads are a mixture of point and nonpoint sources. The plan is proposing to manage nitrogen loads primarily through agriculture education programs and phosphorus loads through the application of phosphorus effluent standards of 1.0 mg/l on major WWTFs within the priority watersheds. While the plan currently does not contemplate total nitrogen effluent limitations for WWTFs, it should not be discounted as a future nutrient loss reduction strategy.

Due to the fact that the Village's West WWTF already contains a Total P effluent limitation of 1.0 mg/l and it is likely the East WWTF will receive the same limitation with the finalization of this round of permit renewal, the statewide nutrients standards likely will not cause any change in the Village of Huntley's NPDES permits. However, given the fact that both of the WWTFs receiving streams have nutrients as a cause for impairment, the IEPA could further restrict nutrient loads to the receiving streams by ultimately lowering the Total P effluent limitations in the Village's WWTF NPDES permits. If it appears that that might be the case, then it would be in the Village's best interest to work with other watershed stakeholders to evaluate the point and nonpoint nutrient loads into the stream, so that load reductions can be appropriately applied to all sources. This could be completed through a more formal Total Maximum Daily Load (TMDL) study or a less formal watershed plan.

6.6.3 Biosolids Disposal – Following stabilization and dewatering, the Village of Huntley contracts for the land application of the biosolids generated at both of the WWTFs. The Village works with the sludge applicator to find fields that will accept the biosolids and then the applicator applies the biosolids in accordance with the applicable federal and state land application regulations.

While Village is required to meet the federal 503 land application regulations and Illinois Part 391, *Design Criteria For Sludge Application On Land*, the Village also is required to meet the applicable radium standards for land application of sludge as administered by Illinois Emergency Management Agency (IEMA). In February of 2011, 32 Illinois Administrative Code 330.40(d) was modified to essentially apply a radium land application limit of 1.0 pCi/g increase in the soil concentration or a maximum radium soil concentration of 3.0 pCi/g. From that point forward, all land application sites needed to be sampled to determine the existing background radium content of the soil. The radium loading provided through the land application of biosolids on the site then needs to be monitored such that the radium content in the soil does not exceed the 1.0 pCi/g increase, or the 3.0 pCi/l concentration ceiling is breached.

Due to the fact that the Village's water supply contains radium, and water containing radium is discharged into the sanitary sewer network, the biosolids at the WWTF contain moderate levels of radium. The radium content of the biosolids from the East WWTF in 2012 and 2013 ranged from 20 – 37 pCi/g, whereas the radium content of West WWTF biosolids for 2012 and 2013 ranged from 40 – 60 pCi/g. The radium content of both facilities is well below the radioactive licensing threshold of 200 pCi/g and well below IEMA's 100 pCi/l threshold that would require closer review of the land application approach. Given the moderate radium content of the Village's biosolids and the fact that there appear to be sufficient land application sites in the area, there is no reason to believe alternative biosolids disposal techniques will need to be considered.

SECTION 7: SUSTAINABLE SOURCE WATER ASSESSMENT

The foundation of all Water Works Systems is the source of supply. Therefore, the foundation of a sustainable Water Works System must be built on a sustainable source water assessment. The Village of Huntley generally has three potential sources of water to consider, namely: 1) local shallow groundwater, 2) deep sandstone groundwater, and 3) surface water by interconnection with a Lake Michigan Water Agency. The Village currently utilizes five (5) deep sandstone wells for water supply sources. In this section, the sustainability of the Village's current supply source will be evaluated, and then the potential integration of other sources of water will be explored.

7.1 Existing Groundwater Resources In the Huntley Area

Since the construction of the Village's community Water Works System, the Village of Huntley has relied on groundwater resources for its source of supply. As stated in Section 2.2, the Village's first six (6) wells were completed in the glacial drift, most likely within sand and gravel deposits. It would seem minimal exploratory efforts were part of the early well siting process, and therefore reliance on the shallow aquifer was deemed an unsustainable source of supply at the time. Given the poor water quality and lack of production of the shallow wells, the Village drilled their first well into the deep sandstone aquifer in the first part of the 1990's. The four additional wells that were drilled since then also were drilled into the deep sandstone and all of the shallow wells have since been abandoned. As the Village's planning boundary expands, and the need for additional water supply increases, the Village will need to determine if they should continue to seek water from the aquifers they currently are withdrawing from or whether alternative groundwater aquifers would be more sustainable and cost effective to utilize.

Many municipalities in Northeastern Illinois who do not receive Lake Michigan water rely on the deep sandstone aquifer as their main source of supply. Based on the current and projected regional deep sandstone withdrawal rates, the deep sandstone aquifers likely will have significant water level drawdown into the future. With this increase in drawdown, energy costs of pumping water from the deep sandstone aquifer will continue to rise, water quality within the deep sandstone aquifers could degrade and the long term sustainability of the deep sandstone aquifer for the region will continue to be a question.

On the other hand, shallow groundwater, if available in sustainable capacity, can reduce demand on the deep aquifers, reduce radium levels in the water supply, and add water supply at an affordable cost. Like deep groundwater sources, shallow groundwater sources typically have few organic constituents, so the cost to treat shallow groundwater is typically considerably less costly to treat than surface water supplies. Shallow well water can be obtained from sand and gravel aquifers in the glacial drift and/or the fractured dolomite bedrock in the Maquoketa or Galena-Platteville systems. Diversifying water resources when possible is always encouraged to minimize a community's susceptibility to drawing down the water supply in a specific groundwater aquifer.

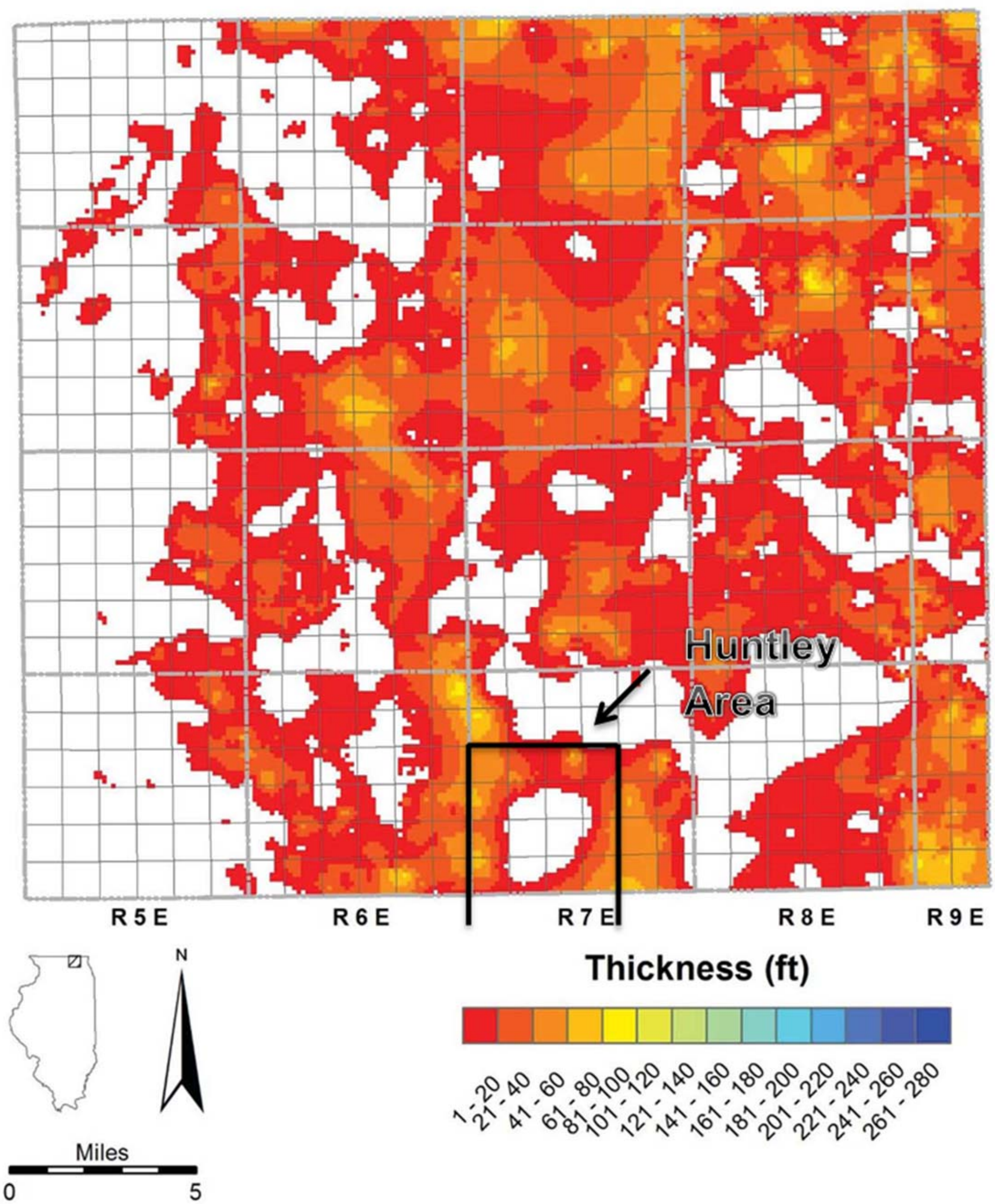
In recent years, several regional water studies have focused on water supply availability within Northeastern Illinois. Three of the studies, which include the *Groundwater Simulation Modeling and Potentiometric Surface Mapping, McHenry County, Illinois (ISWS, 2013)*, the *Kane County Water Resources Investigations: Simulation of Groundwater Flow in Kane County and Northeastern Illinois* (ISGS/ISWS, 2009) and the *Northeastern Illinois Regional Water Supply/Demand Plan* (CMAP/RWSPG, 2010), have evaluated the sustainability of the shallow aquifers, deep sandstone aquifers and the Fox River within the Northeastern Illinois region. As part of these studies, the Illinois State Geologic Survey (ISGS) and Illinois State Water Survey (ISWS) staffs have developed a three dimensional geologic model of a good portion of Northeastern Illinois and deep sandstone macroscale geologic and groundwater flow models that cover a good portion of the Midwest. In this section of the report, a summary of the work completed by the ISGS & ISWS will be reviewed to identify the groundwater resource availability for the Village.

<u>7.1.1 Shallow Sand & Gravel Aquifer</u> – In Northeastern Illinois, the availability of shallow well water sufficiently productive for a municipal well varies and shallow well construction and development often requires extensive studies, exploration, drilling, and testing. In the Huntley area, there are several known Quaternary period (2.588 million years ago to present) aquifers. These sand and gravel aquifers are remnants of the last major episode of glaciation in the Midwest (approximately 110,000 to 10,000 years ago). These glacial sand and gravel deposits rest on a surface of eroded Silurian aged bedrock (443.7 to 416 million years ago). These aquifers have been studied extensively by the ISGS and ISWS and mapped with a relative degree of certainty.

As summarized in the *Groundwater Simulation Modeling and Potentiometric Surface Mapping, McHenry County, Illinois* (ISWS, 2013) report and in consultation with ISWS staff, the most viable sand and gravel aquifer within the Huntley area is the Ashmore formation. Per the McHenry County report, the Ashmore Formation "consists of sand gravel of the Ashmore Tongue of the Henry Formation…..The Ashmore Tongue is a lateral extension of the Henry Formation that occurs beneath the Tiskilwa Formation (Wedron Group), a thick and widespread layer of diamicton….The Ashmore Unit is laterally extensive in McHenry County, with thicknesses up to about 100 ft. It is widely used for domestic water supplies and for some public, industrial, and commercial supplies." Exhibit 7-1 presents the Ashmore sand and gravel formation thickness within McHenry County.

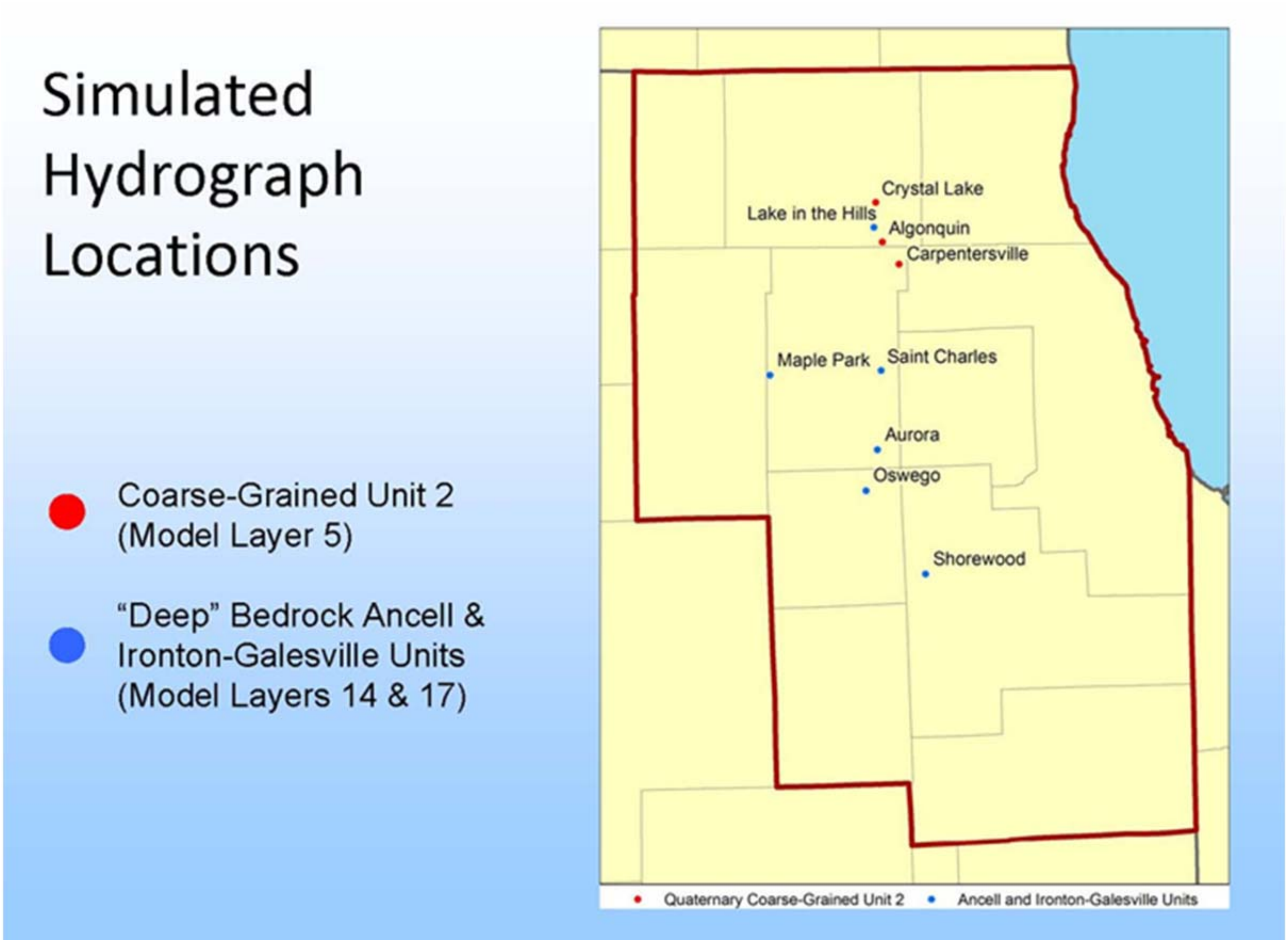
Based on a review of well logs within and adjacent to the Village's planning boundary, which will be summarized in a map later in this section, it would appear both the Villages of Algonquin and Lake in the Hills tap into the Ashmore formation with some of their municipal wells. While the formation has been productive for the two Villages its long term sustainability could be an issue if they continue to pump the aquifer at the same rates. The ISWS completed regional groundwater modeling of the Quaternary coarse-grained aquifers, as well as the deep bedrock Ancell and Ironton-Galesville Aquifers. Simulated hydrograph locations are identified on Exhibit 7-2. A simulated hydrograph of the Quaternary coarse-grained aquifer, which would be

Exhibit 7-1: Ashmore Sand and Gravel Formation Thickness In McHenry Co.



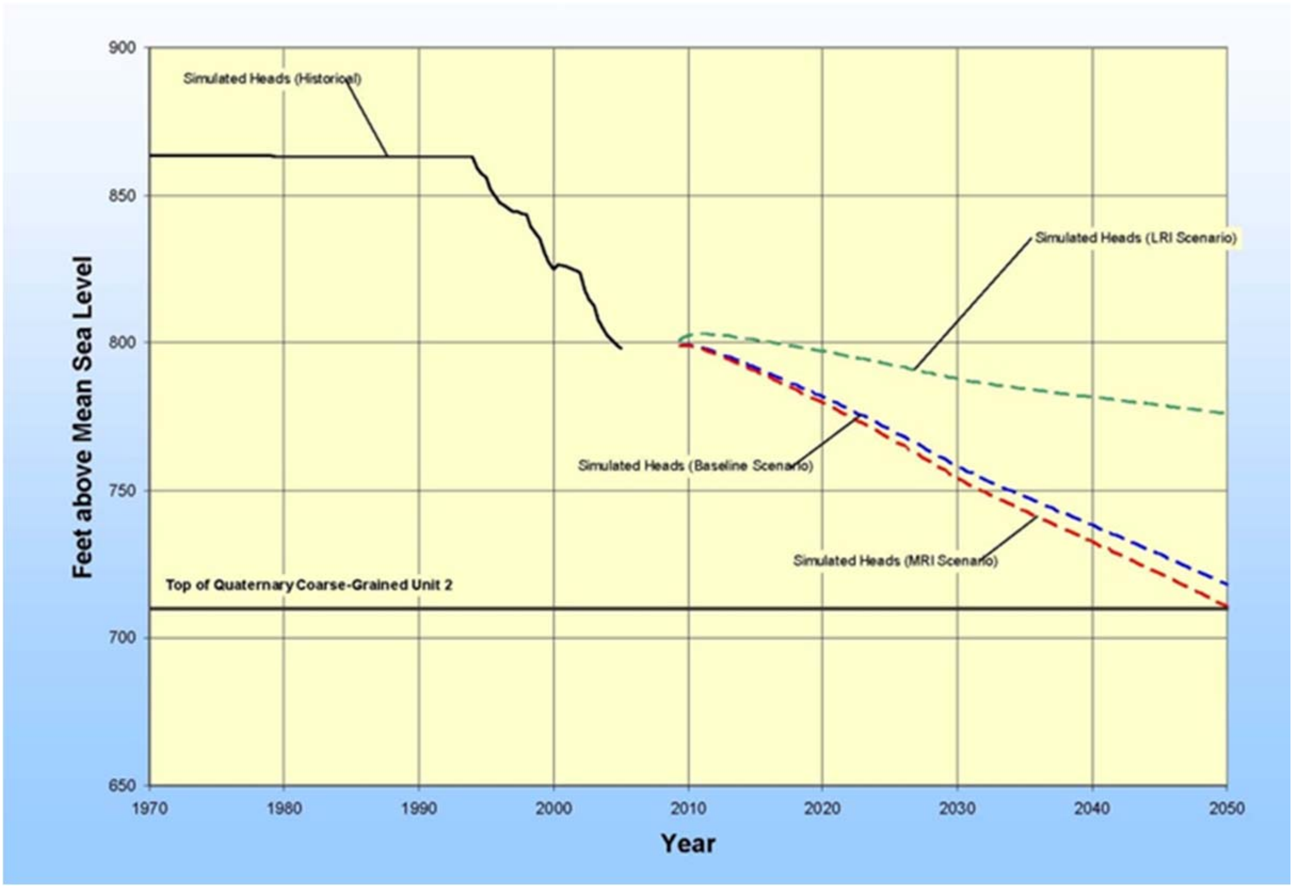
(Source: Groundwater Simulation Modeling and Potentiometric Surface Mapping, McHenry County, Illinois, ISWS, November 2013)

Exhibit 7-2: Simulated Hydrograph Locations



Source: Regional Groundwater Modeling Results for Water Supply Planning in Northeast Illinois -- Presented by Allen Wehrmann, Illinois State Water Survey, on December 16, 2008 at a meeting of the NE Illinois Regional Water Supply Planning Group in Chicago, Illinois. (http://www.isws.illinois.edu/iswsdocs/wsp/ppt/NEIL_RWSPG_Dec2008.pdf)

Exhibit 7-3: Simulated Hydrograph of Quaternary Coarse Grained Unit at Algonquin Cone Center



Source: Regional Groundwater Modeling Results for Water Supply Planning in Northeast Illinois -- Presented by Allen Wehrmann, Illinois State Water Survey, on December 16, 2008 at a meeting of the NE Illinois Regional Water Supply Planning Group in Chicago, Illinois.
(http://www.isws.illinois.edu/iswsdocs/wsp/ppt/NEIL_RWSPG_Dec2008.pdf)

predominately the Ashmore Formation in the Algonquin area, with a cone center at Algonquin was modeled. The results of the simulated water levels, or heads, for various projected water use scenarios are shown in Exhibit 7-3. Under the More Resource Intensive (MRI) and Baseline (CT) Scenarios, the simulated head declines over 75 feet to at or near the top of the quaternary unit. Under the LRI scenario, the model projects a gradual and much less overall simulated head decline of about 25 feet.

Based on the ISWS modeling results, it would seem any shallow sand and gravel deposits on the east side of the Village could have long term sustainability concerns. However, sand and gravel deposits on the west side of the Village could have some potential, primarily due to the fact that there would be significantly less wells in the formation in that area. The map depicting the Ashmore formation within Huntley's planning area will be provided in Section 7.1.4.

7.1.2 Shallow Bedrock Aquifer – In the Huntley planning area, the upper most bedrock unit is the Maquoketa Unit. The uppermost 25 – 125 feet of bedrock forms the shallow bedrock aquifer. Per the McHenry County Groundwater Study, "This aquifer, also called the dolomite aquifer or shallow dolomite aquifer, is defined by secondary porosity and permeability that formed through weathering and dissolution of the carbonate rock, principally along fractures and bedding planes, with subsequent burial by Quaternary materials and saturation by groundwater. The Shallow Bedrock Aquifer is a common target of domestic supply wells in McHenry County, but well yields are variable, a product of the size, number, and degree of connection of fractures and bedding planes intersected by the well bore."

As is the case in most of Northeastern Illinois, the shallow bedrock formation likely can sustain a domestic well in the Huntley area, but the likelihood of intersecting sufficient fractures to sustain a municipal water well are very unlikely. Therefore, it is assumed the shallow bedrock aquifer is not a viable option for the Village of Huntley.

7.1.3 Deep Sandstone Aquifer – Within the Village's Planning Area, deep well water can be obtained from formations in the Ordovician and/or the Cambrian aquifer systems. In general, the Ordovician aquifer system consists of (in descending order) the Galena-Platteville dolomite, the Glenwood-St. Peter sandstone (hereinafter referred to as the St. Peter or Ancell Unit), and the Prairie du Chien dolomite/sandstone formations. Furthermore, the Cambrian aquifer system generally consists of (in descending order) the Eminence–Franconia dolomite/sandstone, the Ironton-Galesville sandstone, the Eau Claire sandstone, and the Elmhurst-Mt. Simon sandstone formations. The major deep water bearing formations in order from the ground surface to the deepest are the St. Peter sandstone, the Ironton-Galesville sandstone, and the Mt. Simon sandstone formations. With observed water production capacities in the maximum range of 400 gpm to 500 gpm, the St. Peter formation is generally the greatest water producer of the Ordovician aquifer system. Based on capacities of other wells in this formation within northeastern Illinois, the water production from the Ironton-Galesville formation of the Cambrian aquifer system can be projected at a rate of 1,000 gpm. The Eau Claire and Mt. Simon formations have also demonstrated high production capability. Because they are deeper (and hence more costly to construct and operate) than the Ironton-Galesville formation and because, in some cases, the total dissolved solids levels within the Mt. Simon aquifer have been excessive, the Eau Claire and Mt. Simon formations are often times not considered. However, as presented later in this section, sometimes localized water quality conditions of the Ironton-Galesville compel an investigation into the use of the Mt. Simon formation.

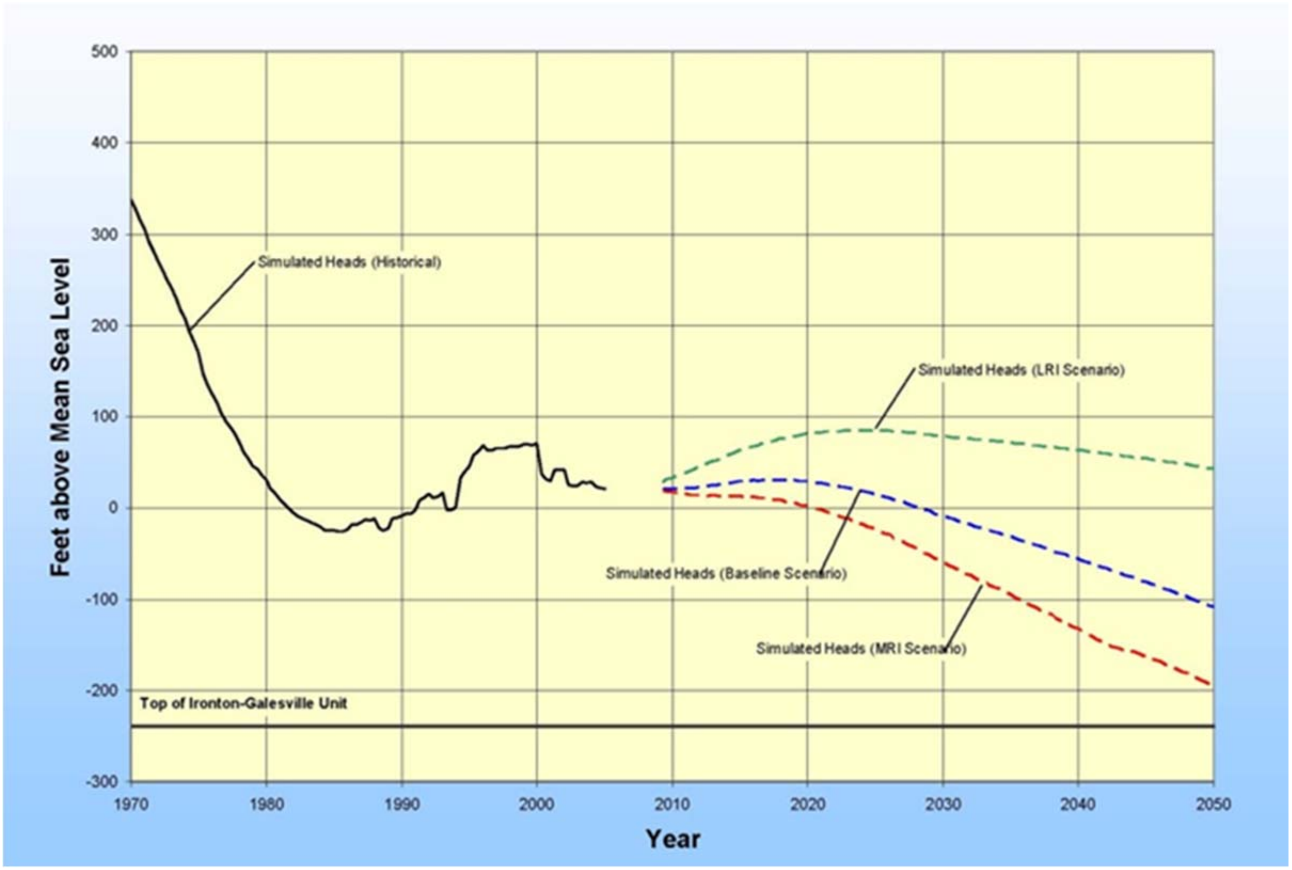
In the past (1970s and 1980s), the deep formations throughout northeastern Illinois had experienced declining static and pumping water levels, in some instances, due to aquifer mining of groundwater systems. Aquifer mining occurs when groundwater is withdrawn from an aquifer at unsustainable rates for a period of time such that the critical water level is reached and exceeded. The critical water level for the deep bedrock system in Northeastern Illinois according to most researchers is the top of the Ironton-Galesville aquifer. The demand from growing populations resulted in over-pumping and thus, lowered groundwater levels. In fact some literature has suggested that water levels within the high pumping centers had dropped more than 900 feet in the deep sandstone aquifers lying deep below the Fox River Valley. This trend was due to the fact that the demand from the deep wells was in excess of the naturally occurring recharge rate. Because of the declining yields of the deep well formations, many Chicago suburban communities turned to alternate sources of supply including shallow groundwater and surface water from adjacent rivers. Moreover, Lake Michigan water became available for many communities in Cook, DuPage, Lake, and Will Counties. Since many suburban communities took advantage of these alternate water supply sources, the burden on the deep well supply has been reduced and the static water levels rebounded.

However, literature from the Illinois State Water Survey (ISWS) has suggested that in 1995 the deep bedrock withdrawals totaled 67 MGD and in 2000 the total was about 72 MGD. It has been suggested that the maximum sustainable yield of the deep aquifer system in northeastern Illinois is approximately 65 – 80 MGD. If the estimates of the practical sustained yield are correct and if the withdrawals continue to exceed that level, the recovery may eventually discontinue and water levels could potentially decline once again. In fact, it has been documented that there already is some decline in some localized cases.

As previously identified, the ISWS has recently completed regional groundwater modeling of the Quaternary coarse-grained aquifers, as well as the deep bedrock Ancell and Ironton-Galesville Aquifers. Simulated hydrograph locations are identified on Exhibit 7-2. A simulated hydrograph of the deep bedrock Ironton-Galesville Aquifer at Lake in the Hills was modeled. The results of the simulated water levels, or heads, for various projected water use scenarios are shown in Exhibit 7-4. Under the More Resource Intensive (MRI) and Baseline (CT) Scenarios, the simulated head declines from over 100 to 200 feet and approach the top of the Ironton-Galesville unit. However, under the LRI scenario, the model projects a much more stable overall simulated head condition.

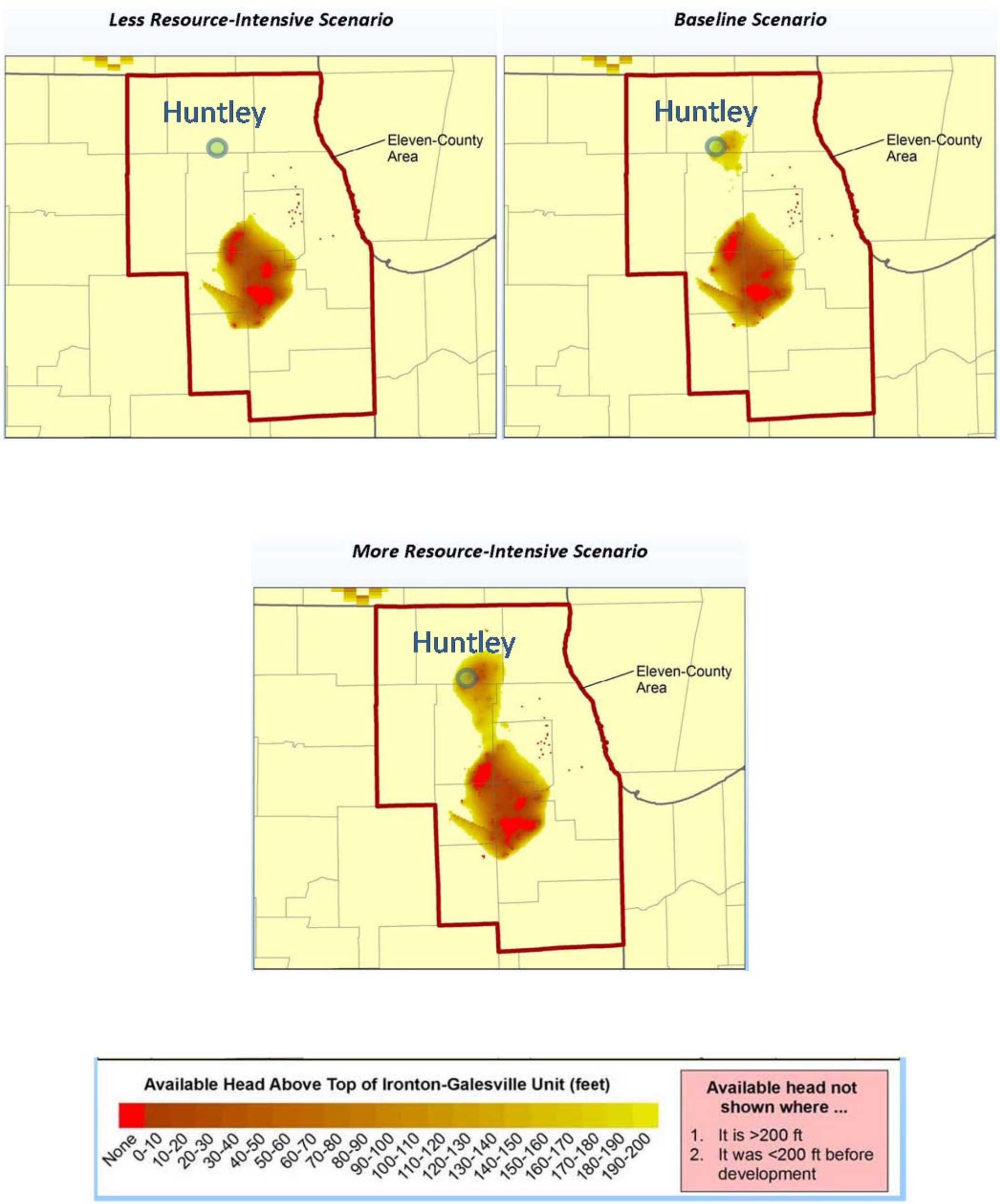
Exhibit 7-5 presents additional results of ISWS modeling efforts of the projected available hydrostatic head above the Ironton-Galesville formation for the eleven county area in northeastern Illinois. This data projects

Exhibit 7-4: Simulated Hydrograph of Ironton-Galesville Unit at Lake in the Hills



Source: Regional Groundwater Modeling Results for Water Supply Planning in Northeast Illinois -- Presented by Allen Wehrmann, Illinois State Water Survey, on December 16, 2008 at a meeting of the NE Illinois Regional Water Supply Planning Group in Chicago, Illinois. (http://www.isws.illinois.edu/iswsdocs/wsp/ppt/NEIL_RWSPG_Dec2008.pdf)

Exhibit 7-5: Projected Available Head Above the Ironton-Galesville Sandstone in 2050



Source: Regional Groundwater Modeling Update for Northeast Illinois -- Presented by Allen Wehrmann, Illinois State Water Survey, on March 24, 2009 at a meeting of the NE Illinois Regional Water Supply Planning Group in Chicago, Illinois. (http://www.isws.illinois.edu/iswsdocs/wsp/ppt/NEIL_RWSPG_Mar2009.pdf) that the Ironton-Galesville formation could be dewatered in portions of southeastern Kane County and western Will County by the year 2050. Also, without conservation, the projections indicate that the available head above the Ironton-Galesville formation near Huntley may be less than 150 feet and possibly even less than 50 feet if the regional demands on the aquifer are increased. However, a change in water use patterns, such as increased regional implementation of water conservation practices, will extend the sustainability of this aquifer. The results of the model represent another important factor of implementing water conservation measures. For the planning period of this report, deep wells of the Cambrian-Ordovician aquifer system should be considered as a viable source of supply for the Village.

Through investigation it has been determined that the Ironton Galesville aquifer in northern Kane County and southern McHenry County, including the Village of Huntley planning area, has elevated levels of barium and radium when compared to other similarly constructed deep wells in northeastern Illinois. Barite rock, whose chemical composition is $BaSO_{4(s)}$, is naturally occurring within the Ironton-Galesville sandstone. Under reducing conditions, which is commonly present in the Ironton-Galesville formation within the Huntley area, the barite rock dissolves into the barium (Ba^{2+}) cation and the sulfate (SO^{4-}) anion. Under these reducing conditions, the sulfate cations are often quickly reduced to sulfide species ($H_2S_{(g)}$, HS^- and S^{2-}). The high sulfide species often contribute to aesthetic issues (rotten egg smell), while the high barium concentrations in the formation typically contribute barium levels in excess of the barium MCL.

Exhibit 7-6 provides a graph of the barium concentration in numerous Ironton-Galesville wells in the northern Kane/southern McHenry County region and compares them to a couple of known Mt. Simon wells from the same region. The differences are profound. For instance, Huntley's Ironton-Galesville Well No. 9 has a barium concentration of about 5.7 mg/l whereas the two Mt. Simon wells are approximately 0.2 mg/l.

Similarly, Exhibit 7-7 provides a graph of the combined radium concentrations of numerous Ironton-Galesville wells in the northern Kane/southern McHenry County region and compares them to the Mt. Simon wells from the same region. While the differences are not as drastic as they were with barium, the evidence suggests that there is a potential that lower radium concentrations can be found from the Mt. Simon formation in this localized region, as well.

Given the regional long term sustainability of the deep sandstone aquifer, a more focused review of the sustainability of the formation in the Huntley area was deemed to be warranted. The modeling of Ironton-Galesville alternatives in the Huntley Planning Area will be presented in Section 7.2. That being said, the water quality characteristics of the Mt. Simon aquifer could prove to be beneficial, and therefore this aquifer should not be discounted as an option. The Village of Hampshire, which is southwest of the Village of Huntley, encountered very high radium levels within some recent Ironton Galesville wells. The Village elected to drill one of the wells deeper into the Mt. Simon formation. While it may not be necessary for the Village of Huntley to drill to the Mt. Simon formation immediately, it would be wise for all future deep sandstone wells to be constructed (i.e. with larger surface and long string casing) such that deepening is a cost-effective option.

Exhibit 7-6: Barium Concentrations In the Local Ironton-Galesville and Mt. Simon Aquifer

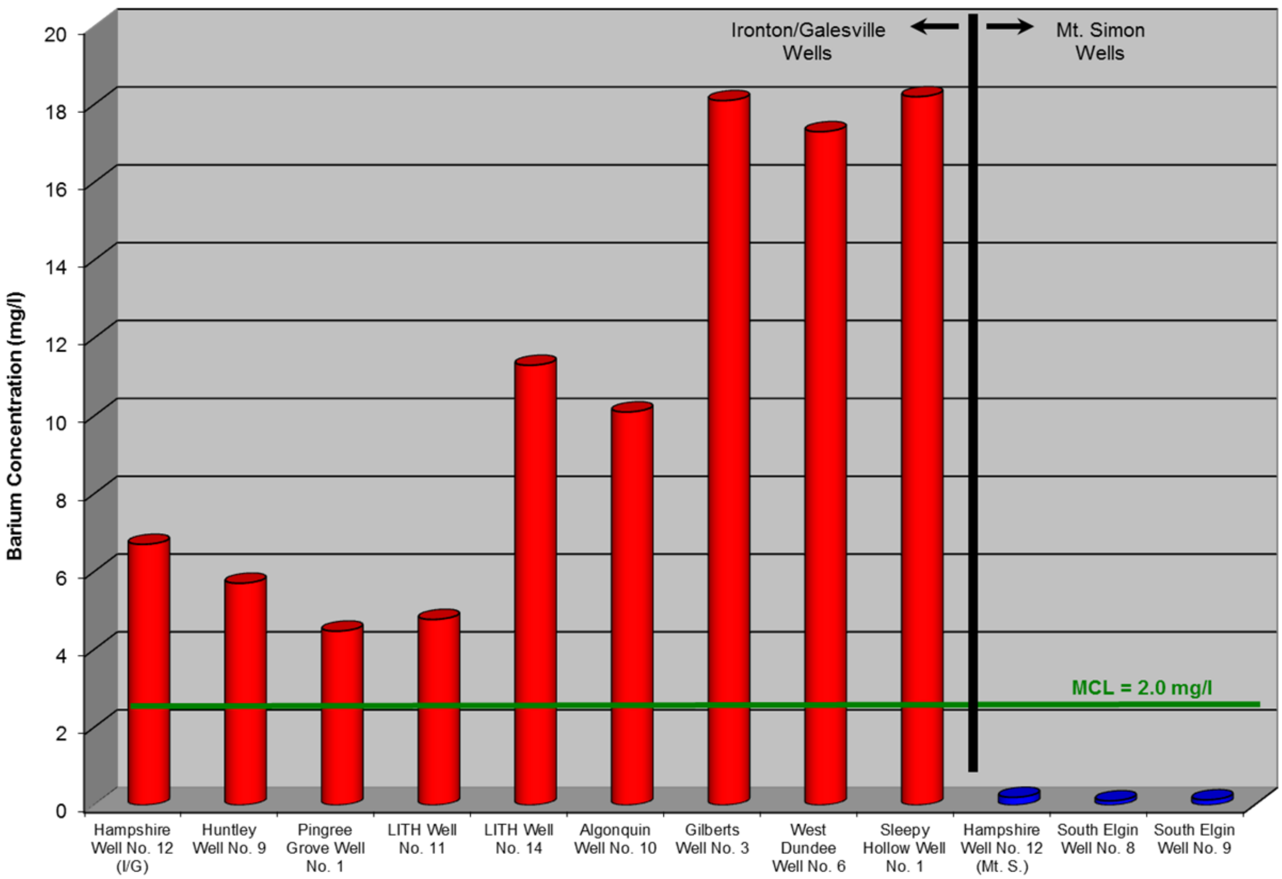
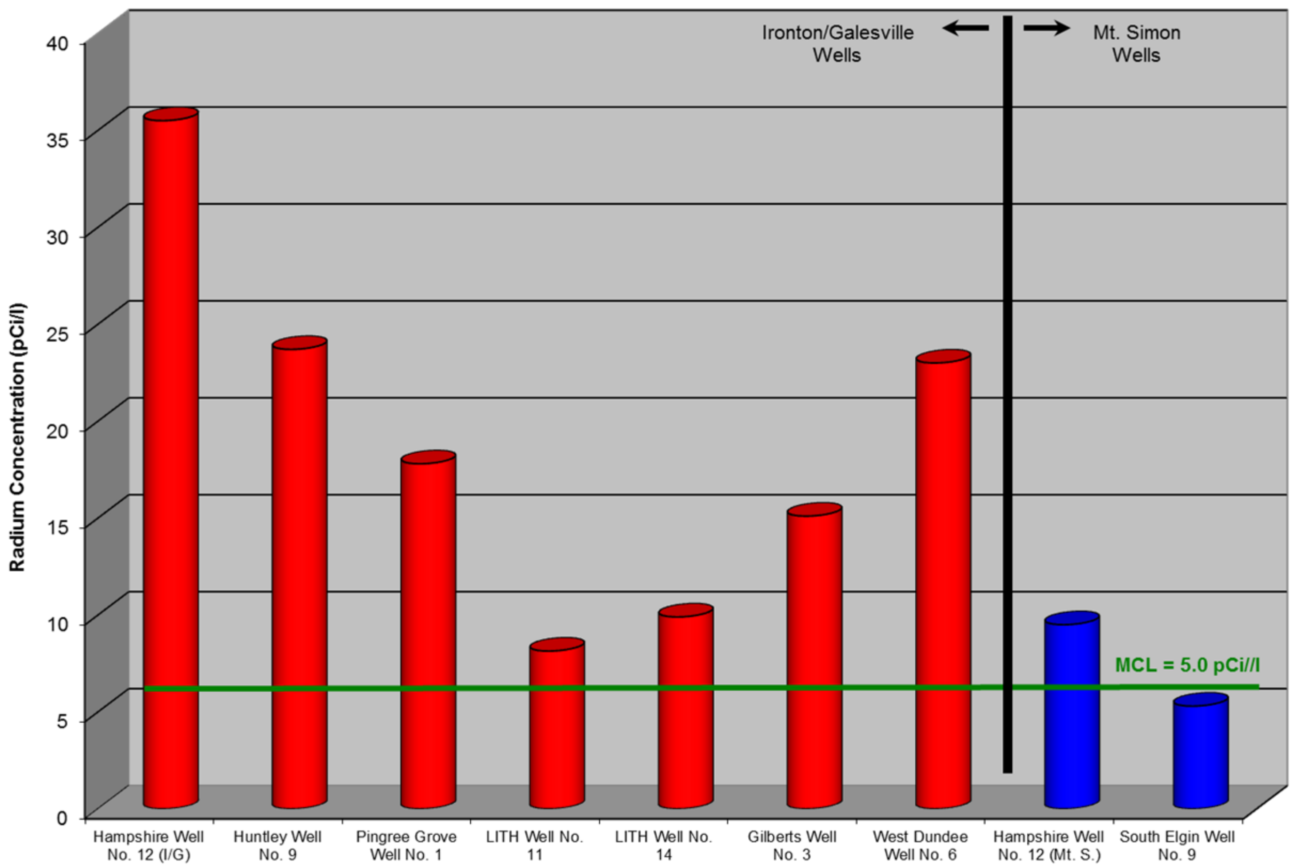


Exhibit 7-7: Radium Concentrations In the Local Ironton-Galesville and Mt. Simon Aquifer



7.1.4 Sustainable Water Supply Planning Map – In an effort to pull all of the existing groundwater resources information together, the project team, which included staff from the ISWS, utilized the ISGS/ISWS Northeastern Illinois geodatabase to map the existing water wells within, and adjacent to, the Planning Area. Exhibit 7-8 is a map of the existing wells, as well as, depicts the thickness of the Ashmore Formation throughout the planning area.

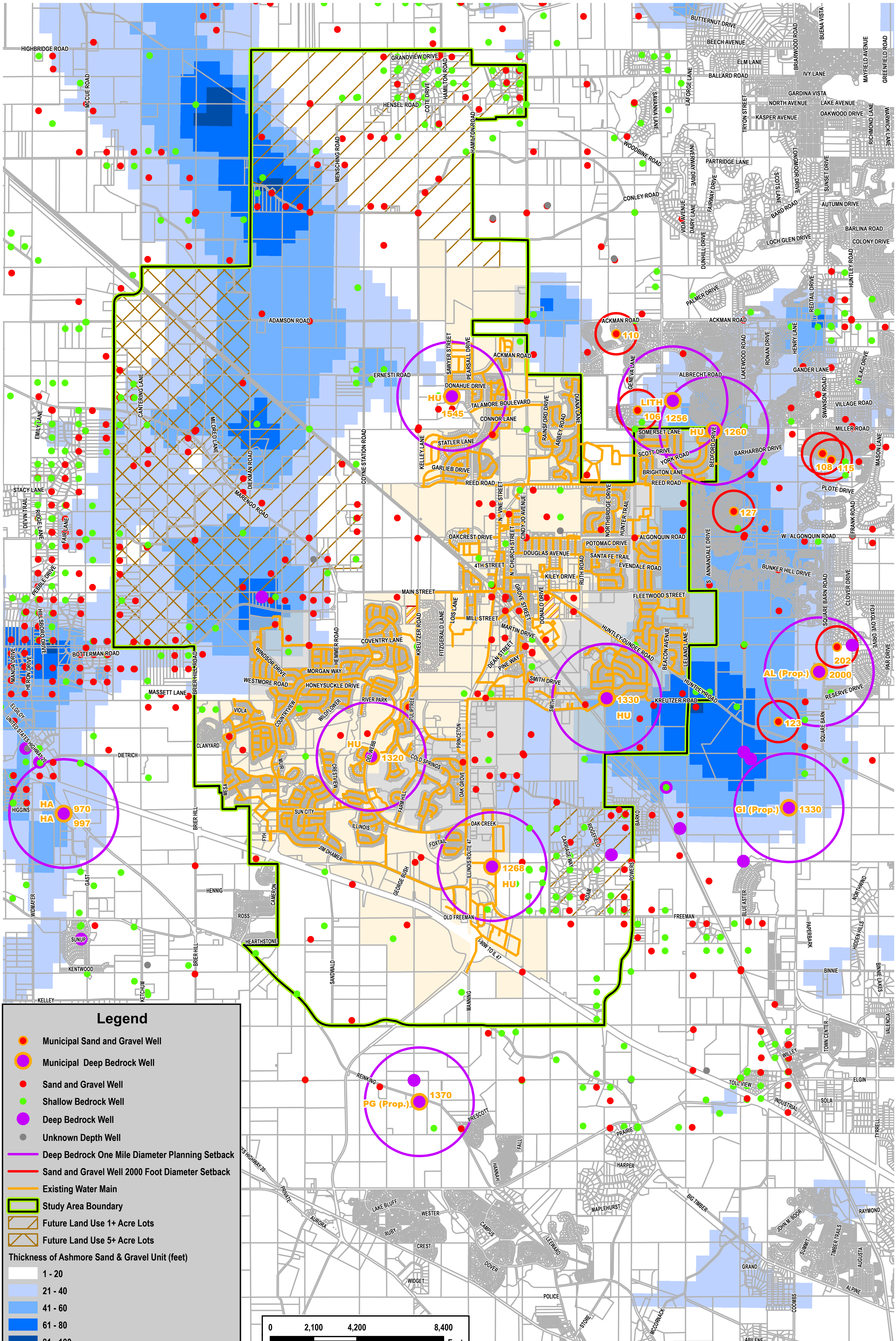
As expected, there is a high density of water wells on the eastern side of the planning area. Algonquin and Lake in the Hills have multiple shallow sand and gravel wells that appear to be withdrawing from the Ashmore Formation in that area. Lake in the Hills also has a deep sandstone well very close to the Village of Huntley's Well No. 8. Given the short distance between the two, approximately 2,300 feet, it seems quite likely the two wells interfere with each other when they are both pumping. Both the Villages of Algonquin and Gilberts have sited deep sandstone wells east of the Village. Based on the proposed depth of the Gilberts well, it would appear it will be drilled into the Ironton-Galesville formation. The proposed Algonquin well is planned to be a Mt. Simon well. The Village of Pingree Grove has sited a proposed deep well, which appears to be an Ironton Galesville targeted well, just south of the Village's planning boundary. The Village of Hampshire has one existing and one proposed St. Peter well southwest of of the Village of Huntley's Planning Area.

There are many private wells within the Village's Planning Area. There are many wells that are finished in the shallow sand and gravel and many wells that are finished in the shallow bedrock. There also are some private wells that withdraw from the deep sandstone. The shallow sand and gravel well distribution is more dense on the west side of the Village, which is probably a good indication that the sand and gravel deposits are relatively productive in that area. There are less sand and gravel wells to the northwest of the Village, primarily because the area is undeveloped. Given the projected Ashmore Formation thickness northwest of the Village's Well No. 11 and the relatively minimal amount of wells tapped into the aquifer in that area, it would seem that is the area with the greatest shallow and gravel potential for the Village.

7.2 Deep Sandstone Aquifer Model

As previously summarized, the ISGS and ISWS collaboratively developed a regional (multistate) deep sandstone aquifer model. Initial model results, which were presented in Section 7.1.3, indicate the water levels within the aquifer are declining. The results also suggest the projected growth in the region, along with a current trends per capita water usage, could create some major aquifer challenges in portions of the region – primarily in Southeast Kane County and Northwest Will County. Alternative regional water use scenarios also were modeled to project water levels under those scenarios. As one would expect, lower water demands under less resource intensive water use scenarios extend the capacity of the deep sandstone water supply resource further into the future.

The baseline water levels in the deep sandstone aquifer model, which are referenced to the Ancell Unit, are summarized in Exhibit 7-9. When looking at the geologic stratigraphy of the region, the St. Peter Sandstone



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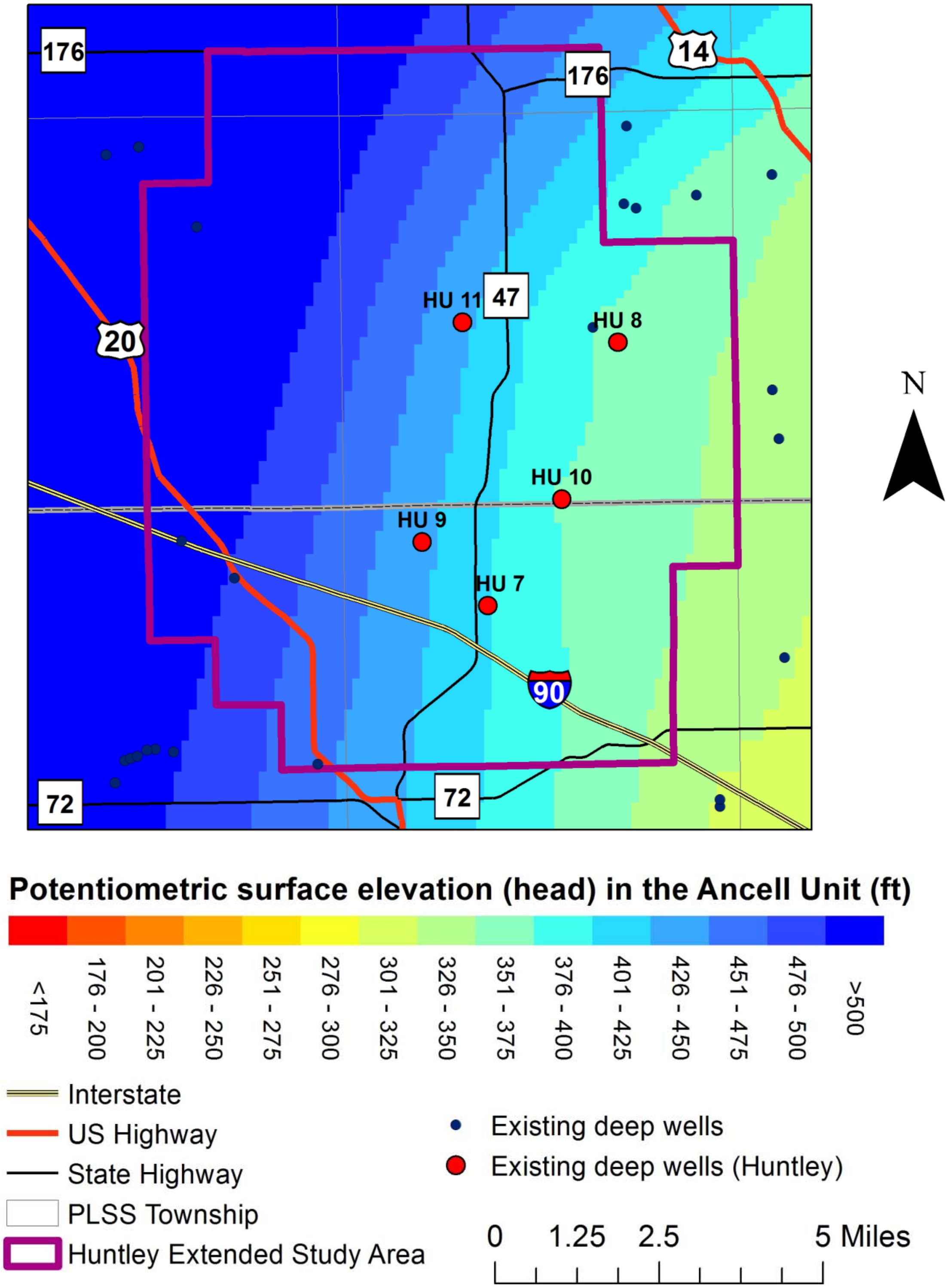
DATE: JULY 2014
PROJECT NO.: HU1401
BY: KKP
PATH: H:\GIS\PUBLIC\HUNTLEY\HU1401\
FILE: HU1401_EXH_7-8_WATER SUPPLY.MXD

COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 7-8
SUSTAINABLE WATER SUPPLY PLANNING MAP

NORTH

Exhibit 7-9: 2009 Ancell Unit Pentiometric Surface Regional Model Elevation Simulation



(Ancell Unit) and the Ironton-Galesville Sandstone appear to be separate aquifer units. However, many municipal wells in Northeastern Illinois are open to both units, and therefore water has transferred across those two units for many years. Given the manmade connection between the two units, the water levels of each individual unit have essentially merged together in most areas of Northeastern Illinois. Even though four of five of the Village's wells are cased through the Ancell unit, the hydraulic interconnection between the Ancell and Ironton-Galesville likely exists in the Huntley area, too. Therefore, water levels in the model utilized the upper Ancell Unit as the reference point.

The top of the Ancell Unit in the Huntley area is approximately at an elevation of 200 ft MSL. Therefore, a 2009 static water level of the Ancell unit at Well No. 7 of approximately 400 ft MSL means the aquifer contained approximately 200 feet of artesian head above the Ancell Unit in 2009. At a static water elevation of approximately 430 ft, the artesian head above the top of the Ancell Unit at Well No. 11 was approximately 230 feet in 2009.

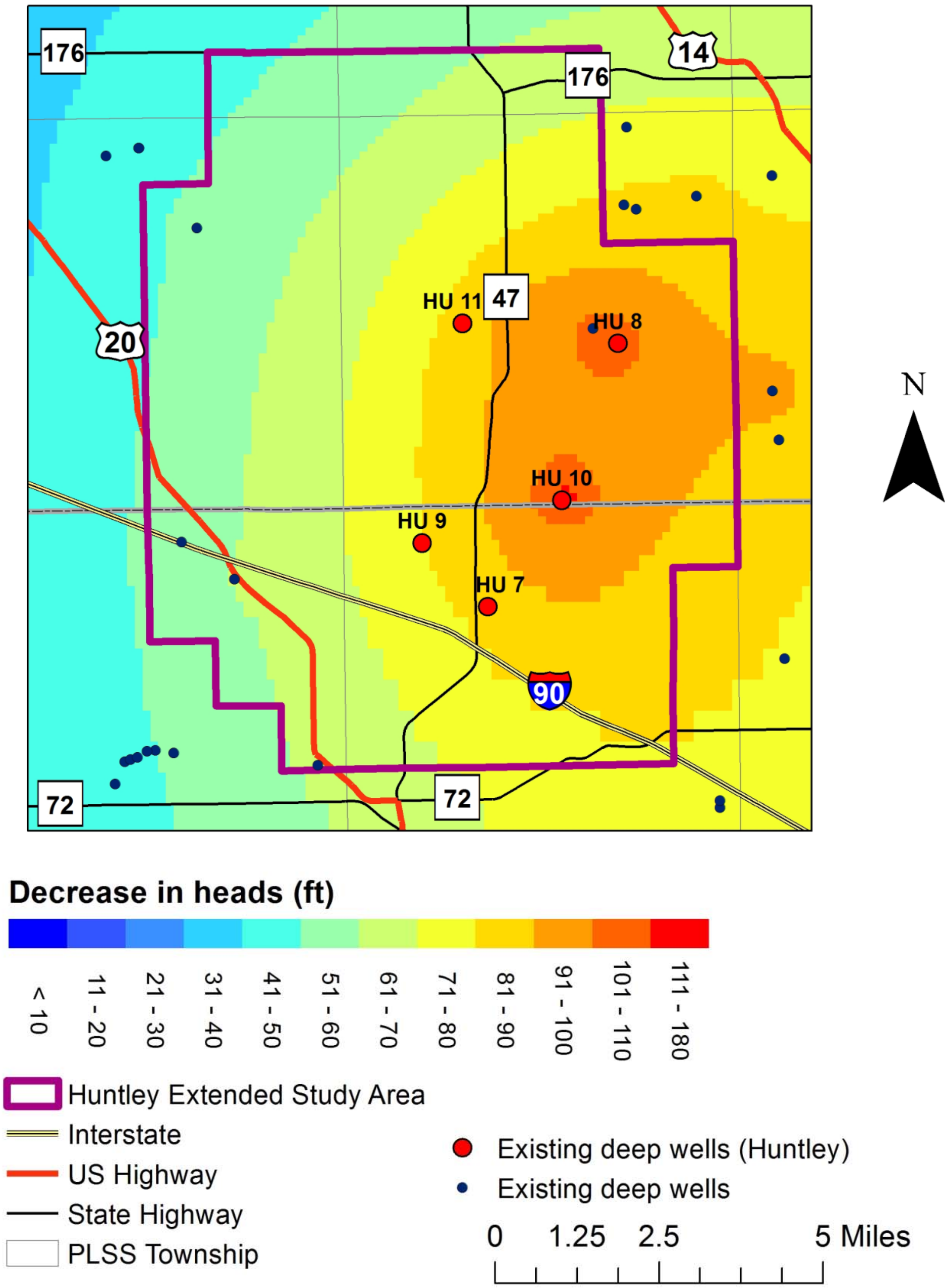
Over the last five years the ISWS has made some refinements within the regional models, and the more recent model results are getting even closer to replicating actual water level measurements in the region. In addition, the Village was interested in utilizing the model to evaluate the sustainability of the deep sandstone formation with multiple deep sandstone water well options in the Huntley area. Therefore, the project team, which included members from the ISWS who developed and refined the models, completed several modeling scenarios for this plan. A summary of the modeling efforts and results is as follows.

7.2.1 2040 Northeastern Illinois Regional Deep Sandstone Aquifer Modeling – The first model run included the use of the refined model to reestablish the 2040 projected deep sandstone water levels in the Huntley area under the original modeling assumptions. When the ISWS conducted the initial regional modeling, all of the projected water use increases for a community were applied to the community's existing wells. While it is understood why they needed to proceed in that manner, it is overly conservative. When water demands increase, most communities would install new wells to increase the pumping distribution from the aquifer.

Exhibit 7-10 summarizes the pentiometric surface elevation change from the 2009 baseline with the CT water use applied to the Village's five existing deep sandstone wells. Under this modeling scenario, water levels drop over 100 feet in the areas of Wells No. 8 and 10. The water levels drop between 70 – 85 feet at the Village's wells No. 7, 9 and 11. The water level decreases decline in a northwesterly direction, primarily due to the fact that water levels are higher in that direction to start with, and there is less urbanization and deep sandstone pumping in that direction.

7.2.2 Alternate 1: 2040 CT Deep Sandstone Aquifer Modeling With Proposed Ironton-Galesville Wells – In the second model run, the CT water demand was spread across the existing and potential future Ironton-

Exhibit 7-10: 2040 Ancell Unit Pentiometric Surface Regional Model Simulation Elevation Change – CT Water Use With Existing Wells



Galesville wells. As stated in Section 5.1.1, the Village will need to increase the water supply resources by approximately 7,300 gpm. A typical target flow rate for an Ironton-Galesville well is 1,000 gpm. Therefore, this model run assumed seven (7), 1,000 gpm wells and one (1) 300 gpm well were added to the water supply network. The distribution of the proposed wells is depicted on Exhibit 7-11.

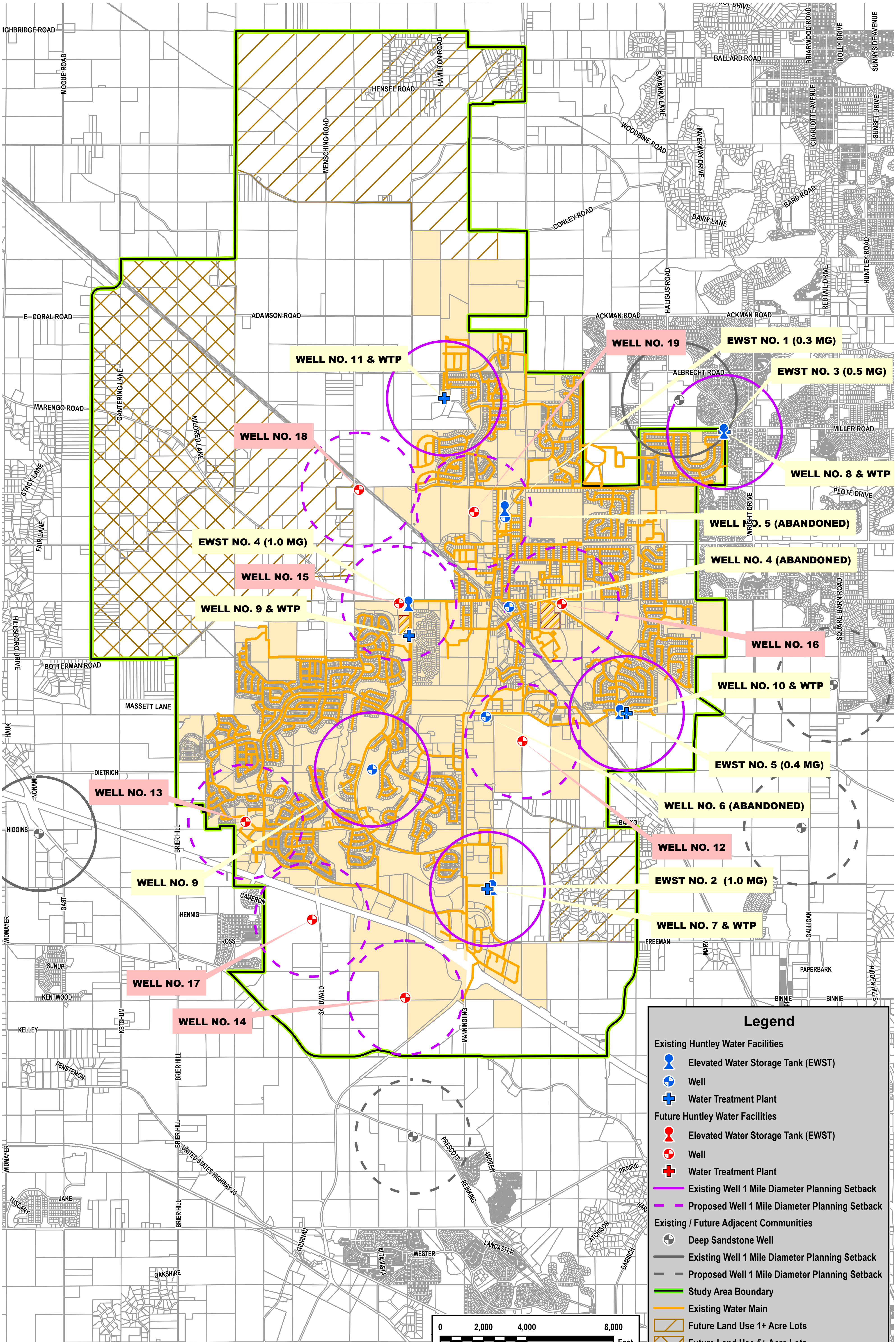
Exhibit 7-12 summarizes the water level changes when compared to the 2009 levels for all of the future conditions analyses. With the additional wells and wider spread of withdrawal from the deep sandstone aquifer, the water level decline reduces approximately 5 – 10 feet across the entire region. There are no areas where the decline exceeds 100 feet and the total area where the drawdown was 90 – 100 feet is considerably smaller.

7.2.3 Alternate 2: 2040 LRI Deep Sandstone Aquifer Modeling With Proposed Ironton-Galesville Wells – The purpose of the third model run was to determine the change in water levels if the LRI water use demand was applied to the deep sandstone aquifer. Section 5.1.3 determined the Village would need to add approximately 3,700 gpm of water supply resources to the Water Works System to meet the 2040 LRI water demand. Therefore, four (4) Ironton-Galesville wells were added to the existing well network for this modeling scenario. The four wells that were added for this model run were Wells No. 13, 15, 16 & 18 as depicted on Exhibit 7-11.

Exhibit 7-13 depicts the 2040 water level decline from the 2009 baseline for this modeling scenario. The water level declines reduce another 5 – 10 feet across the region when compared to the CT water demand distribution across the eight wells. The maximum predicted decline in the water levels is projected to be 80 – 90 feet over the 31 year period which would be an average decline around three (3) feet per year. The water level declines in the northwest portion of the Village's planning area are projected to be only 40 – 50 feet, which would be less than two (2) feet per year on average.

7.2.4 Alternate 3: 2040 CT Deep Sandstone Aquifer Modeling With Partial Alternate Aquifer Withdrawal – The fourth, and final, model run assumed the Village maintained the CT water use demand throughout the planning period, but only utilized the Ironton-Galesville aquifer for one half of the water demand increase for the time period. Under this scenario, alternative water supply resources (i.e. shallow sand and gravel wells and/or Mt. Simon wells) would be tapped to make up the remaining 3,650 gpm of needed supply expansion. While the future withdrawal rate is less than the LRI water use scenario (3,650 gpm versus 4,700 gpm), it is comparable. In an effort to test another dimension of the model, alternate potential future wells were selected for this alternative to see if it would have a noticeable effect on the water level declines in the aquifer. Under this modeling scenario, the reduced water demand projection was applied to Wells No. 13, 15, 16 and 19, as depicted on Exhibit 7-11.

The results of this model run are summarized on Exhibit 7-14. The water level declines drop another 5 – 10 feet under this modeling scenario. By switching Wells No. 18 and 19, and consequently moving the withdrawal further west, the water level declines around the Village's Wells No. 8 and 10 are down to 70 – 80



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FILE: HU1401_EXH_7-11_WATER SUPPLY.MXD

COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 7-11
SUSTAINABLE SOURCE WATER SUPPLY DEEP SANDSTONE MODELING WELL CONFIGURATION SUMMARY

Exhibit 7-12: 2040 Ancell Unit Pentiometric Surface Regional Model Simulation Elevation Change – CT Water Use Including Eight (8) New Ironton-Galesville Wells

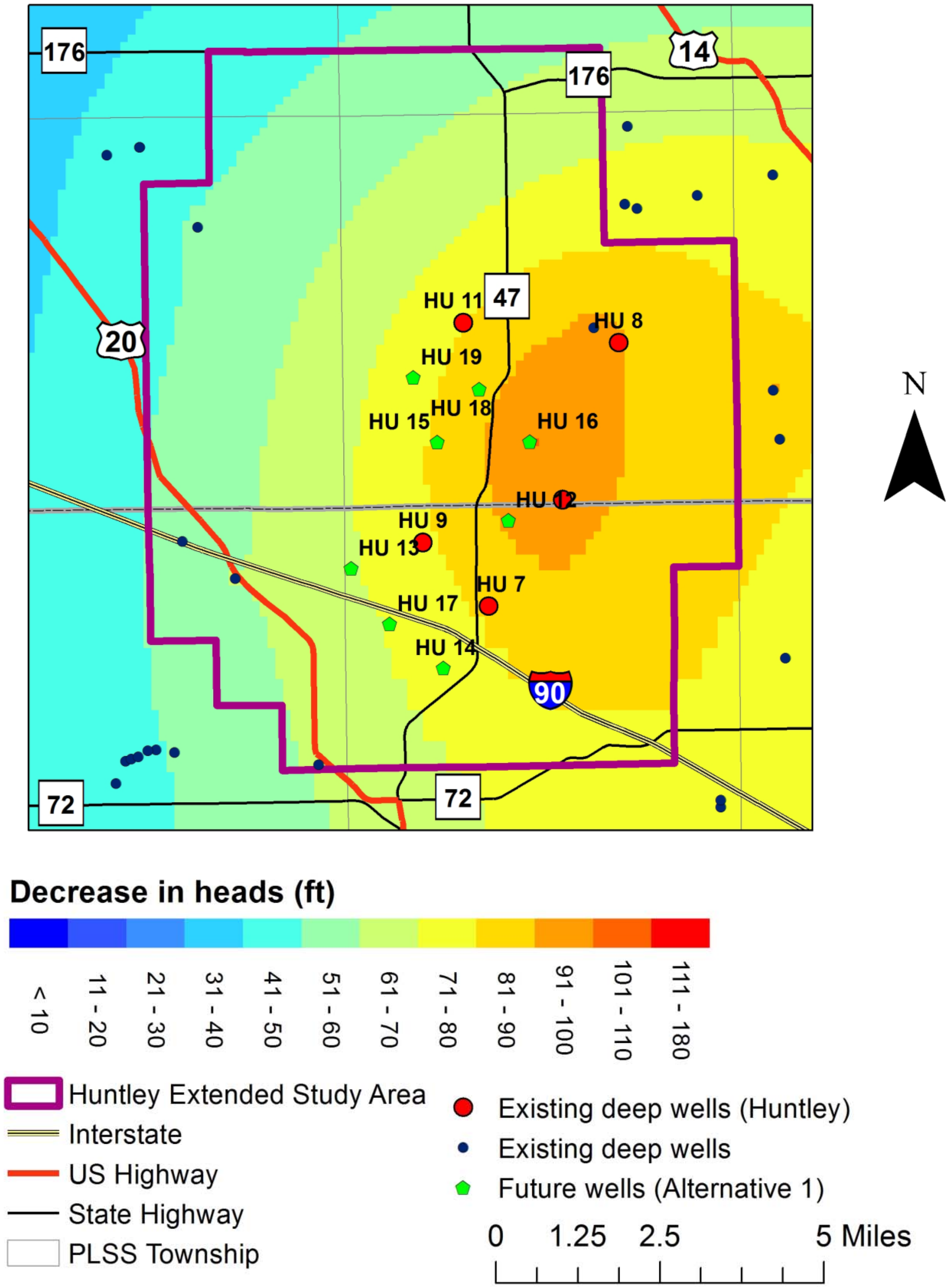


Exhibit 7-13: 2040 Ancell Unit Pentiometric Surface Regional Model Simulation Elevation Change – LRI Water Use Including Four (4) New Ironton-Galesville Wells

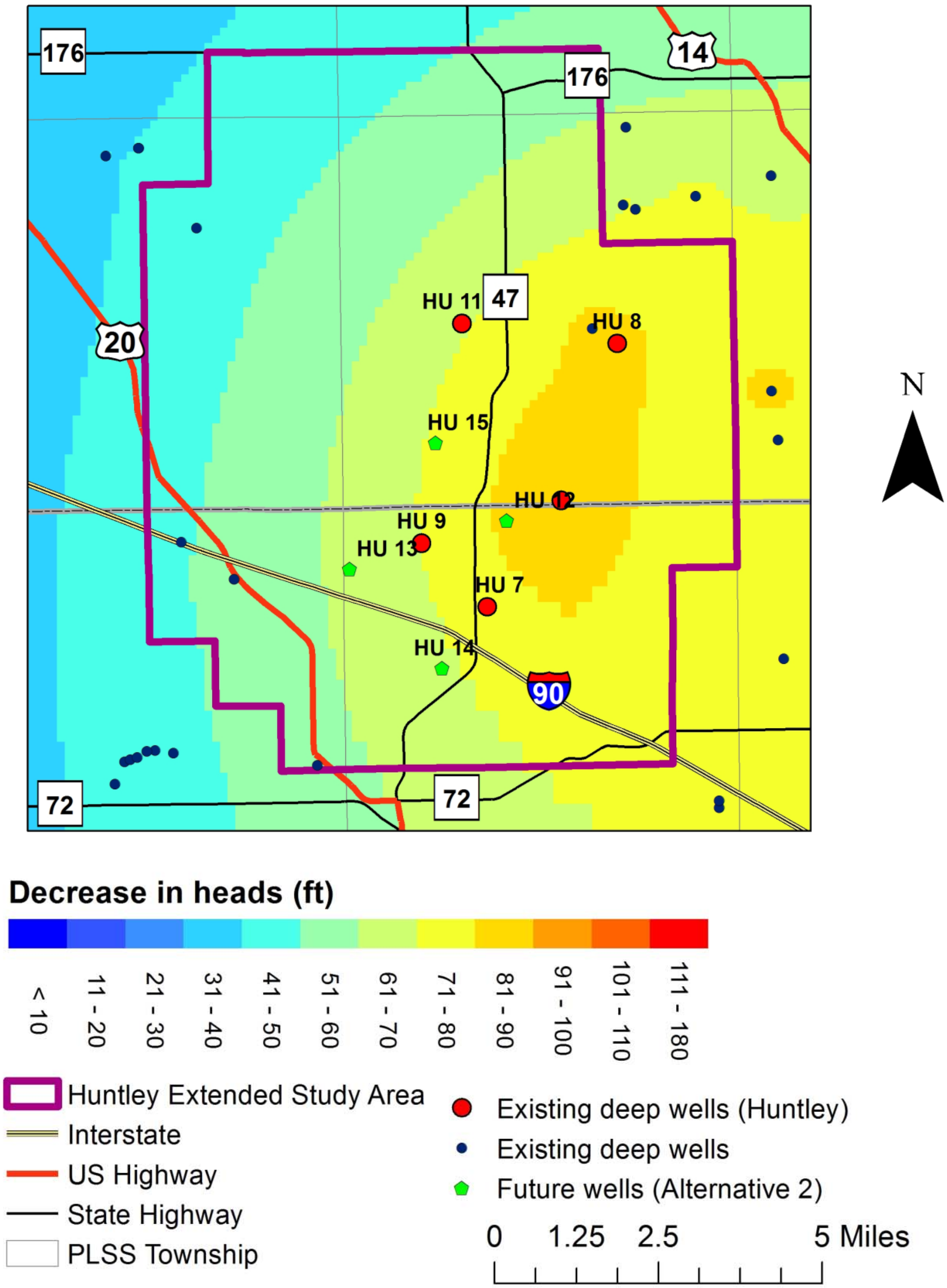
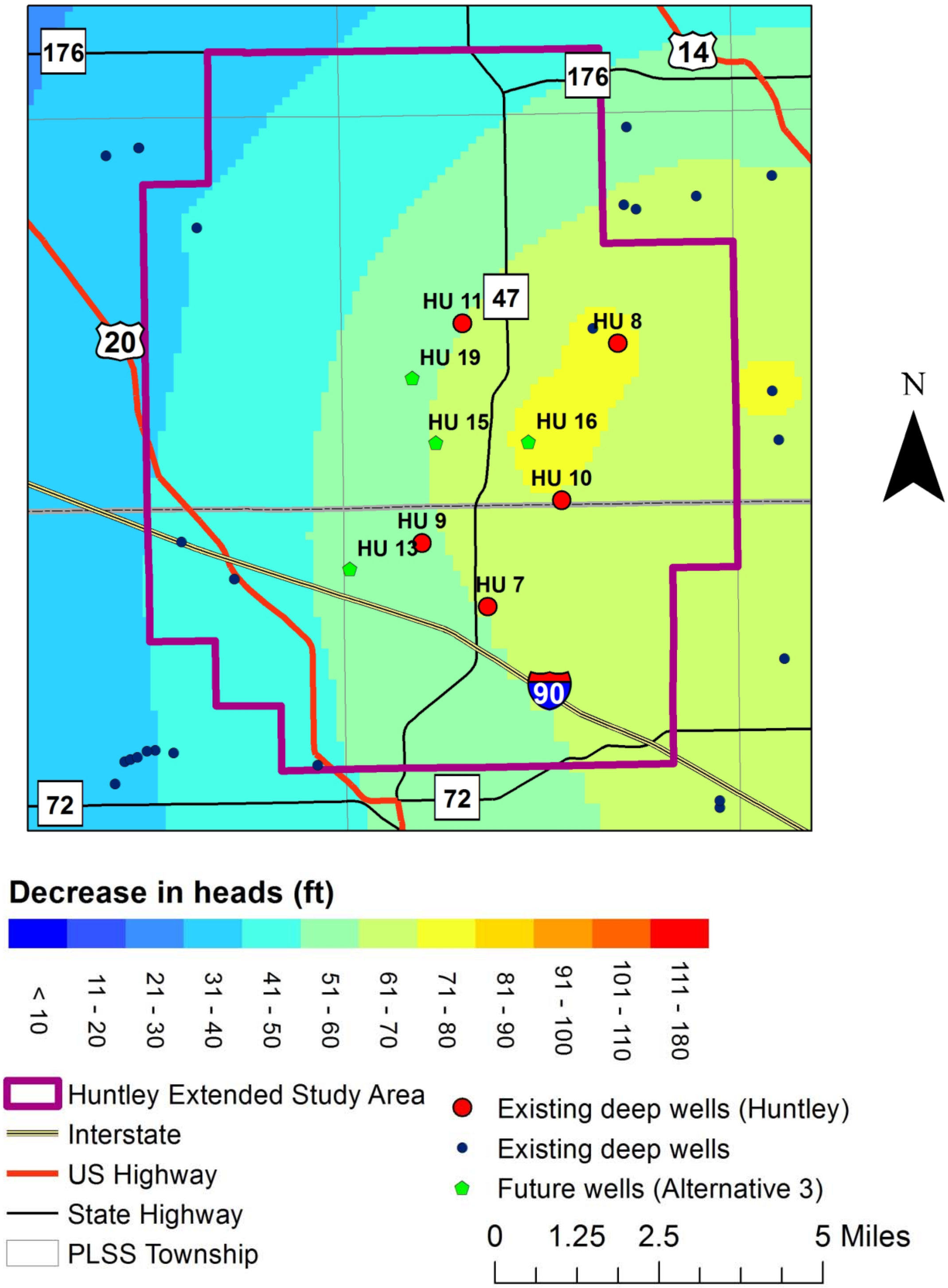


Exhibit 7-14: 2040 Ancell Unit Pentiometric Surface Regional Model Simulation Elevation Change – ½ CT Water Use Including Four (4) New Ironton-Galesville Wells



feet total over the 31 year time period. The predicted water level declines in the northwest portion of the Village's planning area would only be 30 – 40 feet.

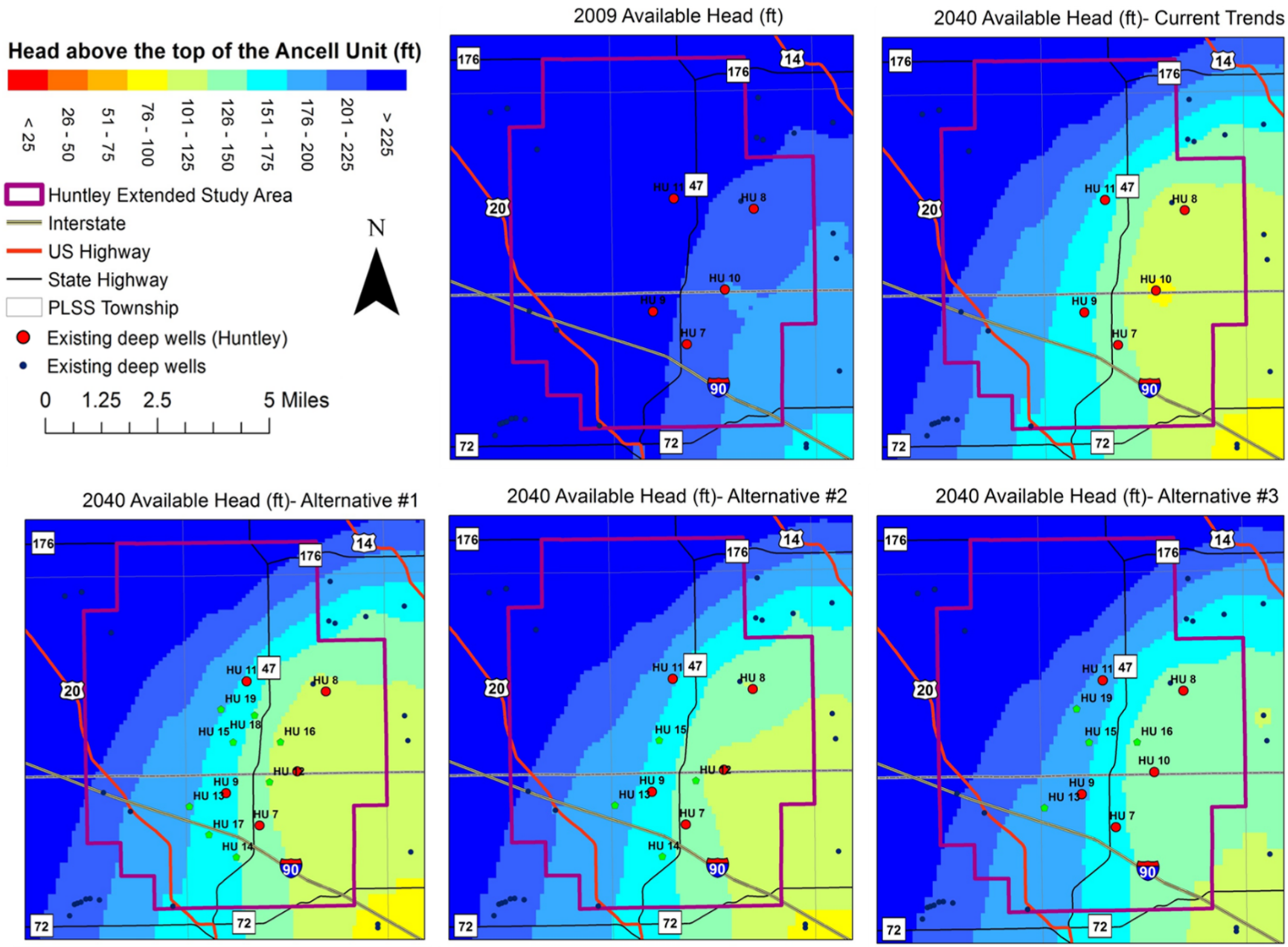
7.2.5 Model Results Summary – The goal of this section of the report was to evaluate the long term sustainable of the deep sandstone aquifer in the Huntley area. The deep sandstone aquifer was modeled to determine the effects of multiple water demand scenarios and multiple well distribution scenarios. The 2009 modeled water levels were referenced to the top of the Ancell Unit and then the alternative scenarios were compared to those values. In general terms, the sustainable yield of an aquifer would be a yield that does not dewater the aquifer. In essence, the withdrawal rate from the aquifer would not exceed the flow passing through the aquifer. As water levels decline, the aquifer gradient steepens and more water is transferred to the lowered water level area. With continuous pumping from the aquifer over a long duration, the gradient steepens even more and then eventually the aquifer reaches equilibrium. At this point, when the water level does not continue to decline, the sustainable yield is theoretically established. However, since demands on the aquifer continue to change over time, and it is impractical to evaluate withdrawals from the aquifer beyond 2040, an alternative method to define the sustainability of the aquifer must be established.

While the definition of the sustainable yield of the deep sandstone aquifer continues to be debated, the current thinking is that maintaining static water levels above the Ancell unit is a reasonable goal. Being that the Ancell unit is the uppermost sandstone formation in the aquifer, and once it were to be dewatered there would be major issues as water level declines approach the top of the Ironton-Galesville, this seems like a reasonable planning constraint for the time period of this study. Exhibit 7-15 summarizes the head above the Ancell Unit for each of the modeling scenarios. As one can see, the only scenario where the head above the Ancell Unit is less than 100 feet is the scenario where all of the CT water demand is applied to the Village's five existing wells – which is unreasonable consideration. With water levels over 100 feet above the Ancell Unit and water level declines below 100 feet for the 31 years of modeled in all scenarios, it is reasonable to assume the Ancell Unit and Ironton-Galesville aquifers have sufficient capacity to meet water demands in the Huntley area throughout the planning period.

7.3 Lake Michigan Interconnection

Lake Michigan is currently the primary source of water for the majority of the population served within northeastern Illinois. Confronted with diminishing groundwater resources, many communities in northeastern Illinois joined together and formed unique intergovernmental cooperatives that own and operate independent Water Systems using Lake Michigan water as the source. Many of these cooperatives, under Illinois State Statute, have formed into a Joint Action Water Agency (JAWA) and are responsible for managing the delivery and pricing of the water supply to its charter communities.

Exhibit 7-15: Modeling Results Summary – Head Above Top of Ancell Unit



There is an allocation of Lake Michigan water usage allotted to the State of Illinois that limits the quantity used and indirectly the area and population that can be served by this resource. In the report Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan, March 2010, published by the Chicago Metropolitan Agency for Planning, it was estimated that 50 to 75 MGD in domestic water supply allocation may be available to new areas. This estimate takes into account a number of variables that could greatly affect this allocation including diversion of stormwater runoff, Lake Michigan water levels (which affects volume of water required to work the locks and leakage through the locks), discretionary diversions required to maintain water quality in the Chicago Sanitary and Ship Canal, and accounting issues (a running average is used to evaluate the diversion). Also, as the population that currently uses Lake Michigan water continues to develop water conservation practices, water loss will be reduced and more water may become available to those communities seeking to use Lake Michigan water. Maximizing the Lake Michigan allocation to northeastern Illinois communities will help preserve the groundwater resources in the region. With this guiding principle, the project team explored opportunities for a Lake Michigan water interconnection.

Among the multiple potential Lake Michigan water supplies in northeastern Illinois, the Northwest Suburban Municipal JAWA (NSMJAWA) is closest to the Village of Huntley's Planning Area. NSMJAWA was established in 1982 with the following Charter Municipalities:

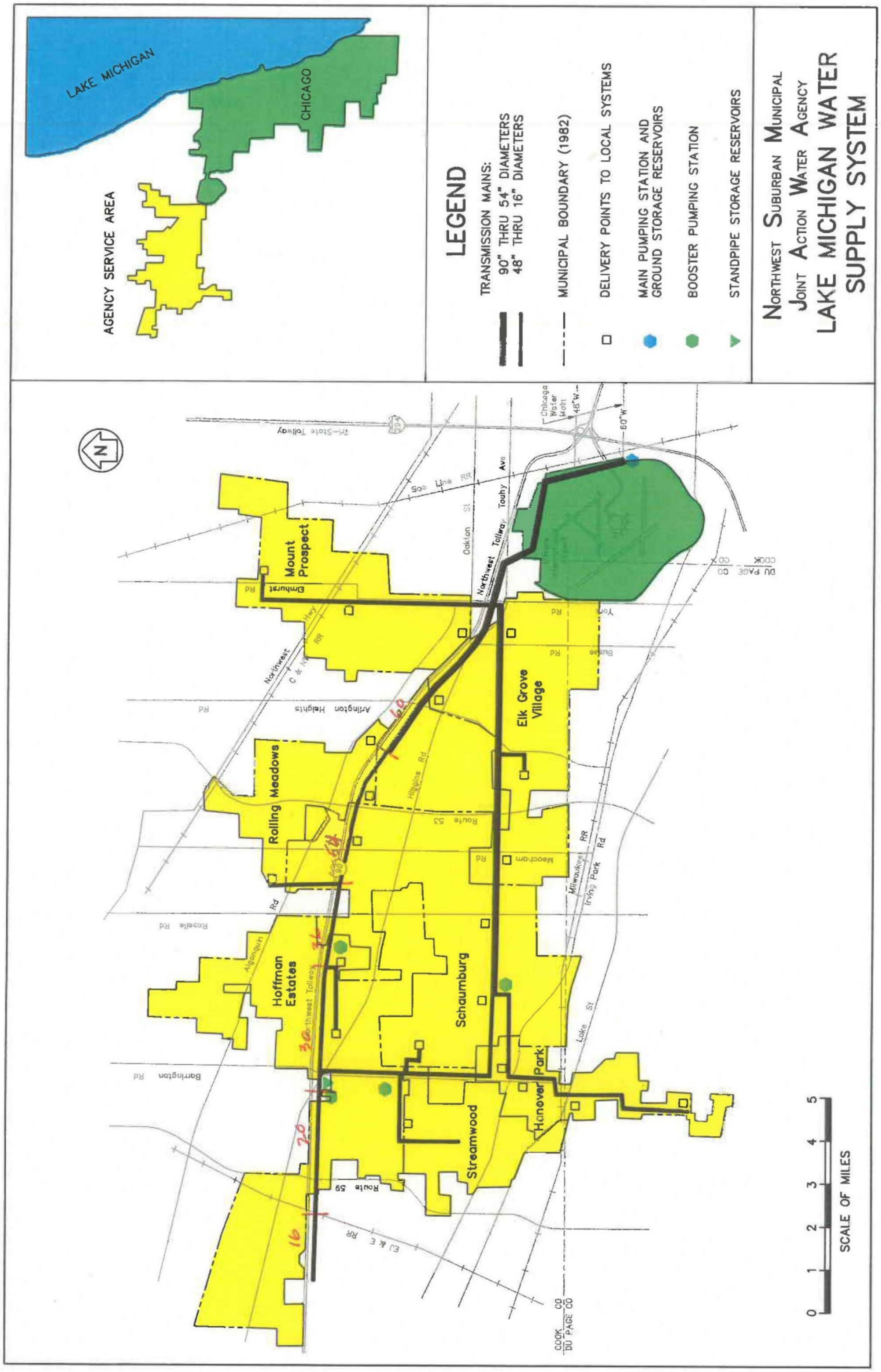
- Elk Grove Village
- Village of Mount Prospect
- Village of Rolling Meadows
- Village of Hoffman Estates
- Village of Schaumburg
- Village of Hanover Park
- Village of Streamwood

The seven member municipalities own 100% of the system capacity and no additional members have been added since its inception. A map of the system is included in Exhibit 7-16. The following is a summary of the NSMJAWA system:

Service area	90 square miles
Nominal System Capacity:	120 MGD
Firm System Capacity:	95 MGD (considering hydraulic limitations)
Current Average Day Use:	30 MGD (18% decrease in demand over last decade)
Current Peak Day Use:	63 MGD

NSMJAWA does not treat Lake Michigan water but rather obtains its source of treated water supply from the City of Chicago with a connection from the Mayfield Pumping Station located at O'Hare International Airport. There are ground storage reservoirs and a main pumping station located at I-190 and Manheim Road that are

Exhibit 7-16: NSMJAWA System Map



utilized to deliver the high pressure water through 60 miles of transmission mains ranging in size from 16" to 90" in diameter. There are 17 pressure reducing delivery points from which the charter members receive their water. NSMJAWA has an agreement with the City of Chicago that expires in 2023. The agreement establishes the bulk water rate at $3.81 per 1,000 gallons in 2015. The current average water rate to the charter members is approximately $5.03 per 1,000 gallons with the difference used to finance capital improvements, utility and other operating costs.

To become a member of NSMJAWA, one or more of the charter members would need to give a portion of their allocated capacity and the requesting member community would need to apply and maintain a Lake Michigan water allocation through the Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR). Also, the requesting member community likely would need to make a payment to NSMJAWA to pay a capital contribution (similar to a connection fee) and plan for capital improvement costs to extend the system. The capital improvements could include new pumping stations, transmission main, delivery structures and additional storage facilities to store a water volume equal to two (2) days of average day demand.

Review of the NSMJAWA system identified that the closest point of connection for the Village of Huntley is a 16" transmission main located at I-90 and Beverly Road. To reach the Village of Huntley's Water Works System at I-90 and Route 47, approximately 14 miles (74,000 feet) of 16", or greater, water main is required, along with upgrades to the NSMJAWA network that would likely include pump station(s) and transmission main improvements. Also, to maintain 2 days of storage volume at the 2040 CT water use projection, an additional 7.4 MG of storage would be required, which is 4.3 MG more than the peak hour storage CT water use scenario defined deficit. The extent of these capital improvements makes the Lake Michigan interconnection cost prohibitive for the Village of Huntley at this time.

7.4 Source Water Plan

The three sources of water supply available to the Village were analyzed for their long term sustainability potential. There appear to be a moderate amount of sand and gravel deposits in the Huntley area that could someday be a water source for the community. While the deposits on the east side of the Village appeareto be fully developed by the adjacent communities of Algonquin and Lake in the Hills, the deposits on the northwest end of the Village's planning area could someday be a productive source of water supply for the community. Given the likely fact that shallow sand and gravel wells in Ashmore formation would have elevated iron levels, the source water would require some level of iron removal treatment. In addition, in an effort to match the hardness of the water distributed by the existing cation exchange water treatment plants, a second treatment step of softening likely would be required for shallow sand and gravel wells. Given the distance from the existing Village Water Works System infrastructure and the fact that extension of the Water Works System to the area where tapping into the shallow sand and gravel deposits seems feasible, it is not recommended that shallow sand and gravel wells be considered as part of the Village's supply portfolio for the planning period of this report. However, as the northwest area of the Village develops, the Village should strongly consider further evaluation of this resource.

A Lake Michigan water interconnection could potentially become available from the NSMJAWA. However, the charter members own all of the allocation and obtaining an allowance from one or more members would likely be an obstacle. Also, the extent of the capital improvements necessary to extend the service to the Village of Huntley make the Lake Michigan interconnection cost prohibitive for the Village at this time. If an adjacent community was to connect to NSMJAWA, and therefore the supply connection potential was much closer, then it could someday be feasible. It is recommended the Village continue to monitor Lake Michigan water service extension, just in case an alternative supply source is needed decades into the future.

Regional modeling of the deep sandstone aquifer indicates its long term sustainability could be an issue in parts of Northeastern Illinois by 2050. However, the regional projections indicate water levels within the Huntley area likely will remain reasonable even under significantly higher water demand scenarios. While the long term sustainability of the deep aquifer could be a concern for the region, it can be concluded that the use of the deep aquifer as a supply source for the Village of Huntley within this report's planning period is appropriate. The Village and region should continue to conserve water such that the capacity of this limited resource can be extended, but ultimately large amounts of population growth in the region likely will force many portions of the region to consider other source water options in the long term.

The modeling conducted as part of this report indicates water wells that withdraw from the Ironton-Galesville formation will have the needed water supply capacity for the Village for the planning period. However, the Village should be aware that the Ironton-Galesville formation could have localized elevated levels of barium and radium in the Huntley planning area that could make treating the Ironton-Galesville formation very difficult. On the other hand, the even deeper Mt. Simon formation appears to have water quality properties that could prove to be a viable, alternate supply source for the Village. Given the potential of the Ironton-Galesville formation having extraordinarily high levels of barium and/or radium in portions of the Village (especially to the south), it is recommended all future Ironton-Galesville wells in the southern portion of the Village be constructed such that deepening to the Mt. Simon formation can be accomplished cost effectively. This would be accomplished by drilling the Ironton-Galesville wells with a larger diameter surface casing (26 inch versus 24 inch) and larger diameter long string casing (22 inch versus 18 inch) than a well that is targeted to be completed in the Ironton-Galesville formation, only.

SECTION 8: WATER WORKS SYSTEM EVALUATION & RECOMMENDATIONS

Previous sections of this report summarize the Water Works System components, provide a needs assessment analysis, and provide a sustainable source water assessment for continued and future water supply for the Village. This section will determine the required improvements to expand the system to meet the 2040 CT and LRI water demand projections for the Village of Huntley. Following a review of the cost of the improvements, a phasing and implementation program will be summarized for both the CT and LRI water demand scenarios. Finally, a cost comparison of the CT and LRI recommendations will be presented to demonstrate the anticipated financial benefit to the Village if the LRI goals outlined in Section 5.1.2 are reached.

8.1 Water Supply Treatment Evaluation & Recommendations

The sustainable source water assessment concluded the continued use of the deep sandstone aquifer to meet existing demands and then expansion of the withdrawals to meet future water demands, is the most sustainable, cost conscience approach for the planning period. The future wells should be drilled with the target aquifer being the Ironton-Galesville sandstone formation for all of the wells. Wells constructed in the southern portion of the planning area should be constructed in a manner that deepening to the Mt. Simon formation can be accomplished.

Due to the fact that it can be reasonably assumed that the Ironton-Galesville formation will have barium and radium concentrations above their respective MCLs, it is assumed the Village will utilize cation exchange treatment for all new wells, which is consistent with the five existing Ironton-Galesville wells and WTPs. As was discussed in Section 2, Well No. 9 contains hydrogen sulfide levels such that treatment is needed to reduce those levels. It is assumed the same type of treatment, aeration and detention, would be utilized for future wells with excessive amounts of hydrogen sulfide. Since it is not preferred to add this extra step of treatment when it is not needed (recall four of the five of the Village's wells do not need it), it is recommended the Village drill and test pump all future wells prior to finalizing the water treatment plant design. If hydrogen sulfide levels are of sufficient concentration to require aeration and detention treatment, then it can be added to the treatment train. However, if the hydrogen sulfide levels are below the level requiring the additional treatment, the water treatment plant can be set up the same as the Wells No. 7, 8 and 10 WTPs.

Utilizing this overall supply and treatment approach, a summary of the needed well and water treatment plants to meet the CT and LRI water use scenarios is as follows.

<u>8.1.1 CT Water Supply and Treatment Evaluation & Recommendations</u> – In Section 5, the needs assessment calculations projected a 2040 CT water use scenario, under the Reliable Source Capacity test parameter, deficit of 7,300 gpm. It also should be noted the needs assessment calculations presented in Section 4 show water supply deficits of 885 and 984 gpm in 2012 and 2011, respectively. Therefore, the Village's existing water supply is currently at capacity and supply and treatment expansion should be strongly considered at

this time. As stated in Section 7, the typical target production rate for an Ironton-Galesville well is 1,000 gpm. Therefore, eight (8) Ironton-Galesville wells will need to be drilled and connected to appropriately sized water treatment plants to make up that deficit.

When water wells are pumped, the water levels in the aquifer decline in a radial direction. While the deep sandstone formations are not purely homogenous, the characteristics of the aquifer are fairly consistent. In an effort to reduce hydraulic interference between deep sandstone wells, a typical minimum well spacing is one (1) mile. By separating the wells by at least one mile, the drawdown in one deep sandstone well will be minimal at the edge of the drawdown from another one.

Up to this point, all of the Village's Ironton-Galesville wells pump to their own individual WTP. This practice could certainly be continued, but there is the opportunity to save capital and O&M costs by combining water treatment for two or more wells in one facility. In essence, the one mile of raw water main needed to pump a well to a multi-well WTP is cheaper than constructing an individual water treatment plant. In addition, the operation and maintenance cost of a 2,000 gpm WTP would be lower than 2 – 1,000 gpm water treatment plants. With this in mind, along with considerations for the hydraulic input and distribution of the water throughout the Village's future Water Works System, eight new wells and five water treatment plants were located throughout the Village's Planning Area under the CT water use scenario. A summary of the well and water treatment plant combinations is as follows:

- Well No. 12 and Well No. 12 WTP: The 1,000 gpm Ironton-Galesville Well No. 12 and its corresponding WTP are proposed to be located south of the western intersection of Smith Drive and Kreutzer Road. It would be located behind the Walmart. At one time, the Village explored the potential of locating a shallow sand and gravel well at this location, but it was determined the sand and gravel deposits were not of sufficient aerial extent in this area to site a new shallow sand and gravel well. However, it is a good location to site a new deep sandstone well and water treatment plant. Due to the fact that Well No. 12 is located in the central to southern portion of the planning area, it is recommended the well be constructed with a 26-inch surface casing and 22-inch long string casing. For reasons discussed previously, the 26X22 well will allow deepening to the Mt. Simon aquifer, should the need arise.
- Well No. 13 and Well No. 13 WTP: The 1,000 gpm Ironton-Galesville Well No. 13 and its corresponding WTP are proposed to be located at the end of Industrial Court. It is recommended this well be a 26X22 well, also. The Village has acquired a small piece of property at the end of the Industrial Court cul-du-sac, and has indicated they would like to site a well there. An initial review of the dimensions of the Village's property at this location indicates the Village may need to acquire more property or obtain easements for this facility. A more detailed review of the property should be completed before detailed design is initiated.
- Well No. 14 & Well No. 17 and Wells No. 14 & 17 WTP: The 1,000 gpm Ironton-Galesville Well No. 14 is proposed to be located south of I-90 and west of Route 47. It is recommended the Village secure property from the development of property in this area, and that it be constructed when development

south of I-90 occurs. Given its southern location, it is recommended this well be a 26X22 well, also. The Well No. 14 WTP would be constructed with extra floor space such that additional cation exchange water treatment equipment could be added to eventually treat Well No. 17. Well No. 17, which also would be a 26X22 well would be constructed west of Well No. 14, but presumably south of I-90. A raw water main would be constructed from the Well No. 17 site to be treated at the Wells No. 14 & 17 WTP.

- Wells No. 15 and 19 and Wells No. 15 and 19 WTP: The 1,000 gpm Ironton-Galesville Well No. 15 would be constructed adjacent the Village's existing EWST No. 4 on the Village of Huntley's property along west Main Street. The building would be sized such that the Well No. 19 connection, along with expansion of the water treatment equipment inside of the building, would expand the plant to a 2,000 gpm WTP. It is assumed Well No. 19 would be sited north of the WTP with the appropriate one (1) mile spacing from each other. It is assumed Wells No. 15 and 19 can be 24X18 wells.
- Well No. 16 and Well No. 16 WTP: The 1,000 gpm Ironton-Galesville Well No. 16 and its corresponding WTP is proposed to be installed just north of the East WWTF. There is a triangular parcel north of the East WWTF that may have development challenges due to the parcel's geometry. The installation of Well No. 16 next to another Village facility and in close proximity to Public Works would be a good location for Village Staff to monitor. A well in this location also keeps the minimum one (1) mile separation from the Village's existing and other potential future wells. Given its central location, it assumed Well No. 16 could be a 24X18 well.
- Well No. 18 and Wells No. 11 & 18 WTP: The 1,000 gpm Ironton-Galesville Well No. 18 would be constructed in the northwest portion of the Village's planning area. It is assumed it would be a 24X18 well. It is recommended that a site near Adamson Road west of Well No. 11 and the Well No. 11 WTP be the location for this well. The elevated water levels within the deep sandstone aquifer is one reason why this would be a good location for another well. In addition, there is the possibility that the Ashmore formation would be of sufficient thickness at the site such that a future shallow well could be located there. A raw water main would be constructed from the Well No. 18 site to the current Well No. 11 site and WTP, and then the WTP would be expanded to accommodate the connection of the new well.

<u>8.1.2 LRI Water Supply and Treatment Evaluation & Recommendations</u> – In Section 5, the needs assessment calculations projected a 2040 LRI water use scenario, under the Reliable Source Capacity test parameter, deficit of 3,567 gpm. Therefore, four (4) Ironton-Galesville wells would need to be connected to appropriately size water treatment plants to make up that deficit. The proposed locations for Wells No. 12, 13, 14, 15 and 16 are the same locations as described in the previous section. Under the LRI scenario, it is assumed the WTPs would be constructed to treat only one well. However, due to the fact that additional well and water treatment plant capacity could be needed in the future (i.e. beyond 2040), it is recommended the design for the Wells No. 14 and 15 WTPs be set up for potential future expansion.

8.2 Water Storage Evaluation & Recommendations

As water demands rise, the Village will need to expand the amount of water storage within the Water Works System, so peak hour demands can be met. The storage expansion could be accomplished with the construction of Elevated Water Storage Tanks, Ground Storage Tank (GST) or a combination, thereof. The main benefit of EWSTs is the fact once the water is pumped into the tank, it can flow out the customers via gravity. On the other hand, ground storage tanks would require a pump to convey the water across the system. Given the constantly changing demands in the Water Works System, the seamless release of water from an EWST far exceeds the need to modify the pumping rate to meet the changed demand. In the end, the cost to construct and operate a 2.0 MG EWST or smaller typically is comparable to the cost of a similar size GST and pumping station. Therefore, due to the comparable costs and ease of operations, it is recommended water storage expansion be accomplished with the construction of EWSTs.

While the distribution of multiple EWSTs throughout the community will help system hydraulics, there is a point where the capital and operation and maintenance costs are optimal. Certainly the cost per gallon goes down as the size of the EWST increases, but funding constraints for a particular tank should be considered. For those reasons, and based on the Village's current and projected size, it is recommended the Village construct tanks at a minimum capacity of 1.0 MG.

A description of the recommended water storage additions to meet future CT and LRI water demand scenarios is as follows.

<u>8.2.1 CT Water Storage Evaluation & Recommendations</u> – In Section 5, the needs assessment calculations for the projected CT water use scenario identified a Peak Hour Storage Capacity deficit of approximately 4.5 million gallons by the end of the planning period. In fact, the historical water works evaluation for the period from 2009 to 2013 showed a deficit that reached as high as 294,000 gallons. Additional storage will need to be integrated into the Water Works System to close the future conditions deficit, with the first tank addition potentially not too far in the future. A description of the recommended water storage improvements is as follows:

- EWST No. 6: It is recommended EWST No. 6 have a capacity of 1.5 MG, and be located at the Well No. 14 and Well No. 14 WTP site. As the only proposed tank in the Village's southern planning area, the central location will optimize distribution across the area.
- EWST No. 7: It is recommended EWST No. 7 be constructed at the Well No. 11 and Well No. 11 WTP site. It is recommended it have a capacity of 1.25 MG. The Village has additional space at this property, so no new property would be needed to construct an EWST there. In addition, its location in the north/northwest portion of the Village will help with the distribution of water in that area.

- EWST No. 8: An EWST with a capacity of 1.0 MG is recommended to be located at the Well No.12 and Wells No. 12 WTP site. The combination of a well, WTP and EWST on sites has worked well for the Village, and this location will help distribute water in central portion of the community.
- EWST No. 9: EWST No. 9, at a capacity of 1.0 MG, is proposed to be located at the Well No. 13 and Wells No. 13 WTP site. With this likely addition, the Village will undoubtedly need to expand the size of the property they currently own in this location.
- EWST No. 1 Demolition – EWST No. 1, which was originally constructed in 1970 could be at the end of its useful life at some point within the planning period. In addition, at a capacity of 0.3 MG the cost per gallon of storage to maintain EWST No. 1 would be higher than the same amount of storage in the newly constructed EWSTs. Therefore, the next time EWST No. 1 is to repainted, the Village should consider demolishing it rather than investing the money to recoat it.

<u>8.2.2 LRI Water Storage Evaluation & Recommendations</u> – In Section 5, the needs assessment calculations for the projected LRI water use scenario identified a Peak Hour Storage Capacity deficit of approximately 2.0 million gallons by the end of the planning period. To close the deficit, additional storage will need to be integrated into the Water Works System. Building on the same concepts as described in the CT water use scenario, EWST No. 6 would be constructed at a 1.5 MG capacity at the Well No. 14 and WTP site. EWST No. 7 would be constructed at the Well No. 11 and WTP site, but be sized for 1.0 MG. It also is assumed the Village would abandon EWST No. 1, for the reasons described in the previous section, under this water use scenario.

8.3 Water Distribution and Pressure Zone Evaluation & Recommendations

The water distribution system was summarized within Section 2. Based on a review of the hydraulic grade line of the Water Works System and the topography within the Village's planning area, it would appear the Village can continue to operate on one pressure zone. The Village's existing large diameter pipe network appears to provide sufficient conveyance across the system, because there are no known hydraulic limitations. Past modeling of the system has also verified good conveyance across the system. As the system expands, it will be important to maintain a large diameter water main backbone of 12-inch and 16-inch water mains.

8.4 Recommended Improvements Summary

The improvements presented in this report will allow for water transfer with minimal headloss, appropriate water storage volume, and the required water supply and treatment to continue to provide safe and adequate water to the Village of Huntley given both CT and LRI demand scenarios. The recommendations are broken down into Supply, Treatment, Storage, and Distribution. The recommended improvements will be presented in this Section, but the actual phasing and implementation of these improvements will be further discussed in Section 8.5.

<u>8.4.1 CT Water Works System Master Plan</u> – Detailed cost estimates for the proposed improvements described in Section 8.1 and 8.2 are provided in Appendix F. Under the CT demand scenario, the following improvements are recommended:

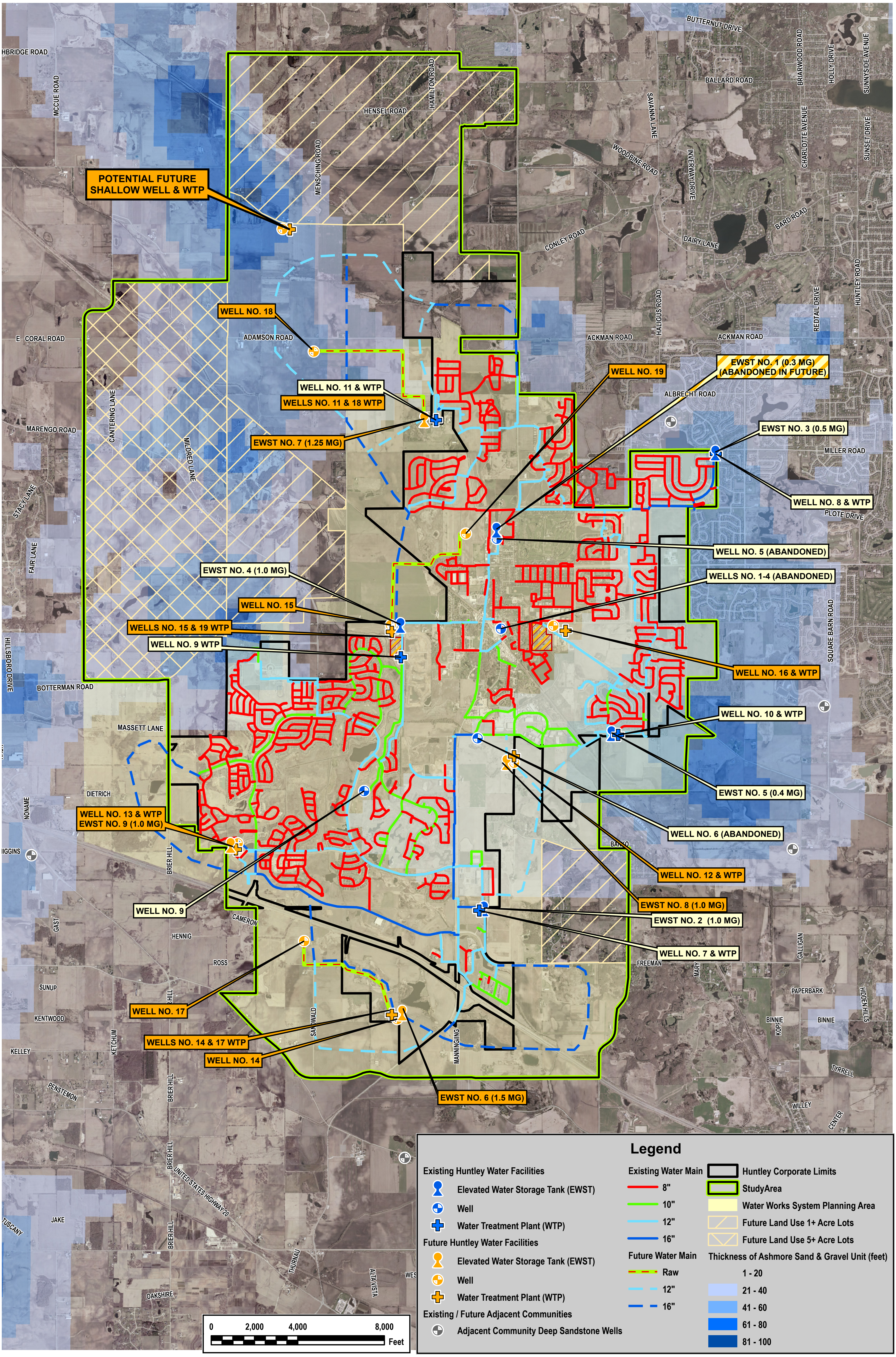
- *Supply & Treatment:*
  - Well No. 12 and Well No. 12 WTP — $6,892,000
  - Well No. 13 and Well No. 13 WTP — $6,942,000
  - Well No. 14 and Well No. 14 WTP (Building Sized For Well No. 17 Future Connection) — $7,310,000
  - Well No. 15 and Well No. 15 WTP (Building Sized For Well No. 19 Future Connection) — $7,147,000
  - Well No. 16 and Well No. 16 WTP — $6,881,000
  - Well No. 17 and Wells No. 14 & 17 WTP Expansion — $5,822,000
  - Well No. 18 and Wells No. 11 & 18 WTP Expansion — $6,100,000
  - Well No. 19 and Wells No. 15 & 19 WTP Expansion — $5,659,000
- *Storage:*
  - EWST No. 6 (1.50 MG) — $4,640,000
  - EWST No. 7 (1.25 MG) — $4,047,000
  - EWST No. 8 (1.00 MG) — $3,456,000
  - EWST No. 9 (1.00 MG) — $3,456,000

The location of all the recommended improvements for the CT demand scenario, included the large diameter water main extension, are depicted on Exhibit 8-1.

<u>8.4.2 LRI Water Works System Master Plan</u> – Under the LRI demand scenario, the following improvements are recommended (note LRI cost estimates are provided in Appendix F, as well):

- *Supply & Treatment:*
  - Well No. 12 and Well No. 12 WTP — $6,892,000
  - Well No. 13 and Well No. 13 WTP — $6,942,000
  - Well No. 14 and Well No. 14 WTP — $6,892,000
  - Well No. 15 and Well No. 15 WTP — $6,731,000
- *Storage:*
  - EWST No. 6 (1.50 MG) — $4,640,000
  - EWST No. 7 (1.00 MG) — $3,456,000

The locations of all the recommended improvements for the LRI demand scenario are depicted on Exhibit 8-2.



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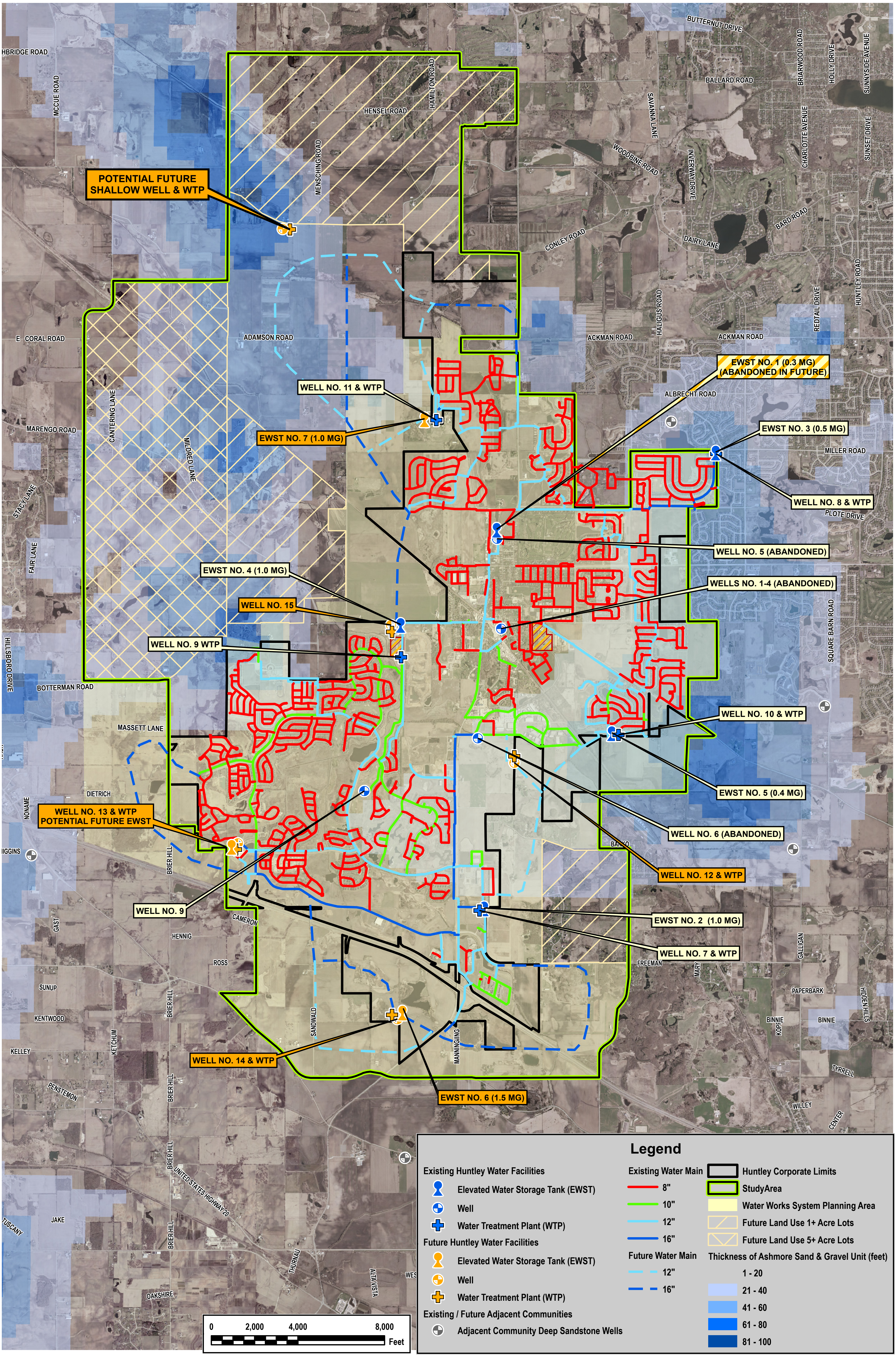
DATE:	JULY 2014
PROJECT NO.:	HU1401
BY:	KKP
PATH:	H:\GIS\PUBLIC\HUNTLEY\HU1401
FILE:	HU1401_EXH_8-1.MXD

COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 8-1
WATER WORKS SYSTEM MASTER PLAN (CURRENT TRENDS - CT)

NORTH



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COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 8-2
WATER WORKS SYSTEM MASTER PLAN
(LESS RESOURCE INTENSIVE - LRI)

NORTH

8.5 Water Works System Phasing and Implementation Plan

In order to provide an organized logical phasing and implementation plan that also recognizes population projections for a 25 year period are less than exact, the recommendations have been prioritized and grouped into three categories: 1) Immediate Improvements, 2) Near Future Improvements, and 3) Long Term Improvements. The Immediate Improvements are the minimum improvements necessary to correct the deficiencies in the existing Water Works System and meet the demands that an additional 5,000 people and commensurate commercial and industrial growth would add to the system. Based on the population projection provided in Section 1.6, it is estimated this level of population increase could occur over the next five (5) years. The Near Future Improvements are the necessary improvements necessary to accommodate 5,001 to 16,000 people along with the additional commercial and industrial growth. This total population growth is projected to occur in six (6) to fifteen (15) years. The Long Term Improvements are the optimal improvements to accommodate the 2040 population projection of 58,997 people, approximately 31,200 additional people from 2014, and the associated commercial and industrial growth that will be encountered with the growth. The recommendations summarized in Section 8.4 were placed into the three water demand projection timeframes, and a phasing and implementation plan has been prepared for both the CT and LRI scenarios.

<u>8.5.1 CT Implementation Plan</u> – Table No. 8-1 presents the recommended Phasing and Implementation Plan for the proposed improvements under the CT demand scenario along with the summary of costs for each of the three categories.

As shown on the Phasing and Implementation Plan, the total cost of recommended Immediate, Near Future, and Long Term Water Works System improvements is approximately $68.35 million, which includes $18.47 million for the Village's Immediate Needs, $18.50 million for Near Future Improvements and $31.37 million for Long Term Improvements. These improvements include water supply improvements including new wells, new water treatment plants, water treatment plant expansions and additional water storage.

<u>8.5.2 LRI Implementation Plan</u> – Table No. 8-2 presents the recommended Phasing and Implementation Plan for the proposed improvements under the LRI demand scenario along with the summary of costs for each of the three categories.

As shown on the Phasing and Implementation Plan - LRI, there are no improvements suggested for the immediate future. However, in order for this to occur, there would need to be an immediate focus on water conservation throughout the community. If water demands are not immediately reduced, then the Village should consider installing a new well, WTP and EWST in the immediate future. If water conservation measures are effective in reducing the immediate future demands, then the first improvements would not be needed for approximately five (5) years. The Near Future improvements are estimated to be approximately

Table No. 8-1: Water Works System Phasing & Implementation Plan - CT

Village of Huntley, McHenry & Kane Cos., IL

Water Works System Component	Immediate: 0 - 5,000 Population Equivalents Addition, 0 - 5 Years — Description	Cost[θ]	Near Future: 5,001 - 16,000 Population Equivalents Addition, 6 - 15 Years — Description	Cost[θ]	Long Term: 16,001 - 31,193 Population Equivalent Additions, 16 - 26 Years — Description	Cost[θ]	Total
Supply & Treatment	Well No. 12 & Well No. 12 WTP	$ 6,892,000	Well No. 14 & Well No. 14 WTP	$ 7,310,000	Well No. 16 & Well No. 16 WTP	$ 6,881,000	
	Well No. 13 & Well No. 13 WTP	$ 6,942,000	Well No. 15 & Well No. 15 WTP	$ 7,147,000	Well No. 17 & Well No. 14 & 17 WTP Expansion	$ 5,822,000	
					Well No. 18 & Well No. 11 & 18 WTP	$ 6,100,000	
					Well No. 19 & Well No. 15 & 19 WTP	$ 5,659,000	
Supply & Treatment Subtotal:		**$ 13,834,000**		**$ 14,457,000**		**$ 24,462,000**	**$ 52,753,000**
Storage	EWST No. 6 (1.5 MG)	$ 4,640,000	EWST No. 7 (1.25 MG)	$ 4,047,000	EWST No. 8 (1.0 MG)	$ 3,456,000	
					EWST No. 9 (1.0 MG)	$ 3,456,000	
Storage Subtotal:		**$ 4,640,000**		**$ 4,047,000**		**$ 6,912,000**	**$ 15,599,000**
TOTAL:		**$ 18,474,000**		**$ 18,504,000**		**$ 31,374,000**	**$ 68,352,000**

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Notes

θ Based on 2014 dollars and 2014 construction costs; includes engineering and contingency costs

Table No. 8-2: Water Works System Phasing & Implementation Plan - LRI

Village of Huntley, McHenry & Kane Cos., IL

Water Works System Component	Immediate: 0 - 5,000 Population Equivalents Addition, 0 - 5 Years — Description	Cost[θ]	Near Future: 5,001 - 16,000 Population Equivalents Addition, 6 - 15 Years — Description	Cost[θ]	Long Term: 16,001 - 31,193 Population Equivalent Additions, 16 - 26 Years — Description	Cost[θ]	Total
Supply & Treatment			Well No. 12 & Well No. 12 WTP	$ 6,892,000	Well No. 14 & Well No. 14 WTP	$ 6,892,000	
			Well No. 13 & Well No. 13 WTP	$ 6,942,000	Well No. 15 & Well No. 15 WTP	$ 6,731,000	
Supply & Treatment Subtotal:		**$ -**		**$ 13,834,000**		**$ 13,623,000**	**$ 27,457,000**
Storage			EWST No. 6 (1.5 MG)	$ 4,640,000	EWST No. 7 (1.0 MG)	$ 3,456,000	
Storage Subtotal:		**$ -**		**$ 4,640,000**		**$ 3,456,000**	**$ 8,096,000**
TOTAL:		**$ -**		**$ 18,474,000**		**$ 17,079,000**	**$ 35,553,000**

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Notes

θ Based on 2014 dollars and 2014 construction costs; includes engineering and contingency costs

$18.47 M in 2014 dollars. The Long Term Water Works System improvements are estimated to be $17.10 M. Therefore, the total recommended improvements for the LRI water demand scenario is $35.55 M.

8.5.3 Capital Cost Savings With LRI Water Use Committment – The major differences in the recommended improvements for the CT and LRI have been identified. In Sections 8.5.1 and 8.5.2, the Phasing and Implementation Plan for the recommended improvements under both the CT and LRI demand scenarios is provided along with cost estimate summaries for each phase and the total combined. Table No. 8-3 summarizes the potential financial benefit if the Village meets their water conservation goals and is able to implement the improvements based on the LRI demand scenario.

Table No. 8-3:
Capital Cost Savings With LRI Water Use Commitment
Village of Huntley, McHenry & Kane Cos., IL

Water Works System Component	Present Worth Capital Cost		
	Current Trends (CT)	Less Resource Intensive (LRI)	Savings
Supply & Treatment	$ 52,753,000	$ 27,457,000	($25,296,000)
Storage	$ 15,599,000	$ 8,096,000	($7,503,000)
TOTAL:	**$68,352,000**	**$35,553,000**	**($32,799,000)**

SECTION 9: WASTEWATER SYSTEM EVALUATION & RECOMMENDATIONS

Previous sections of this report summarized the Wastewater System components, identified existing needs at each of the Village's WWTFs, and reviewed the regulatory challenges that may be presented in the near future. This section will determine the required improvements needed to meet the existing operation and maintenance needs at each of the WWTF's and the improvements needed to expand portions of the West WWTF to meet the 2040 wastewater flow projections for the Village of Huntley. Following a review of the cost of the improvements, a phasing and implementation program will be summarized.

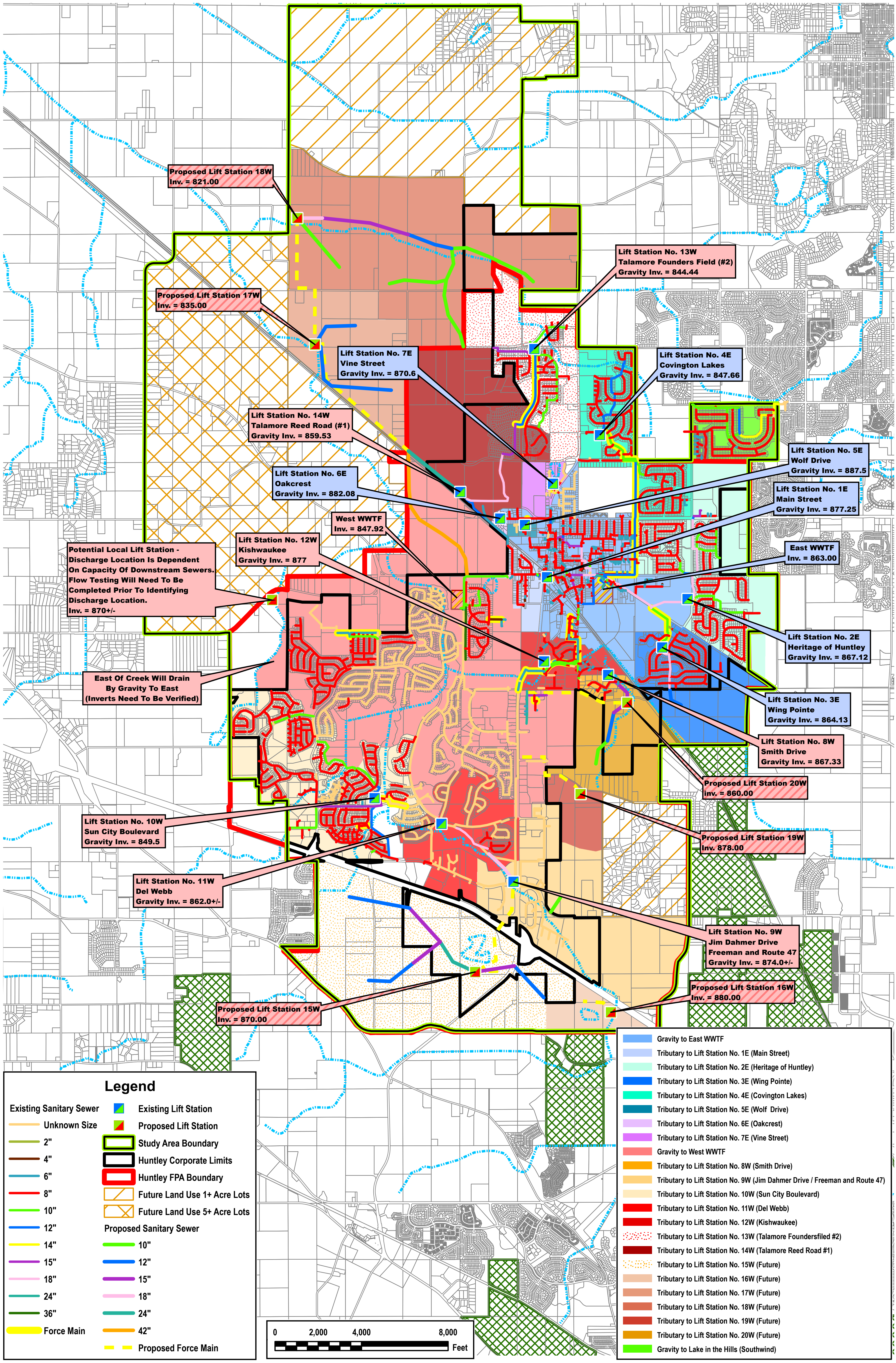
9.1 Study Area Collection and Conveyance Plan

The goal of the sanitary sewer network is to collect and convey the wastewater as efficiently as possible. Ideally, the majority of the flows can be transferred via gravity flow. However, topographic and ultimately cost constraints can make gravity flow too challenging. In those instances, a lift station needs to be installed. As stated, the Village's collection system currently consists of 14 lift stations (not including the lift stations at each WWTF). Seven (7) of the lift stations are tributary to each of the Village's WWTFs. One of the goals of this planning report was to determine if any of the existing lift stations could be eliminated. Another goal was to establish the wastewater collection and conveyance plan for the undeveloped portions of the Village's Planning Area.

Wastewater flows depend on the ultimate land use of the property. Residential wastewater flow projections are fairly straight forward, however, wastewater flows can vary quite a bit for commercial and industrial land uses. A lot of work can be put into computing land areas for the projected land uses, applying wastewater flows based on number of units, building square footage or overall acreage, but it ends up being a guestimate at best. In general, wastewater flows across larger areas of multiple land uses tend to average out around 8 – 10 population equivalents per acre (P.E./Ac). After considering the options, the Village determined a wastewater flow of 8.75 P.E./Ac was consistent with the existing collection system and likely would be consistent for developed areas in the future.

The tools utilized to develop the future collection system plan included two foot contour topographic maps, aerial photographs and the development of spreadsheets. Smaller collection system service areas were subdivided from larger planning areas, wastewater flow projections for the service areas were completed and then future pipe sizes and inverts were established throughout the service area. The resultant existing and future collection system plan is included on Exhibit 9-1. A summary of the conveyance in the northern, southern, western and eastern planning areas is as follows.

<u>9.1.1 Northern Service Area Collection System Expansion</u> – The northern portion of the Village's planning area consists of the existing Talamore Subdivision and then the undeveloped area to the northwest and west



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DATE: DECEMBER 2014
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COMPREHENSIVE WATER AND WASTEWATER SYTEMS MASTER PLAN

EXHIBIT 9-1
EXISTING AND FUTURE COLLECTION SYSTEM

NORTH

of the Talamore Subdivision. The existing Talamore subdivision currently consists of two lift stations. The northern most lift station is near the north end of the subdivision and it collects approximately ½ of the existing subdivision. The southern lift station is just north of the railroad tracks. It collects the southern half of the subdivision, but also collects the wastewater transferred from the northern lift station as it is pumped into the southern portion of the subdivision's gravity sanitary sewer network. The southern lift station, Talamore Reed Road No. 1, pumps the wastewater to the 18-inch gravity sanitary sewer along Bonnie Brae Road. The 18" sanitary sewer along Bonnie Brae Road discharges to an 18" sanitary sewer along Main Street and then discharges into a 24" sanitary sewer along Kreutzer Road. The 24" Kreutzer Road sanitary sewer conveys the wastewater to the West WWTF.

The two lift stations and the 18" and 24" sanitary sewers were installed along with the Talamore Subdivision. Due to the fact that the infrastructure was sized to convey flows beyond the capacity of the Talamore Subdivision's wastewater flows, recapture agreements were established for the excess capacity. Copies of the exhibits from recapture agreements for the three improvements, Talamore Lift Station No. 1, West Main Street Sanitary Sewer and Kreutzer Road Sanitary Sewer, are included in Appendix G. Of the 12,008 P.E. of wastewater conveyance capacity within the Talamore Lift Station No. 1, 5,662 P.E. is reserved for the Talamore subdivision and the remaining 53% is allocated to adjoining properties to the west of the subdivision. Another recapture agreement allocates 57.36% of the additional capacity within the 18" West Main Street sanitary sewer improvements to the same adjacent west properties plus the Romke Road LLC property south of the railroad tracks, but north of Main Street. Finally, 64.89% of the capacity of the 24" Kreutzer Road sanitary sewer is allocated to the properties west of Talamore plus the western portion of the Romke Road LLC property south of the railroad tracks and north of Main Street. The three recapture agreements were executed in 2008 and carry a term of 30 years.

After review of the Talamore recapture areas and a determination of the service areas to those improvements, the rest of the northern service area collection system was planned. This portion of the planning area generally slopes toward the northwest. Since the land is sloping away from the Village's West WWTF, two additional lift stations will be needed to transfer wastewater from the undeveloped portions of the Village's northern planning area back to the West WWTF. One lift station, Lift Station 18W, is proposed to be located at the edge of the Village's Planning Area. The second lift station, Lift Station 17W, is proposed to be located just north of the railroad tracks on the western edge of the Village's planning area. Lift Station 18W would need to pump to Lift Station 17W and then lift station 17W would pump to a future gravity sewer at the intersection of Coyne Station Road and the railroad tracks. The proposed lift station locations and inverts, tributary sanitary sewer backbone and general force main routes are depicted on Exhibit 9-1.

The flows from the northern service area are proposed to ultimately be transferred to the West WWTF through a 42-inch sanitary sewer that runs across the Rosenwinkle Farm (referred to as the Romke Road LLC property in the Talamore recapture agreements). It is recommended an alignment adjacent to the future Kreutzer Road extension through the property be considered. The proposed 42-inch sewer would have capacity to convey the flows tributary to the Talamore Lift Station No. 1, as well. When the time is right, it is proposed a 24-inch gravity sanitary sewer be installed from the Talamore Lift Station location, north of the railroad tracks and discharge into the future 42-inch sanitary sewer at the Coyne Road/railroad tracks intersection. At that time, the Talamore Lift Station No. 1 can be abandoned.

Upon review of the remaining existing lift stations in the northern planning area, it was determined abandonment of Lift Stations 5E, 6E and 7E could potentially be planned with the development of the Huntley Ventures LLC property and FRS Development property south of Reed Road. As the engineering for the sanitary sewer network commences for these properties, the Village should determine if any of these three lift stations could be abandoned and the tributary wastewater flows conveyed through the new developments to Lift Station No. 14W (Talamore Lift Station No. 1).

<u>9.1.2 Southern Service Area Collection System Expansion</u> – The Village's southern service area is the currently undeveloped area south of I-90. In the mid-2000's preliminary wastewater collection and conveyance planning was completed as development proposals started to come forward. The original plan suggested the installation of a lift station on the east side of Route 47 just south of the eastbound I-90 ramp. The intent of the service area for a lift station at that location was an approximately 1,000 acre area west and east of Route 47. During this timeframe, the final design phase of the I-90 and Route 47 full interchange improvements were occurring. Due to the fact that the existing access ramps on the east side of Route 47 were going to be rebuilt, the Village felt it was an ideal time to install the forcemain that would connect to the proposed Route 47 south lift station. Therefore, the Village designed and installed approximately 10,600 feet of 16" force main from the proposed lift station location, across I-90, north along Route 47 to the point where the forcemain discharges into the gravity sanitary sewer network at the northeast corner of the intersection of Route 47 and Powers Road.

In the mid to late 2000's, when the planning for the lift station and forcemain improvements were occurring, there was a significant amount of growth within and adjacent to the Village. The Village did not have boundary agreements with some of its adjacent communities and infrastructure expansion was one way to entice developments to the community. Seeing a high amount of economic development potential in this southern service area, and with the thought that it would occur fairly quickly, it was determined a 16" forcemain was the appropriate size forcemain to install at the time. Unfortunately, development did not occur in the area as expected. When development of this area initiates, conveyance of wastewater through the large 16" forcemain will be a challenge. With minimal flows from this service area in the initial years, the detention time within the forcemain will be months.

The original design for the Route 47 south lift station set a sanitary sewer invert at 882.4 and then the bottom of the excavation would have been at an elevation of 877.6. With a ground surface elevation of 913 at the lift station site, the total depth of the lift station was going to be approximately 35.5 feet. The lift station was planned to have approximately 10,000 P.E. directly tributary to it, which would have resulted in an ultimate average day wastewater flow of approximately 1.0 MGD and a peak hour flow of nearly 3.0 MGD. Given the ultimate flows tributary to the lift station, the design included an automatically cleaned fine screen and a screenings washer compactor.

While the Route 47 lift station was designed and permitted, the construction of the improvement did not move forward due to the downturn in the economy and no development south of I-90 moving forward. In addition, with the large capacity of the 16-inch force main and challenges it would create trying to convey the wastewater flows in the early years of development, it was determined a fresh look at the conveyance plan for this area should be completed. An initial review of the area suggested gravity flow to the Del Webb Lift Station (Lift Station 11W) might be a possibility. However, after a closer review of this alternative, it was determined this option would not be the best option for the Village due to the limited available capacity in the sanitary sewer downstream of the lift station.

Two additional collection and conveyance options for the area that included the construction of a lift station west of Route 47 were also considered. One option considered the construction of a lift station that could serve all of the southern service area except a small portion on the east end. The other option established the invert of this lift station at a shallower elevation that would serve the area the original Route 47 lift station presumably planned to serve. This second western lift station option, as well as the original Route 47 option, would require a third lift station in the southern service area to convey flows from the western end of the service area.

In an effort to solve the challenges the 16-inch force main would present during the initial low flow period of the initial phases of development, it was determined a 6-inch forcemain that conveyed flows from the new lift station across I-90 and discharged into Jim Dahmer Drive Lift Station (Lift Station 9W) seemed like a viable option. Lift Station 9W currently receives a minimal amount of flow and therefore has excess capacity at this time. It should be noted a detailed review of the capacity of Lift Station 9W was not completed as part of this analysis. If the proposed 6-inch force main connection is deemed to be the best approach in the future, then a determination of the capacity of that lift station at the time would need to be completed. An upgrade to the pumps within the lift station may be required at the time of the 6-inch connection or at some point in the future.

Under the Route 47 western lift station alternative, the capacity of the 6-inch forcemain will be reached at some point in the future. When that occurs, the plan would be to transfer the flows over to the existing 16-inch forcemain. If a maximum velocity of 5.0 ft/sec in the 6-inch forcemain is utilized as the design constraint, then the maximum flow through the forcemain would be set at 0.63 MGD. A peak hydraulic flow of 0.63 MGD would equate to an approximate design average flow of 0.16 MGD or approximately 1,600 P.E. Therefore, once the flows in the southern service area reach 0.16 MGD or 1,600 P.E., then it is presumed the flows would be transferred to the 16-inch forcemain under this alternative. If the downstream Jim Dhamer Lift

Station and downstream sewer has the capacity to accept even higher flows, and the Village is comfortable with higher velocities in the 6-inch forcemain, then it would be possible to extend the switchover trigger point.

Table No. 9-1 compares the original Route 47 lift station conveyance plan, referred to as Alternate A in the table, to the two west lift station alternates (Alternate B.1 and B.2 in the table). As Table No. 9-1 shows, both Alternate B options are more expensive that Alternate A, however both of those options include the $1.4+ M of 6-inch forcemain improvements. Since it seems impractical to utilize the 16-inch forcemain with the initial low flows, one of these alternatives seems to be a much better short and long term option. While Alternate B.1 is estimated to be $225,000 more than Alternate B.2, the construction to the proposed depth of Alternate B.1 would eliminate the need for the third lift station in the western portion of the Southern Service Area.

Table No. 9-1: Southern Service Area Lift Station Alternative Evaluation

Village of Huntley, IL

Parameter	Alternate A - LS on East Side of Route 47 (Original Location)	Alternate B.1 - LS West of Route 47 With Maximized Gravity Flow Collection	Alternate B.2 - LS West of Route 47 Serving Same Area By Gravity As Alternate A
Collection Plan	Gravity Flow From Sandwald To All But East 35+/- Acres; 3 LS Total South of I-90	All Gravity Flow From West & All But East 35+/- Acres; 2 LS Total South of I-90	Gravity Flow From Sandwald To All But East 35+/- Acres; 3 LS Total South of I-90
P.E. Tributary To LS By Gravity$^{\Delta}$	9,987	13,540	9,987
Total P.E. Tributary To LS$^{\Delta}$	13,846	13,846	13,846
LIFT STATION ELEVATION SUMMARY			
Ground Surface Elev.	913	902	902
Sanitary Invert Elev.	882.4	870.0	881.0
Bottom Wet Well Elev.	879.9	867.5	878.5
Bottom Excavation Elev.	877.6	865.5	876.5
Total Depth of Excavation	35.4	36.5	25.5
COST ESTIMATES			
Lift Station$^{\theta}$	$3,100,000	$2,020,000	$1,795,000
6" Forcemain To Jim Dahmer LS	--	$1,416,100	$1,416,100
Upgrade To Jim Dahmer Dr. LS$^{\pi}$	--	$20,000	$20,000
Subtotal (Village):	$3,100,000	$3,456,100	$3,231,100
Gravity Flow From Route 47 To LS$^{\Sigma}$	$638,300	$572,700	$572,700
16" Future Force Main Connection	--	$561,400	$561,400
Subtotal (Developer):	$638,300	$1,134,100	$1,134,100
TOTAL:	$3,738,300	$4,590,200	$4,365,200

Notes:

$^{\Delta}$ @ 8.75 P.E./Ac

$^{\Sigma}$ Assumes development on west side of Route 47; 24" sanitary sewer in casing pipe under Route 47 for Alternate A; 15" sanitary sewer pipe In Alternate B

$^{\pi}$ Assumed near future upgrades to Jim Dahmer Dr. LS would include pump upgrades, only; When capacity of station or force main is surpassed, the Southern Service Area flows would switch to the 16" force main and would no longer be tributary to the Jim Dahmer Dr LS

$^{\theta}$ Alternate A lift station includes mechanical and manual bypass screening due to the size of incoming sewer (30"); Alternate A lift station cost estimate provided by another consultant in 2009; The $3,100,000 2009 cost estimate projected forward to 2014 with a 3% annual interest rate would result in an estimated 2014 cost of $3,593,750, or an increase of nearly $500,000; Alternate B lift station allows space and design elements to add screening in the the future if deemed necessary

It is recommended the Village consider these three options when development reengages in the Southern Service Area and make a determination which option will meet the Village's short and long term needs. Since only one option could be summarized on Exhibit 9-1, the Alternate B.1 option is depicted.

It should be noted the concept design that was utilized for the cost estimates for the Alternate B lift stations is a phased construction design. The concept design is a formed, poured in place concrete submersible lift station with a control and generator building located at the surface. It included a split wet well that would utilize half of the volume in the lower flow period and then be expanded to use the full wet well when the flows were higher. It also included provisions to attach a channel with an automatically cleaned screen and screenings washing press in the extended building at the surface at some point in the future if screening is deemed appropriate at this facility.

9.1.3 Western Service Area Collection System Expansion – There is a minimal amount of undeveloped area in the western portion of the Village's Planning Area. In addition, there are multiple options to convey the wastewater to the West WWTF. The conveyance plan for this area can be better defined when a more clear picture of development in this area is established and the capacity of the sanitary sewer network downstream of the area is more established. At a minimum, it would appear a lift station will be required to collect wastewater in this area. Depending on the projected flows in the area, the forcemain would be routed to discharge in either an adjacent sanitary sewer within the Del Webb development or traverse further east along Harmony Road until a sanitary sewer with sufficient capacity to convey the flows is intersected.

9.1.4 Eastern Service Area Collection System Expansion – There is a moderate amount of undeveloped area on eastern side of the Village's planning area. A portion of the future flow is proposed to be conveyed to the East WWTF and a portion is proposed to be conveyed to the West WWTF.

It is recommended the undeveloped area furthest east on the south side of Kreutzer Road be conveyed to the existing 12-inch sanitary sewer stubbed across Kreutzer Road. The wastewater generated from this area would flow to Lift Station No. 3E where it would be pumped to the sanitary sewer that flows by gravity to the East WWTF. It is proposed the undeveloped area immediately west of this area be conveyed to a new lift station (Lift Station 20E) to be located just south of the railroad tracks. A forcemain would be installed from Lift Station 20E to the Kreutzer Road interceptor near Route 47.

All of the areas on the east side of the Village's Planning Area south of Powers Road are recommended to be conveyed to the West WWTF. A portion the area north of Freeman Road can flow south across Freeman Road and tie into a gravity sanitary sewer that conveys flows west toward Route 47. For the short term, those flows would be tributary to the Jim Dhamer Drive Lift Station (Lift Station 9W). If a gravity sanitary sewer line is constructed from the location of the Jim Dhamer Lift station to the Del Webb lift station located to the west, then the Jim Dhamer Lift Station could be abandoned. In order for this to occur, an analysis of the capacity of the sewers downstream of the Del Webb lift station would need to be completed.

It is recommended that the area on the east side of the Village's planning area just south of Powers Road would drain to a small lift station on the south side of Powers Road (Lift Station 19W) . Those flows would be pumped via forcemain west to the sanitary sewer network where it has capacity along Route 47.

9.2 East WWTF Improvements

The condition and capacity of the East WWTF was presented in Section 3. In addition, the current and future regulatory challenges for the East WWTF were presented in Section 6. A summary of the proposed improvements for the rehabilitation and upgrade of the East WWTF follows.

9.2.1 Operation and Maintenance Improvements – While the overall condition of the East WWTF is good, Section 3 identified some areas of the facility that need to be improved. A summary of the proposed Operation and Maintenance Improvements and their associated costs is as follows:

- Replace valves and gates in northwest orbal oxidation ditch → $85,000
- Replace effluent valves in northeast closed loop reactor oxidation ditch → $50,000
- Modify flow splitter box for northwest oxidation ditch compatibility with clarifies 2 and 3 → $55,000
- Upgrade non-potable water system → $145,000
- Upgrade UV system → $320,000
- Demolish gravity sludge thickener tank and add gravity belt thickener within a building → $1,100,000

9.2.2 Regulatory/Capacity Upgrades – While it has been determined the East WWTF will not be expanded beyond its rated capacity of 1.8 MGD, there are some components within the facility that will need to be upgraded to achieve that capacity. In addition, it is presumed the Village will receive a Total Phosphorus effluent standard of 1.0 mg/l at the next permit renewal. Therefore, the Village will need to plan to replace the filtration process, improve the biological process and install a chemical feed system. It seems possible the Village could receive an effluent limitation on, or special condition establishing an effluent goal for, Total Nitrogen. If that were to occur, then an internal recycle within the oxidation ditches would be required.

A summary of the regulatory/capacity improvements with the associated costs is as follows:

- Remove Secondary Clarifier No. 1 and construct a chemical feed building for Barium and Phosphorus removal → $650,000
- Install Variable Frequency Drives (VFDs) and a control system (w/ DO probes) for the oxidation ditch aerators to improve biological nutrient removal of the facility → $450,000
- Convert existing Sand Filter Building to Chemical Feed Building or Tertiary Disk Filter Building → $900,000
- Replace 12-inch effluent parshall flume with 18-inch flume → $30,000

- Replace influent raw sewage pumps with larger capacity pumps → $200,000
- Install internal recycle on oxidation ditches for Total N removal → $165,000

9.3 West WWTF Improvements

Being that the first phase of the West WWTF was constructed in 1999, it is of no surprise that the condition of that facility is very good. That being said, there are some components of the system that require some attention. While many of the unit processes at this facility have capacity in excess of the rated capacity of the facility, some don't. Specifically, several unit processes in the biosolids treatment train are undersized.

The West WWTF is meeting all of the existing regulatory requirements established within its permit. In the event a Total Nitrogen standard is applied to this facility, some process control improvements would be required. Section 5 projected the total wastewater flows from the service area to be 4.69 MGD and 4.57 MGD for the CT and LRI wastewater flow projections, respectively. With the total WWTF capacity of 4.4 MGD between the Village's two WWTFs, an expansion of some of the unit processes within the West WWTF is projected to be needed within the planning period.

9.3.1 Operation and Maintenance Improvements – A summary of the proposed Operation and Maintenance Improvements and their associated costs is as follows:

- Improve the oxidation ditch drainage efficiency by connecting the drain lines to a raw sewage pump station → $155,000
- Automate the aerobic digester controls → $25,000
- Replace the drain mud valves on Oxidation Ditch Nos. 1 and 2 → $30,000
- Replace existing comminutors/screens with alternative screening approach → $525,000
- Construct new Administration/Laboratory/Garage Building to increase operational efficiencies at the facility → $1,250,000

9.3.2 Regulatory/Capacity Upgrades – A summary of the proposed regulatory and capacity upgrades is as follows:

- Add one new 1.5 meter belt filter press for dewatering and replace the existing conveyor liner → $500,000
- Replace motors and add VFD's and control system upgrades on Oxidation Ditch No. 2 → $300,000
- Add two (2) digester tanks and one (1) blower → $420,000
- Double the sludge storage capacity → $175,000
- Add third pump to Raw Sewage Pump Station No. 2 → $45,000
- Add second filter in Sand Filter Building B → $430,000
- Install internal recycle on oxidation ditches for Total N removal → $165,000

9.4 Wastewater System Phasing and Implementation Plan

The Village of Huntley's WWTFs phasing and implementation plan for the 25 year planning period is summarized in Table No. 9-2. It was completed with the same timeline approach as the Water Works System improvements phasing and implementation plan. Since there is minimal difference between the CT and LRI wastewater flow projections, there is no difference in the recommended WWTF improvements for the two projections.

Table No. 9-2: Wastewater Treatment Facilities Phasing & Implementation Plan

Village of Huntley, IL

WWTF System Component	Immediate: 0 - 5,000 Population Equivalents Addition, 0 - 5 Years		Near Future: 5,001 - 16,000 Population Equivalents Addition, 6 - 15 Years		Long Term: 16,001 - 31,193 Population Equivalent Additions, 16 - 26 Years		Total
	Description	Cost[θ]	Description	Cost[θ]	Description	Cost[θ]	
East WWTF - Operation and Maintenance Upgrades	Replace Valves and Gates in NW Ox Ditch	$ 85,000	Upgrade UV System	$ 320,000			
	Replace Effluent Valves in NE Ox Ditch	$ 50,000	Gravity Belt Thickener Bldg for Sludge Thickening; Gravity Sludge Thickener Removal	$ 1,100,000			
	Modify Flow Splitter Box for NW Ox Ditch Compatability with Clarifiers 2 and 3	$ 55,000					
	Upgrade Non-Potable Water System - New Skid	$ 145,000					
Subtotal:		**$ 335,000**		**$ 1,420,000**		**$ -**	**$ 1,755,000**
East WWTF - Regulatory/Capacity Upgrades	Remove Secondary Clarifier No. 1 & New Chemical Feed Building for Ba and P Removal	$ 650,000	Convert Sand Filter Building to Tertiary Filter Building	$ 900,000	Install Internal Recycle on Ox Ditches for Total N Removal	$ 165,000	
	Install VFD's on Ox Ditch Aerators and DO Control System	$ 450,000	Replace 12-inch Effluent Parshall Flume with 18-inch Flume	$ 30,000			
			Replace Raw Sewage Pumps with Larger Capacity Pumps	$ 200,000			
Subtotal:		**$ 1,100,000**		**$ 1,130,000**		**$ 165,000**	**$ 2,395,000**
East WWTF Total:		**$ 1,435,000**		**$ 2,550,000**		**$ 165,000**	**$ 4,150,000**
West WWTF - Operation and Maintenance Upgrades	Modifications to Ox Ditch Drainage System - Route 12" to Raw Sewage Pumps	$ 155,000	Replace Drain Mud Valves on Ox Ditches No. 1 and 2	$ 30,000			
	Upgrades to Raw Sewage Pump Station No. 2 to Resolve Piping Issues*	--	Replace Existing Comminutors/Screens with Alternate Screening	$ 525,000			
	Automated Controls for Aerobic Digesters	$ 25,000	New Admin/Lab/Garage Building (Not Including Garage Space for Other Depts.)	$ 1,250,000			
Subtotal:		**$ 180,000**		**$ 1,805,000**		**$ -**	**$ 1,985,000**
West WWTF - Regulatory/Capacity Upgrades	Add One New 1.5 Meter Belt Filter Press for Dewatering and Replace Existing Conveyor Liner	$ 500,000	Ox Ditch No. 2 - Replace Motors and Add VFD's and Control System Upgrades	$ 300,000	Add 3rd Pump to Raw Sewage Pump Station No. 2	$ 45,000	
			Add 2 Digester Tanks and 1 Blower for Required Capacity @ 2% Solids in Digesters	$ 420,000	Add 2nd Filter in Sand Filter Building B	$ 430,000	
			Double Sludge Storage Capacity	$ 175,000	Install Internal Recycle on Ox Ditches for Total N Removal	$ 165,000	
Subtotal:		**$ 500,000**		**$ 895,000**		**$ 640,000**	**$ 2,035,000**
West WWTF Total:		**$ 680,000**		**$ 2,700,000**		**$ 640,000**	**$ 4,020,000**
TOTAL:		**$ 2,115,000**		**$ 5,250,000**		**$ 805,000**	**$ 8,170,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Wastewater Phasing & Implementation Plan.xlsx]WWTF

Notes

[θ] Based on 2014 dollars and 2014 construction costs; includes engineering and contingency costs

* Village staff initiated project during report preparation; potential additional costs unknown

SECTION 10: SUSTAINABLE WATER WORKS SYSTEM AND WASTEWATER SYSTEM PLANNING

Although both population and approximate timeframes for improvements have been provided in the previous sub-sections as part of the Phasing and Implementation plans, it is ultimately the water demands and wastewater flows on the systems that dictate when and what improvements will need to be constructed. As the Village continues to mature, expand, and implement water conservation strategies, the water demands will evolve. It is recommended the Village continuously monitor and evaluate its Water Works and Wastewater Systems as the Village develops. The staging of the improvements within this plan is dependent on the construction schedule and financing of the annexed and proposed developments. The Phasing and Implementation Plan must continually be reviewed and should be modified based on the rate of development and where the development is actually occurring.

As emphasized in Section 8.5.3 with the cost comparison of recommended Water Works System improvements between the CT and LRI scenarios, the financial benefits of minimal levels of water conservation can be huge for the Village. To that end, this Comprehensive Water Works and Wastewater System Master Plan is a valuable planning tool and stepping stone for the Village's Water Works System. The recommended next steps for the Village are as follows:

- Review current policies, consider revising existing policies and then enforce adopted policies regarding water conservation strategies and goals, and develop financing alternatives for the identified improvements. By evaluating water conservation opportunities, the Village will not only show how they continue to be good stewards of our limited resource of water, but the Village also has the potential to significantly reduce the required capital investment in the system.
- Review the water rates to determine how revenue will be impacted by a significant decrease in water consumption resulting from water conservation measures. This will allow the Village's water conservation efforts to be successful from a financial perspective.

This Master Plan advocates similar goals to those of the regional water supply planning efforts. The water supply sources of Northeastern Illinois, namely Lake Michigan, the Fox River, shallow groundwater and deep groundwater, know no political boundaries. Their geographic extent is such that their availabilities are dependent on everyone's wise use of the resource. Therefore, we also recommend the Village continue to build strong, collaborative relationships regionally for sustainable water use so the region and the Village of Huntley can extend the capacity of the local water resources for an economically and environmentally sustainable region.

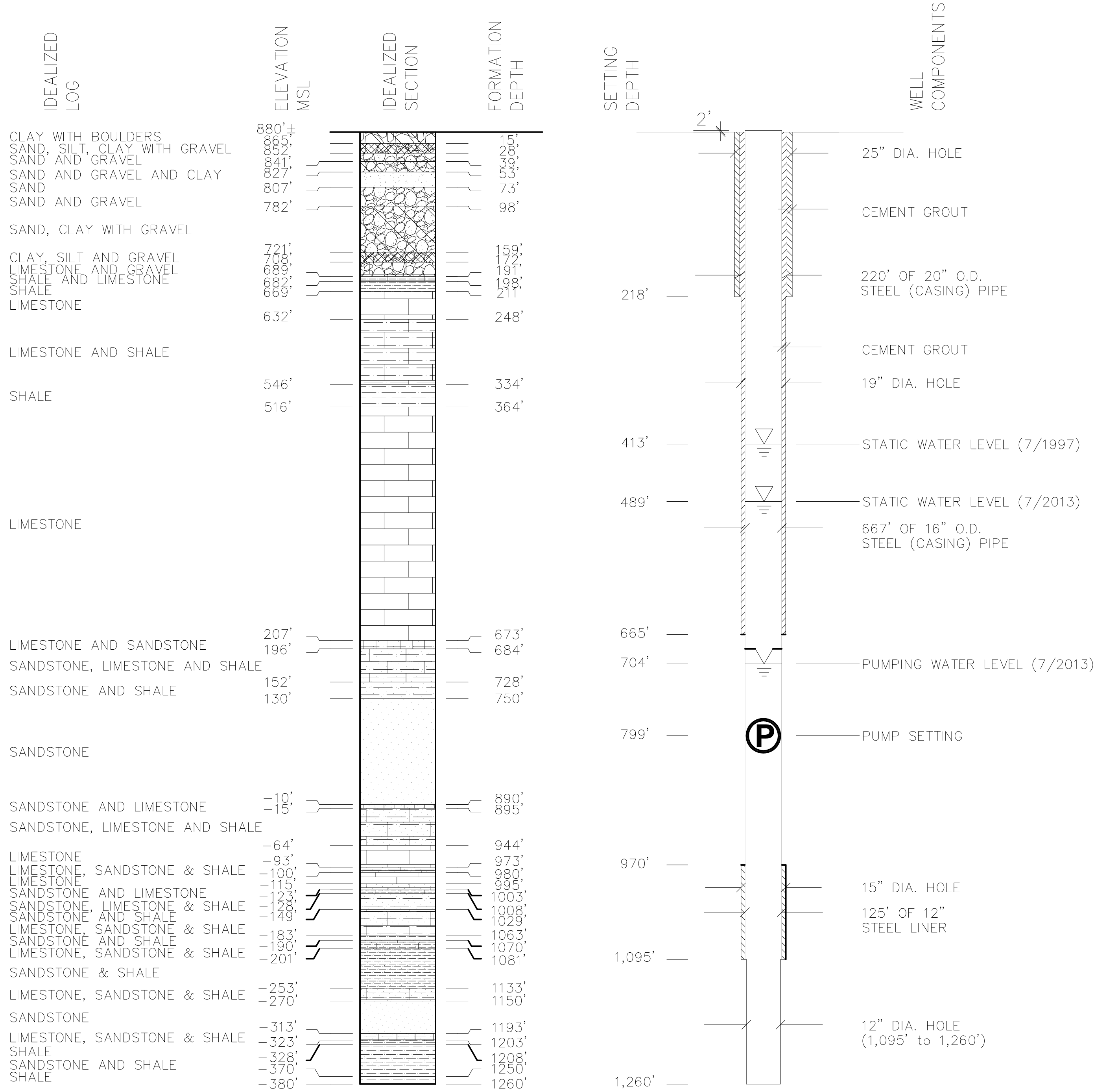
Appendix A

Well Schematics

SCHEMATIC OF EXISTING WATER WELL No. 8 (DEEP CONSOLIDATED AQUIFER) VILLAGE OF HUNTLEY

McHENRY & KANE COUNTIES, ILLINOIS

DATA DERIVED FROM ILLINOIS STATE GEOLOGICAL SURVEY,
WEB BASED WATER WELL DATA AND WELL MAINTENANCE RECORDS



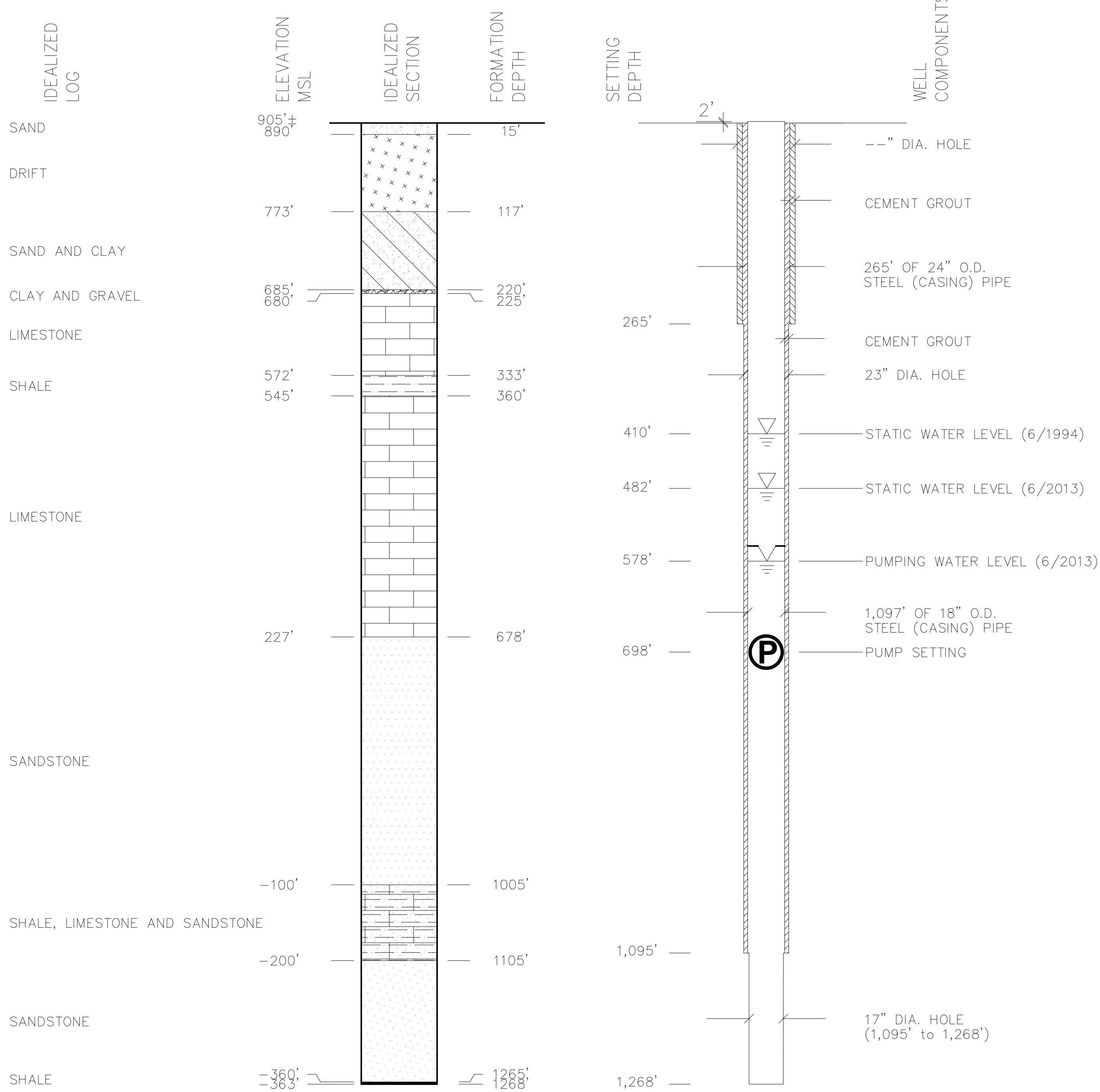
FILE NO: HLTY-WELL 8 BW

Plotted: September 10, 2014 @ 1:47 PM By: James Williams - Tab: 200 Scale

Path: G:\DEVELOPMENT SERVICES\DSD - PLANNINGZONINGDIVISION\AUTOCAD\VOH WELL X-SECTION EXHIBITS\HLTY-WELL 8 BW

SCHEMATIC OF EXISTING WATER WELL No. 7
(DEEP CONSOLIDATED AQUIFER)
VILLAGE OF HUNTLEY
McHENRY & KANE COUNTIES, ILLINOIS

DATA DERIVED FROM ILLINOIS STATE GEOLOGICAL SURVEY,
WEB BASED WATER WELL DATA AND WELL MAINTENANCE RECORDS



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FILE NO: HLTY-WELL 7 BW

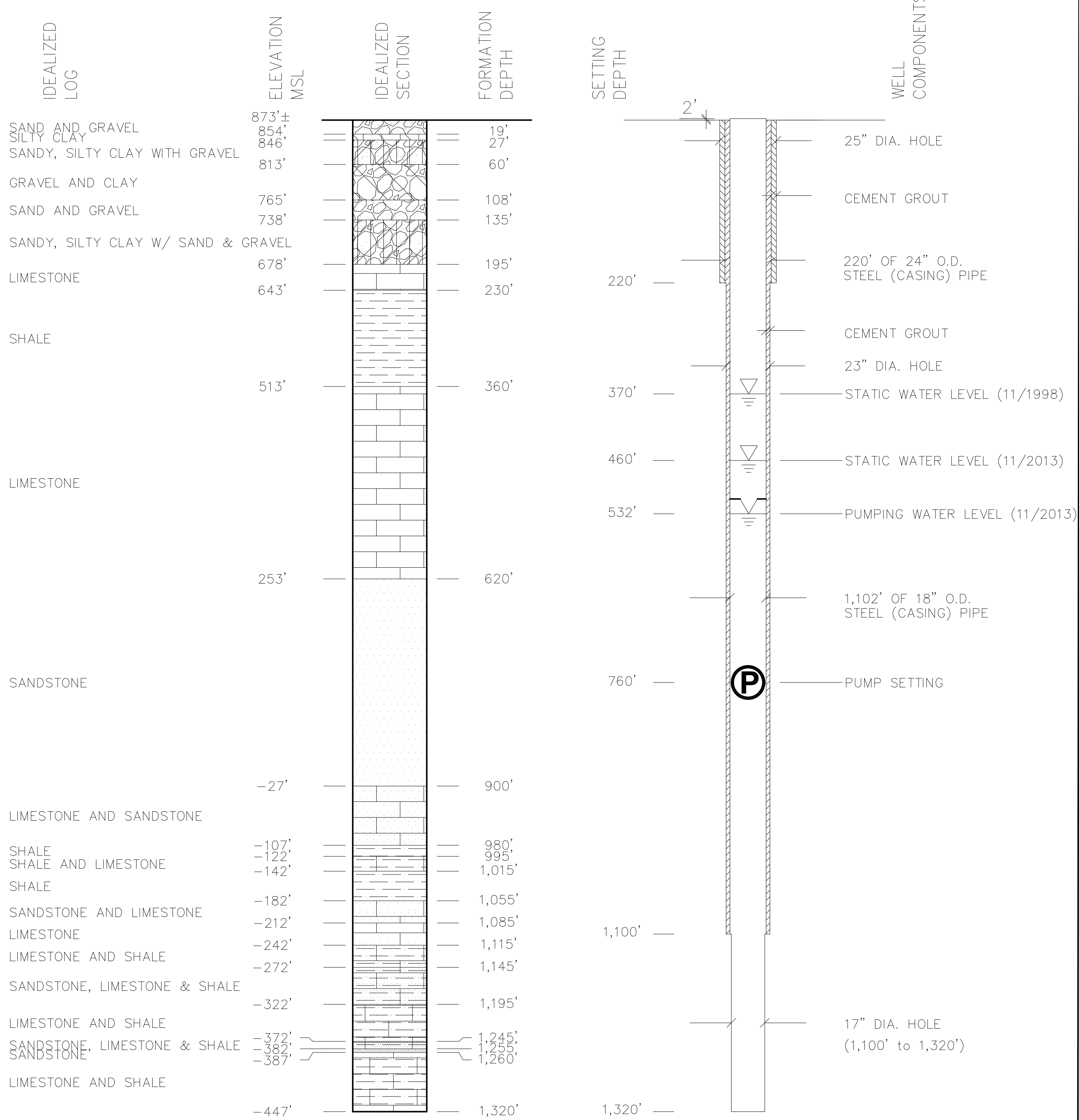
Plotted: September 10, 2014 @ 1:47 PM By: James Williams – Tab: 200 Scale

Path: G:\DEVELOPMENT SERVICES\DSD – PLANNINGZONINGDIVISION\AUTOCAD\VOH WELL X-SECTION EXHIBITS\HLTY-WELL 7 BW

SCHEMATIC OF EXISTING WATER WELL No. 9 (DEEP CONSOLIDATED AQUIFER) VILLAGE OF HUNTLEY

McHENRY & KANE COUNTIES, ILLINOIS

DATA DERIVED FROM ILLINOIS STATE GEOLOGICAL SURVEY,
WEB BASED WATER WELL DATA AND WELL MAINTENANCE RECORDS



FILE NO: HLTY-WELL 9 BW

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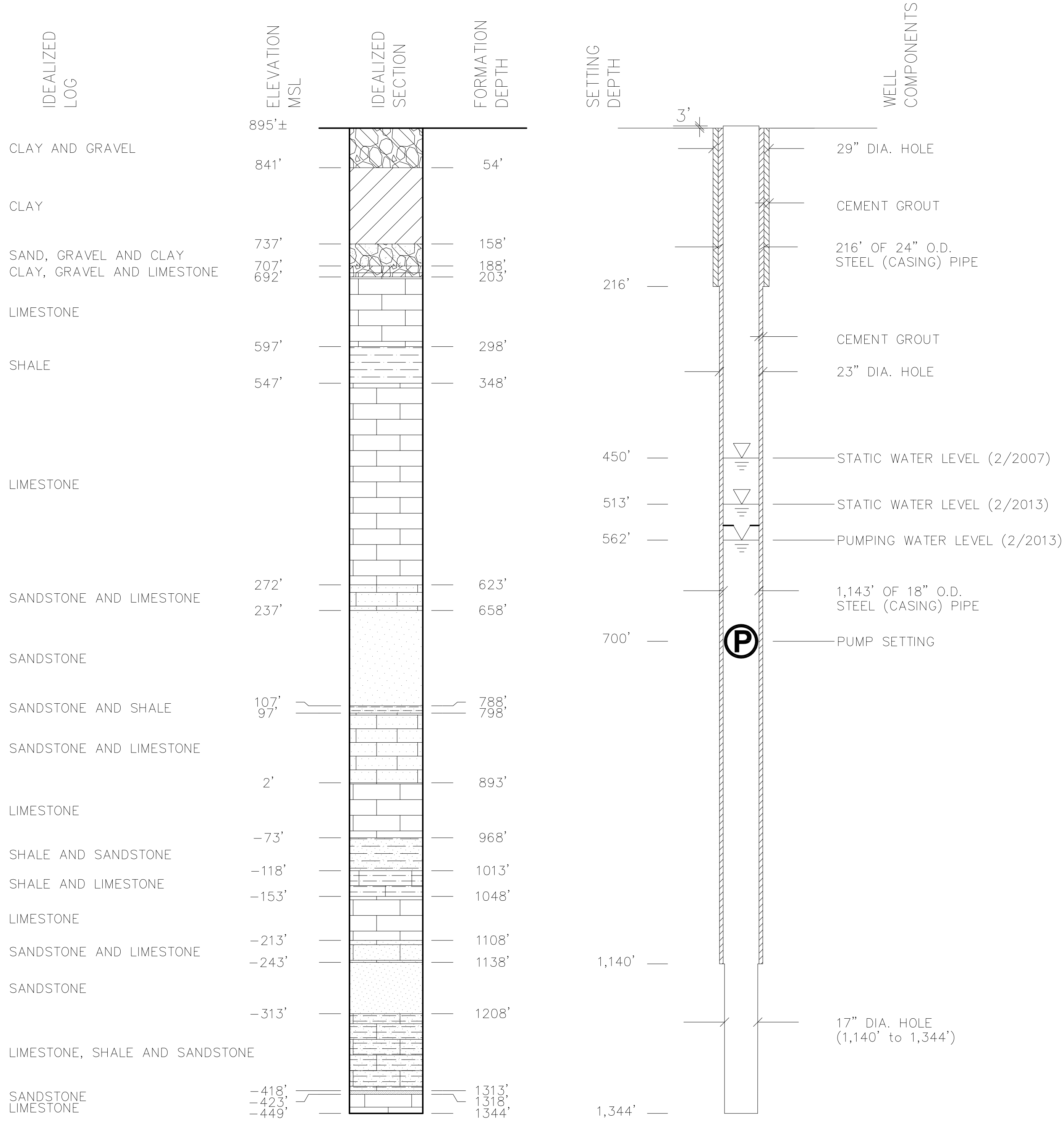
SCHEMATIC OF EXISTING
WATER WELL No. 11
(DEEP CONSOLIDATED AQUIFER)
VILLAGE OF HUNTLEY
McHENRY & KANE COUNTIES, ILLINOIS

DATA DERIVED FROM WELL DRILLER'S LOG AND
WELL MAINTENANCE RECORDS



FILE NO: HLTY-WELL 11 BW

Plotted: September 10, 2014 @ 1:45 PM By: James Williams - Tab: 200 Scale

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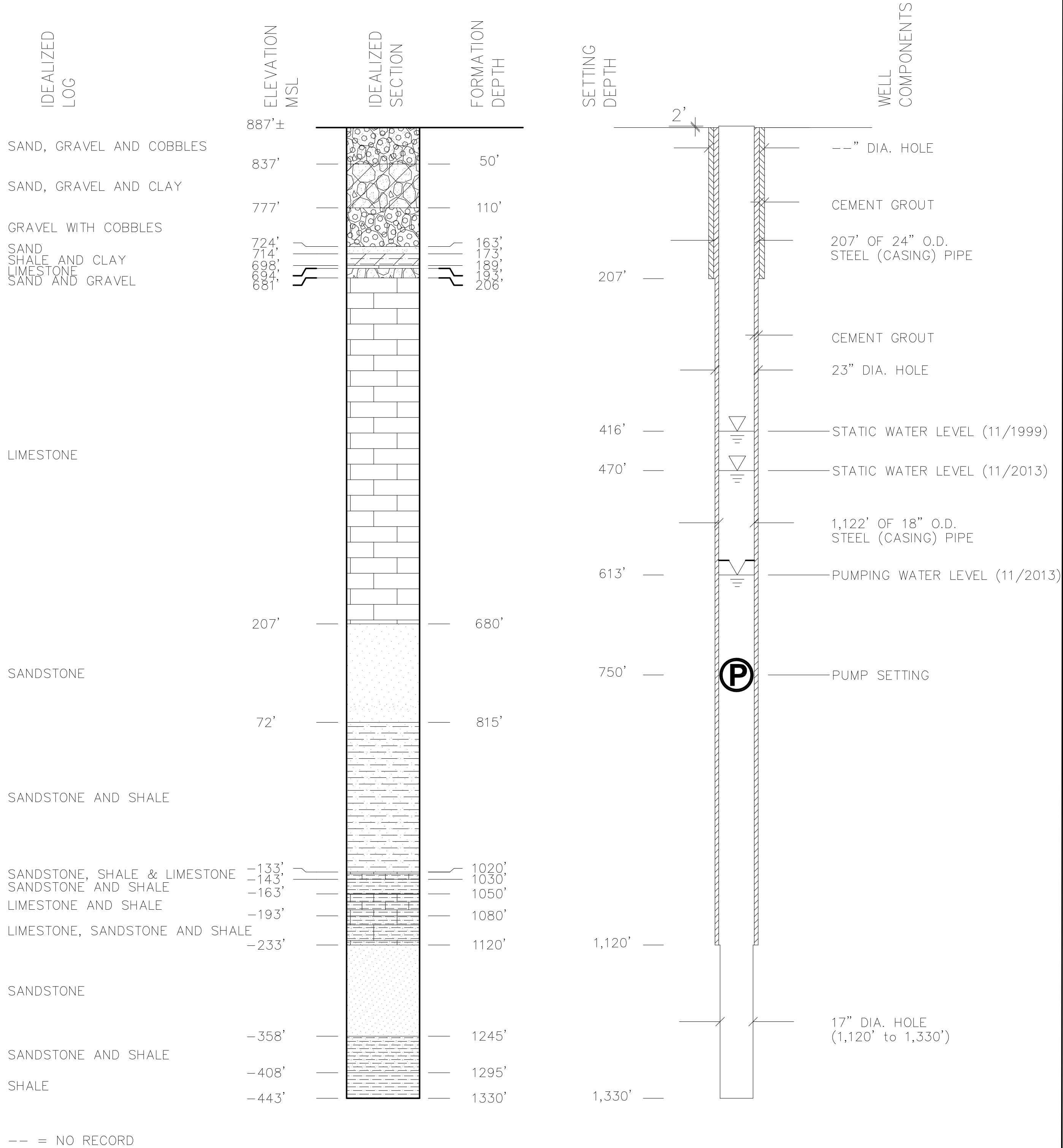
SCHEMATIC OF EXISTING WATER WELL No. 10 (DEEP CONSOLIDATED AQUIFER) VILLAGE OF HUNTLEY

McHENRY & KANE COUNTIES, ILLINOIS

DATA DERIVED FROM WELL DRILLER'S LOG AND WELL MAINTENANCE RECORDS



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FILE NO: HLTY-WELL 10 BW

Appendix B

Current NPDES Permits – East & West WWTFs

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 – (217) 782-3397
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601 – (312) 814-6026

ROD R. BLAGOJEVICH, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

217/782-0610

RECEIVED

JAN 28 2008

VILLAGE OF HUNTLEY
PUBLIC WORKS DEPT.

January 25, 2008

Village of Huntley
10987 Main Street
Huntley, IL 60142

Re: Village of Huntley
Village of Huntley - East WWTP
NPDES Permit No. IL0029238
Final Permit

Gentlemen:

Attached is the final NPDES Permit for your discharge. The Permit as issued covers discharge limitations, monitoring, and reporting requirements. Failure to meet any portion of the Permit could result in civil and/or criminal penalties. The Illinois Environmental Protection Agency is ready and willing to assist you in interpreting any of the conditions of the Permit as they relate specifically to your discharge.

We have reviewed your letter dated October 8, 2007 and offer the following comments:

1. The decision to regulate barium was based on eight samples reported by the Huntley - East WWTP on their DMRs. The data shows that six of the eight samples exceeded the 35 IAC 304.124(a) effluent standard of 2.0 mg/L. It is likely that monthly average effluent concentrations will exceed this standard. One of the eight samples exceeded the daily maximum effluent limit of 4.0 mg/L (35 IAC 304.104). Therefore, the Illinois EPA must regulate this substance and thereby bring the facility into compliance with the standards. Special Condition 14 has been included in the permit to provide the Village the necessary time to comply with the barium limits.

2. The sampling frequency for barium has also been modified to 1 day/month (See page 2 of the permit).

The Agency has begun a program allowing the submittal of electronic Discharge Monitoring Reports (eDMRs) instead of paper Discharge Monitoring Reports (DMRs). If you are interested in eDMRs, more information can be found on the Agency website, http://epa.state.il.us/water/edmr/index.html. If your facility is not registered in the eDMR program, a supply of preprinted paper DMR Forms for your facility will be sent to you prior to the initiation of DMR reporting under the reissued permit. Additional information and instructions will accompany the preprinted DMRs upon their arrival.

The attached Permit is effective as of the date indicated on the first page of the Permit. Until the effective date of any re-issued Permit, the limitations and conditions of the previously-issued Permit remain in full effect. You have the right to appeal any condition of the Permit to the Illinois Pollution Control Board within a 35 day period following the issuance date.

Should you have questions concerning the Permit, please contact Amy Dragovich at the telephone number indicated above.

Sincerely,

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

SAK:ALD:GY:07080701.dlk

Attachment: Final Permit

cc: Records
Compliance Assurance Section
Des Plaines Region
Facility
CMAP
USEPA

NPDES Permit No. IL0029238

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue East

Post Office Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: February 28, 2013

Issue Date: January 25, 2008
Effective Date: March 1, 2008

Name and Address of Permittee:

Village of Huntley
10987 Main Street
Huntley, IL 60142

Facility Name and Address:

Village of Huntley - East WWTP
11313 Dundee Road
Huntley, IL 60142
(McHenry County)

Receiving Waters: Huntley Branch

In compliance with the provisions of the Illinois Environmental Protection Act, Title 35 of the Ill. Adm. Code, Subtitle C, Chapter I, and the Clean Water Act (CWA), the above-named Permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the Permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

SAK:GY:07080701.dlk

NPDES Permit No. IL0029238

Effluent Limitations, Monitoring, and Reporting

FINAL

Discharge Number(s) and Name(s): 001 STP Outfall

Load limits computed based on a design average flow (DAF) of 1.8 MGD (design maximum flow (DMF) of 4.5 MGD).

Excess flow facilities (if applicable) shall not be utilized until the main treatment facility is receiving its maximum practical flow.

From the effective date of this Permit until the expiration date, the effluent of the above discharge(s) shall be monitored and limited at all times as follows:

	LOAD LIMITS lbs/day DAF (DMF)*			CONCENTRATION LIMITS MG/L				
Parameter	Monthly Average	Weekly Average	Daily Maximum	Monthly Average	Weekly Average	Daily Maximum	Sample Frequency	Sample Type
Flow (MGD)							Continuous	
$CBOD_5$**	150 (375)		300 (751)	10		20	3 Days/Week	Composite
Suspended Solids	180 (450)		360 (901)	12		24	3 Days/Week	Composite
Dissolved Oxygen	Shall not be less than 6 mg/L						3 Days/Week	Grab
pH	Shall be in the range of 6 to 9 Standard Units						3 Days/Week	Grab
Fecal Coliform***	Daily Maximum shall not exceed 400 per 100 mL (May through October)						3 Days/Week	Grab
Ammonia Nitrogen:								
April-May/Sept.-Oct.	17 (41)	68 (169)	74 (184)	1.1	4.5	4.9	3 Days/Week	Composite
March	21 (53)	68 (169)	75 (188)	1.4	4.5	5.0	3 Days/Week	Composite
June-August	17 (41)	50 (124)	74 (184)	1.1	3.3	4.9	3 Days/Week	Composite
Nov.-Feb.	21 (53)		75 (188)	1.4		5.0	3 Days/Week	Composite
Barium****	30 (75)		60 (150)	2.0		4.0	1 Day/Month	Composite

*Load limits based on design maximum flow shall apply only when flow exceeds design average flow.
**Carbonaceous BOD_5 ($CBOD_5$) testing shall be in accordance with 40 CFR 136.
***See Special Condition 8.
****See Special Condition 14.

Flow shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

Fecal Coliform shall be reported on the DMR as a daily maximum value.

pH shall be reported on the DMR as minimum and maximum value.

Dissolved oxygen shall be reported on the DMR as a minimum value.

NPDES Permit No. IL0029238

Influent Monitoring, and Reporting

The influent to the plant shall be monitored as follows:

Parameter	Sample Frequency	Sample Type
Flow (MGD)	Continuous	IRT*
BOD_5	3 Days/Week	Composite
Suspended Solids	3 Days/Week	Composite

Influent samples shall be taken at a point representative of the influent.

Flow (MGD) shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

BOD_5 and Suspended Solids shall be reported on the DMR as a monthly average concentration.

* Indicating, Recording, Totalizing

NPDES Permit No. IL0029238

Special Conditions

SPECIAL CONDITION 1. This Permit may be modified to include different final effluent limitations or requirements which are consistent with applicable laws, regulations, or judicial orders. The IEPA will public notice the permit modification.

SPECIAL CONDITION 2. The use or operation of this facility shall be by or under the supervision of a Certified Class 1 operator.

SPECIAL CONDITION 3. The IEPA may request in writing submittal of operational information in a specified form and at a required frequency at any time during the effective period of this Permit.

SPECIAL CONDITION 4. The IEPA may request more frequent monitoring by permit modification pursuant to 40 CFR § 122.63 and Without Public Notice in the event of operational, maintenance or other problems resulting in possible effluent deterioration.

SPECIAL CONDITION 5. The effluent, alone or in combination with other sources, shall not cause a violation of any applicable water quality standard outlined in 35 Ill. Adm. Code 302.

SPECIAL CONDITION 6. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.

SPECIAL CONDITION 7. For Discharge No. 001, any use of chlorine to control slime growths, odors or as an operational control, etc. shall not exceed the limit of 0.05 mg/L (daily maximum) total residual chlorine in the effluent. Sampling is required on a daily grab basis during the chlorination process. Reporting shall be submitted on the DMR's on a monthly basis.

SPECIAL CONDITION 8. Fecal Coliform limits for Discharge Number 001 are effective May thru October. Sampling of Fecal Coliform is only required during this time period.

SPECIAL CONDITION 9. The Permittee shall conduct semi-annual monitoring of the effluent and report concentrations (in mg/l) of the following listed parameters. Monitoring shall begin three (3) months from the effective date of this permit. The sample shall be a 24-hour effluent composite except as otherwise specifically provided below and the results shall be submitted on Discharge Monitoring Report Forms to IEPA unless otherwise specified by the IEPA. The parameters to be sampled and the minimum reporting limits to be attained are as follows:

STORET CODE	PARAMETER	Minimum reporting limit
01002	Arsenic	0.05 mg/L
01007	Barium	0.5 mg/L
01027	Cadmium	0.001 mg/L
01032	Chromium (hexavalent) (grab)	0.01 mg/L
01034	Chromium (total)	0.05 mg/L
01042	Copper	0.005 mg/L
00718	Cyanide (grab) (weak acid dissociable)	5.0 ug/L
00720	Cyanide (grab not to exceed 24 hours) (total)	5.0 ug/L
00951	Fluoride	0.1 mg/L
01045	Iron (total)	0.5 mg/L
01046	Iron (Dissolved)	0.5 mg/L
01051	Lead	0.05 mg/L
01055	Manganese	0.5 mg/L
71900	Mercury (grab) (using USEPA Method 1631 or equivalent)	1.0 ng/L*
01067	Nickel	0.005 mg/L
00556	Oil (hexane soluble or equivalent) (Grab Sample only)	5.0 mg/L
32730	Phenols (grab)	0.005 mg/L
01147	Selenium	0.005 mg/L
01077	Silver (total)	0.003 mg/L
01092	Zinc	0.025 mg/L

Unless otherwise indicated, concentrations refer to the total amount of the constituent present in all phases, whether solid, suspended or dissolved, elemental or combined, including all oxidation states.

NPDES Permit No. IL0029238

Special Conditions

*1.0 ng/L = 1 part per trillion.

SPECIAL CONDITION 10. During January of each year the Permittee shall submit annual fiscal data regarding sewerage system operations to the Illinois Environmental Protection Agency/Division of Water Pollution Control/Compliance Assurance Section. The Permittee may use any fiscal year period provided the period ends within twelve (12) months of the submission date.

Submission shall be on forms provided by IEPA titled "Fiscal Report Form For NPDES Permittees".

SPECIAL CONDITION 11. The Permittee shall conduct biomonitoring of the effluent from Discharge Number(s) 001.

Biomonitoring

1. Acute Toxicity - Standard definitive acute toxicity tests shall be run on at least two trophic levels of aquatic species (fish, invertebrate) representative of the aquatic community of the receiving stream. Testing must be consistent with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fifth Ed.) EPA/821-R-02-012. Unless substitute tests are pre-approved; the following tests are required:

   a. Fish - 96 hour static LC_{50} Bioassay using fathead minnows (Pimephales promelas).

   b. Invertebrate 48-hour static LC_{50} Bioassay using Ceriodaphnia.

Aug. 28, 2011 Start

2. Testing Frequency - The above tests shall be conducted using 24-hour composite samples unless otherwise authorized by the IEPA. Samples must be collected in the 18th, 15th, 12th, and 9th month prior to the expiration date of this Permit.

3. Reporting - Results shall be reported according to EPA/821-R-02-012, Section 12, Report Preparation, and shall be submitted to IEPA, Bureau of Water, Compliance Assurance Section within one week of receipt from the laboratory. Reports are due to the IEPA no later than the 16th, 13th, 10th, and 7th month prior to the expiration date of this Permit.

4. Toxicity Reduction Evaluation - Should the results of the biomonitoring program identify toxicity, the IEPA may require that the Permittee prepare a plan for toxicity reduction evaluation and identification. This plan shall be developed in accordance with Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833B-99/002, and shall include an evaluation to determine which chemicals have a potential for being discharged in the plant wastewater, a monitoring program to determine their presence or absence and to identify other compounds which are not being removed by treatment, and other measures as appropriate. The Permittee shall submit to the IEPA its plan for toxicity reduction evaluation within ninety (90) days following notification by the IEPA. The Permittee shall implement the plan within ninety (90) days or other such date as contained in a notification letter received from the IEPA.

   The IEPA may modify this Permit during its term to incorporate additional requirements or limitations based on the results of the biomonitoring. In addition, after review of the monitoring results, the IEPA may modify this Permit to include numerical limitations for specific toxic pollutants. Modifications under this condition shall follow public notice and opportunity for hearing.

SPECIAL CONDITION 12. For the duration of this Permit, the Permittee shall determine the quantity of sludge produced by the treatment facility in dry tons or gallons with average percent total solids analysis. The Permittee shall maintain adequate records of the quantities of sludge produced and have said records available for IEPA inspection. The Permittee shall submit to the IEPA, at a minimum, a semi-annual summary report of the quantities of sludge generated and disposed of, in units of dry tons or gallons (average total percent solids) by different disposal methods including but not limited to application on farmland, application on reclamation land, landfilling, public distribution, dedicated land disposal, sod farms, storage lagoons or any other specified disposal method. Said reports shall be submitted to the IEPA by January 31 and July 31 of each year reporting the preceding January thru June and July thru December interval of sludge disposal operations.

Duty to Mitigate. The Permittee shall take all reasonable steps to minimize any sludge use or disposal in violation of this Permit.

Sludge monitoring must be conducted according to test procedures approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, unless other test procedures have been specified in this Permit.

Planned Changes. The Permittee shall give notice to the IEPA on the semi-annual report of any changes in sludge use and disposal.

Special Conditions

The Permittee shall retain records of all sludge monitoring, and reports required by the Sludge Permit as referenced in Standard Condition 23 for a period of at least five (5) years from the date of this Permit.

If the Permittee monitors any pollutant more frequently than required by the Sludge Permit, the results of this monitoring shall be included in the reporting of data submitted to the IEPA.

Monitoring reports for sludge shall be reported on the form titled "Sludge Management Reports" to the following address:

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
Mail Code #19
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 13. The Permittee shall record monitoring results on Discharge Monitoring Report (DMR) Forms using one such form for each outfall each month.

In the event that an outfall does not discharge during a monthly reporting period, the DMR Form shall be submitted with no discharge indicated.

The Permittee may choose to submit electronic DMRs (eDMRs) instead of mailing paper DMRs to the IEPA. More information, including registration information for the eDMR program, can be obtained on the IEPA website, http://www.epa.state.il.us/water/edmr/index.html.

The completed Discharge Monitoring Report forms shall be submitted to IEPA no later than the 25th day of the following month, unless otherwise specified by the permitting authority.

Permittees not using eDMRs shall mail Discharge Monitoring Reports with an original signature to the IEPA at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section, Mail Code #19

SPECIAL CONDITION 14. Twelve (12) months from the effective date of this Permit the barium limits on page 2 of this permit shall become effective.

The Permittee shall complete the necessary facility upgrades to meet the limits in accordance with the following schedule:

(1) Submit Progress Report	6 months from the effective date of this Permit	September 1 2008
(2) Obtain Compliance with Limit	12 months from the effective date of this Permit	

Compliance dates set out in this Permit may be superseded or supplemented by compliance dates in judicial orders, Illinois Pollution Control Board orders. This Permit may be modified with Public Notice, to include such revised compliance dates.

REPORTING

The Permittee shall submit a progress report for item 1 of the compliance schedule indicating: a) the date the item was completed, or b) that the item was not completed, the reasons for non-completion and the anticipated completion date to the Agency Compliance Section.

ATTACHMENT H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act, Ch 111 1/2 Ill. Rev. Stat., Sec 1001-1052 as Amended.

Agency means the Illinois Environmental Protection Agency.

Board means the Illinois Pollution Control Board.

Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) means Pub. L. 92-500, as amended. 33 U.S.C. 1251 et seq.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318 and 405 of the Clean Water Act.

USEPA means the United States Environmental Protection Agency.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Discharge Limitation (7 day average) means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

24 Hour Composite Sample means a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

8 Hour Composite Sample means a combination of at least 3 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over an 8-hour period.

Flow Proportional Composite Sample means a combination of sample aliquots of at least 100 milliliters collected at periodic intervals such that either the time interval between each aliquot or the volume of each aliquot is proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot.

(1) **Duty to comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(2) **Duty to reapply.** If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper application as required by the Agency no later than 180 days prior to the expiration date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.

(3) **Need to halt or reduce activity not a defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(4) **Duty to mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(5) **Proper operation and maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up, or auxiliary facilities, or similar systems only when necessary to achieve compliance with the conditions of the permit.

(6) **Permit actions.** This permit may be modified, revoked and reissued, or terminated for cause by the Agency pursuant to 40 CFR 122.62. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(7) **Property rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

(8) **Duty to provide information.** The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency, upon request, copies of records required to be kept by this permit.

(9) **Inspection and entry.** The permittee shall allow an authorized representative of the Agency, upon the presentation of credentials and other documents as may be required by law, to:

- (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- (d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any location.

(10) **Monitoring and records.**

- (a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
- (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of this permit, measurement, report or application. This period may be extended by request of the Agency at any time.
- (c) Records of monitoring information shall include:
  - (1) The date, exact place, and time of sampling or measurements;
  - (2) The individual(s) who performed the sampling or measurements;
  - (3) The date(s) analyses were performed;
  - (4) The individual(s) who performed the analyses;
  - (5) The analytical techniques or methods used; and
  - (6) The results of such analyses.
- (d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test method for approval. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.

(11) **Signatory requirement.** All applications, reports or information submitted to the Agency shall be signed and certified.

- (a) **Application.** All permit applications shall be signed as follows:
  - (1) **For a corporation:** by a principal executive officer of at least the level of vice president or a person or position having overall responsibility for environmental matters for the corporation;
  - (2) **For a partnership or sole proprietorship:** by a general partner or the proprietor, respectively; or
  - (3) **For a municipality, State, Federal, or other public agency:** by either a principal executive officer or ranking elected official.
- (b) **Reports.** All reports required by permits, or other information requested by the Agency shall be signed by a person described in paragraph (a) or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - (1) The authorization is made in writing by a person described in paragraph (a); and
  - (2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge originates, such as a plant manager, superintendent or person of equivalent responsibility; and
  - (3) The written authorization is submitted to the Agency.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
James R. Thompson Center, 100 West Randolph, Suite 11-300, Chicago, IL 60601 • (312) 814-6026

PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

217/782-0610

July 9, 2010

Village of Huntley
10987 Main Street
Huntley, Illinois 60142

Re: Village of Huntley
Huntley West WWTP
NPDES Permit No. IL0070688
Final Permit

Gentlemen:

Attached is the final NPDES Permit for your discharge. The Permit as issued covers discharge limitations, monitoring, and reporting requirements. Failure to meet any portion of the Permit could result in civil and/or criminal penalties. The Illinois Environmental Protection Agency is ready and willing to assist you in interpreting any of the conditions of the Permit as they relate specifically to your discharge.

The Agency has completed our review of your comments on the draft NPDES Permit and have the following comments:

1. Effluent limits for the 1.6 MGD facility have been removed from the Permit, since the 2.6 MGD facility is operational.

2. The compliance schedule for dissolved oxygen (Special Condition 19) has been removed from the permit, since the facility has completed installation of an aeration system to ensure compliance.

3. Barium limits have been included in the Permit for both the Phase 3 and Phase 4 expansions. 35 IAC Section 304.103 indicates that users are not required to clean up contamination caused essentially by upstream sources. Background refers to substances present in the receiving stream, not substances present in the effluent. In Huntley's case, the South Branch Kishwaukee does not contain barium and therefore, they are not removing stream water with barium from the South Branch Kishwaukee River. The Agency became aware of the barium levels while conducting the Water Quality Based Effluent Limitation analysis for the renewal of the Permit. There is a reasonable potential for untreated effluent to exceed the effluent standard at 35 IAC Section 304.124 for barium. Since treatment must be applied for this standard to be met, the prescribed effluent standard must be included as a permit limit. Special Condition 19 has been replaced with a 3 year compliance schedule for the existing facility to come into

compliance with the barium effluent limits. The sample frequency for the Phase 3 expansion has also been reduced to 1 day/week.

Please note that we have revised the Permit to include monitoring for Total Nitrogen for the Phase 3 and Phase 4 expansions (see Pages 2 and 3 of the Permit). Special Condition 20 has also been added to the Permit based on comments received during the Public Comment period.

The Agency has begun a program allowing the submittal of electronic Discharge Monitoring Reports (eDMRs) instead of paper Discharge Monitoring Reports (DMRs). If you are interested in eDMRs, more information can be found on the Agency website, http://epa.state.il.us/water/edmr/index.html. If your facility is not registered in the eDMR program, a supply of preprinted paper DMR Forms for your facility will be sent to you prior to the initiation of DMR reporting under the reissued permit. Additional information and instructions will accompany the preprinted DMRs upon their arrival.

The attached Permit is effective as of the date indicated on the first page of the Permit. Until the effective date of any re-issued Permit, the limitations and conditions of the previously-issued Permit remain in full effect. You have the right to appeal any condition of the Permit to the Illinois Pollution Control Board within a 35 day period following the issuance date.

Should you have questions concerning the Permit, please contact Amy Dragovich at the telephone number indicated above.

Sincerely,

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

SAK:ALD:DGN:07053001.bah

Attachment: Final Permit

cc: Records
Compliance Assurance Section
Des Plaines Region
Baxter & Woodman, Inc.
CMAP
Billing

NPDES Permit No. IL0070688

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue East

Post Office Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: July 31, 2015

Issue Date: July 9, 2010
Effective Date: August 1, 2010

Name and Address of Discharger:
Village of Huntley
10987 Main Street
Huntley, Illinois 60142

Name and Address of Facility:
Huntley West WWTP
12601 West Main Street
Huntley, Illinois
(McHenry County)

Receiving Waters: South Branch Kishwaukee River (East)

In compliance with the provisions of the Illinois Environmental Protection Act, Title 35 of the Ill. Adm. Code, Subtitle C, Chapter I, and the Clean Water Act (CWA), the above-named Permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization beyond the expiration date, the Permittee shall submit the proper authorization as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

SAK:DGN:07053001.bah

NPDES Permit No. IL0070688

Effluent Limitations, Monitoring, and Reporting

FINAL

Discharge Number(s) and Name(s): 001 STP Outfall

Load Limits computed based on a design average flow (DAF) of 2.6 MGD [1](design maximum flow (DMF) of 6.5 MGD).

Excess flow facilities (if applicable) shall not be utilized until the main treatment facility is receiving its maximum practical flow.

From the effective date of this Permit until the operational date of the Phase 4 expansion, the effluent of the above discharge(s) shall be monitored and limited at all times as follows:

	LOAD LIMITS lbs/day* DAF (DMF)			CONCENTRATION LIMITS mg/L				
Parameter	Monthly Avg.	Weekly Avg.	Daily Maximum	Monthly Avg.	Weekly Avg.	Daily Maximum	Sample Frequency	Sample Type
Flow (MGD)							Continuous	
$CBOD_5$**	217 (542)		434 (1084)	10		20	3 days/week	Composite
Suspended Solids	260 (651)		520 (1301)	12		24	3 days/week	Composite
Dissolved Oxygen	Shall not be less than 6 mg/L						3 days/week	Grab
pH	Shall be in the range of 6 to 9 Standard Units						3 days/week	Grab
Fecal Coliform***	Daily Maximum shall not exceed 400 per 100 mL (May through October)						3 days/week	Grab
Ammonia Nitrogen as (N)								
March	33 (81)	98 (244)	111 (276)	1.5	4.5	5.1	3 days/week	Composite
April-May/Sept.-Oct.	26 (65)	98 (244)	111 (276)	1.2	4.5	5.1	3 days/week	Composite
June-August	26 (65)	76 (190)	111 (276)	1.2	3.5	5.1	3 days/week	Composite
Nov.-Feb.	33 (81)	----	111 (276)	1.5	----	5.1	3 days/week	Composite
Phosphorus	22 (54)			1.0			3 days/week	Composite
Barium****	43(108)		87(217)	2.0		4.0	1 day/week	Composite
Total Nitrogen	Monitor Only						3 days/week	Composite

*Load limits based on design maximum flow shall apply only when flow exceeds design average flow.
**Carbonaceous BOD_5 $(CBOD)_5$ testing shall be in accordance with 40 CFR 136.
***See Special Condition 8.
****See Special Condition 19.

Flow shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

Fecal Coliform shall be reported on the DMR as daily maximum.

pH shall be reported on the DMR as a minimum and a maximum.

Dissolved oxygen shall be reported on DMR as minimum.

[1]See Special Condition 16.

NPDES Permit No. IL0070688

Effluent Limitations, Monitoring, and Reporting

FINAL

Discharge Number(s) and Name(s): 001 STP Outfall

Load Limits computed based on a design average flow (DAF) of 4.9 MGD [1](design maximum flow (DMF) of 11.0 MGD).

Excess flow facilities (if applicable) shall not be utilized until the main treatment facility is receiving its maximum practical flow.

From the operational date of the Phase 4 expansion until the expiration date, the effluent of the above discharge(s) shall be monitored and limited at all times as follows:

	LOAD LIMITS lbs/day* DAF (DMF)			CONCENTRATION LIMITS mg/L				
Parameter	Monthly Avg.	Weekly Avg.	Daily Maximum	Monthly Avg.	Weekly Avg.	Daily Maximum	Sample Frequency	Sample Type
Flow (MGD)							Continuous	
$CBOD_5$**	409 (917)		817 (1835)	10		20	3 days/week	Composite
Suspended Solids	490 (1101)		981 (2202)	12		24	3 days/week	Composite
Dissolved Oxygen	Shall not be less than 6 mg/L						3 days/week	Grab
pH	Shall be in the range of 6 to 9 Standard Units						3 days/week	Grab
Fecal Coliform***	Daily Maximum shall not exceed 400 per 100 mL (May through October)						3 days/week	Grab
Ammonia Nitrogen as (N)								
March	61 (138)	184 (413)	208 (468)	1.5	4.5	5.1	3 days/week	Composite
April-May/Sept.-Oct.	49 (110)	184 (413)	208 (468)	1.2	4.5	5.1	3 days/week	Composite
June-August	49 (110)	143 (321)	208 (468)	1.2	3.5	5.1	3 days/week	Composite
Nov.-Feb.	61 (138)	----	208 (468)	1.5	----	5.1	3 days/week	Composite
Phosphorus	41 (92)			1.0			3 days/week	Composite
Copper****	1.3 (2.9)		2.2 (5.0)	0.032		0.054	3 days/week	Composite
Silver			0.20 (0.46)			0.005	3 days/week	Composite
Barium	82 (183)		163 (367)	2.0		4.0	3 days/week	Composite
Total Nitrogen*****	Monitor Only						3 days/week	Composite

*Load limits based on design maximum flow shall apply only when flow exceeds design average flow.
**Carbonaceous BOD_5 $(CBOD)_5$ testing shall be in accordance with 40 CFR 136.
***See Special Condition 8.
****See Special Condition 15.
*****See Special Condition 20.

Flow shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

Fecal Coliform shall be reported on the DMR as daily maximum.

pH shall be reported on the DMR as a minimum and a maximum.

Dissolved oxygen shall be reported on DMR as minimum.

[1]See Special Condition 16.

NPDES Permit No. IL0070688

Effluent Limitations, Monitoring, and Reporting

FINAL

The influent to the plant shall be monitored as follows:

Parameter	Sample Frequency	Sample Type
Flow (MGD)	Continuous	IRT*
BOD_5	3 days/week	Composite
Suspended Solids	3 days/week	Composite

Influent samples shall be taken at a point representative of the influent.

Flow (MGD) shall be reported on the Discharge Monitoring Report (DMR) as monthly average and daily maximum.

BOD_5 and Suspended Solids shall be reported on the DMR as a monthly average concentration.

*Indicating, Recording, Totalizing.

Special Conditions

SPECIAL CONDITION 1. This Permit may be modified to include different final effluent limitations or requirements, which are consistent with applicable laws, regulations, or judicial orders. The IEPA will public notice the permit modification.

SPECIAL CONDITION 2. The use or operation of this facility shall be by or under the supervision of a Certified Class 1 operator.

SPECIAL CONDITION 3. The IEPA may request in writing submittal of operational information in a specified form and at a required frequency at any time during the effective period of the Permit.

SPECIAL CONDITION 4. The IEPA may request more frequent monitoring by permit modification pursuant to 40 CFR § 122.63 and Without Public Notice in the event of operational, maintenance or other problems resulting in possible effluent deterioration.

SPECIAL CONDITION 5. The effluent, alone or in combination with other sources, shall not cause a violation of any applicable water quality standard outlined in 35 Ill. Adm. Code 302.

SPECIAL CONDITION 6. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.

SPECIAL CONDITION 7. For Discharge No. 001 any use of chlorine to control slime growths odors or as an operational control, etc. shall not exceed the limit of 0.05 mg/l (daily maximum) total residual chlorine in the effluent. Sampling is required on a daily grab basis during the chlorination process. Reporting shall be submitted on the DMR's on a monthly basis.

SPECIAL CONDITION 8. Fecal Coliform limits for Discharge Number 001 are effective May thru October. Sampling of Fecal Coliform is only required during this time period.

SPECIAL CONDITION 9. The permittee shall conduct semi-annual monitoring of the effluent and report concentrations (in mg/l) of the following listed parameters. Monitoring shall begin three (3) months from the effective date of this permit. The sample shall be a 24-hour effluent composite except as otherwise specifically provided below and the results shall be submitted on Discharge Monitoring Report Forms to IEPA unless otherwise specified by the IEPA. The parameters to be sampled and the minimum detection limits to be attained are as follows:

November 1, 2010

Storet Code	Parameter	Minimum Detection Limit
01002	Arsenic	0.05 mg/l
01007	Barium	0.5 mg/
01027	Cadmium	0.001 mg/l
01032	Chromium (hexavalent) (grab)	0.01 mg/l
01034	Chromium (total)	0.05 mg/l
01042	Copper	0.005 mg/l
00718	Cyanide (grab) (weak acid dissociable)	5.0 ug/l
00720	Cyanide (grab not to exceed 24 hours) (total)	5.0 ug/l
00951	Fluoride	0.1 mg/l
01045	Iron (total)	0.5 mg/l
01046	Iron (Dissolved)	0.5 mg/l
01051	Lead	0.05 mg/l
01055	Manganese	0.5 mg/
71900	Mercury (grab)**	1.0 ng/l*
01067	Nickel	0.005 mg/l
00550	Oil (hexane soluble or equivalent) (grab sample only)	5.0 mg/l
32730	Phenols (grab)	0.005 mg/l
01147	Selenium	0.005 mg/l
01077	Silver (total)	0.003 mg/l
01092	Zinc	0.025 mg/l

Unless otherwise indicated, concentrations refer to the total amount of the constituent present in all phases, whether solid, suspended or dissolved, elemental or combined, including all oxidation states.

*1.0 ng/l = 1 part per trillion.
**Utilize USEPA Method 1631E and the digestion procedure described in Section 11.1.1.2 of 1631E.

Special Conditions

SPECIAL CONDITION 10. During January of each year the Permittee shall submit annual fiscal data regarding sewerage system operations to the Illinois Environmental Protection Agency/Division of Water Pollution Control/Compliance Assurance Section. The Permittee may use any fiscal year period provided the period ends within twelve (12) months of the submission date:.

Submission shall be on forms provided by IEPA titled "Fiscal Report Form For NPDES Permittees"

SPECIAL CONDITION 11. The Permittee shall conduct biomonitoring of the effluent from Discharge Number(s) 001

Biomonitoring

1. Acute Toxicity - Standard definitive acute toxicity tests shall be run on at least two trophic levels of aquatic species (fish, invertebrate) representative of the aquatic community of the receiving stream. Testing must be consistent with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fifth Ed.) EPA/821-R-02-012. Unless substitute tests are pre-approved; the following tests are required:

   a. Fish - 96 hour static LC_{50} Bioassay using fathead minnows (Pimephales promelas).

   B. Invertebrate 48-hour static LC_{50} Bioassay using Ceriodaphnia.

2. Testing Frequency - The above tests shall be conducted using 24-hour composite samples unless otherwise authorized by the IEPA. Samples must be collected in the 18th, 15th, 12th, and 9th month prior to the expiration date of this Permit.

3. Reporting - Results shall be reported according to EPA/821-R-02-012, Section 12, Report Preparation, and shall be submitted to IEPA, Bureau of Water, Compliance Assurance Section within one week of receipt from the laboratory. Reports are due to the IEPA no later than the 16th, 13th, 10th, and 7th month prior to the expiration date of this Permit.

4. Toxicity Reduction Evaluation - Should the results of the biomonitoring program identify toxicity, the IEPA may require that the Permittee prepare a plan for toxicity reduction evaluation and identification. This plan shall be developed in accordance with Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833B-99/002, and shall include an evaluation to determine which chemicals have a potential for being discharged in the plant wastewater, a monitoring program to determine their presence or absence and to identify other compounds which are not being removed by treatment, and other measures as appropriate. The Permittee shall submit to the IEPA its plan for toxicity reduction evaluation within ninety (90) days following notification by the IEPA. The Permittee shall implement the plan within ninety (90) days or other such date as contained in a notification letter received from the IEPA.

   The IEPA may modify this Permit during its term to incorporate additional requirements or limitations based on the results of the biomonitoring. In addition, after review of the monitoring results, the IEPA may modify this Permit to include numerical limitations for specific toxic pollutants. Modifications under this condition shall follow public notice and opportunity for hearing.

SPECIAL CONDITION 12. For the duration of this Permit, the Permittee shall determine the quantity of sludge produced by the treatment facility in dry tons or gallons with average percent total solids analysis. The Permittee shall maintain adequate records of the quantities of sludge produced and have said records available for Agency inspection. The permittee shall submit to the IEPA, at a minimum, a semi-annual summary report of the quantities of sludge generated and disposed of, in units of dry tons or gallons (average total percent solids) by different disposal methods including but not limited to application on farmland, application on reclamation land, landfilling, public distribution, dedicated land disposal, sod farms, storage lagoons or any other specified disposal method. Said reports shall be submitted to the IEPA by January 31 and July 31 of each year reporting the preceding January thru June and July thru December interval of sludge disposal operations.

Duty to Mitigate. The Permittee shall take all reasonable steps to minimize any sludge use or disposal in violation of this Permit.

Sludge monitoring must be conducted according to test procedures approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, unless other test procedures have been specified in this Permit.

Planned Changes. The Permittee shall give notice to the IEPA on the semi-annual report of any changes in sludge use and disposal.

The Permittee shall retain records of all sludge monitoring, and reports required by the Sludge Permit as referenced in Standard Condition 23 for a period of at least five (5) years from the date of this Permit.

If the Permittee monitors any pollutant more frequently than required by the Sludge Permit, the results of this monitoring shall be included in the reporting of data submitted to the IEPA.

Special Conditions

Monitoring reports for sludge shall be reported on the form titled "Sludge Management Reports" to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance Section
Mail Code #19
1021 N. Grand Ave. E.
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 13. The Permittee shall record monitoring results on Discharge Monitoring Report (DMR) Forms using one such form for each outfall each month.

In the event that an outfall does not discharge during a monthly reporting period, the DMR Form shall be submitted with no discharge indicated.

The Permittee may choose to submit electronic DMRs (eDMRs) instead of mailing paper DMRs to the IEPA. More information, including registration information for the eDMR program, can be obtained on the IEPA website, http://www.epa.state.il.us/water/edmr/index.html.

The completed Discharge Monitoring Report forms shall be submitted to IEPA no later than the 25th day of the following month, unless otherwise specified by the permitting authority.

Permittees not using eDMRs shall mail Discharge Monitoring Reports with an original signature to the IEPA at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 N. Grand Ave. E.
Post Office Box 19276
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section, Mail Code #19

SPECIAL CONDITION 14. The permittees shall notify the Agency in writing once each treatment plant expansion has been completed. A letter stating the date that the expansion was completed should be sent to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section

SPECIAL CONDITION 15. The Permittee may collect data in support of developing a site-specific metals translator for copper. Total and dissolved metals for a minimum of twelve weekly samples need to be collected from the effluent and at a downstream location indicative of complete mixing between the effluent and the receiving water to determine a metal translator for these parameters. The IEPA will review submitted sample data and may reopen and modify this Permit to eliminate or include revised effluent limitations for these parameters based on the metal translator determined from the collected data.

SPECIAL CONDITION 16. The Permittee shall land apply 34% of the total flow that would have otherwise been discharged through Outfall 001 during the period of the months of April through October. In November of each year, the Permittee shall report the quantities discharged during the months of April through October and the amount diverted on the Discharge Monitoring Reports in accordance with Special Condition 13. The permittee shall obtain a state operating permit for the land application of wastewater effluent and shall be subject to the applicable requirements of 35 Illinois Administrative Code part 372 and said permit issued by this Agency.

Special Conditions

SPECIAL CONDITION 17. The Permittee shall conduct biosurveys in the receiving stream that repeat the investigations contained in a study report entitled Biological Assessment of South Branch Kishwaukee River (East) McHenry County, Illinois. November 2005. Huff & Huff, Inc. Added to the mussel and macroinvertebrate sampling will be fish surveys conducted at each of the sampling stations utilized in the above study using methods identical to those explained in another study report entitled Biological Assessment of the South Branch Kishwaukee River. July 2002. Huff & Huff, Inc. Water quality data consisting of temperature, pH, dissolved oxygen, conductivity, BOD_5, total phosphorus and ammonia nitrogen must be collected on each day that biological sampling occurs. Two such studies are required. The first study must take place during the first complete July through October period following completion of the 2.6 MGD plant. The second study must take place during the first complete July through October period following the completion of the 4.9 MGD plant. Reports for each biosurvey must be submitted to the Agency by the end of the calendar year in which they were conducted.

SPECIAL CONDITION 18.

Schedule for Implementing the POTW Pretreatment Program

Under the authority of Sections 307(b) and 402(b)(8) of the Clean Water Act, and implementing regulations 40 CFR 403, the Permittee may be required to develop a Pretreatment Program. If it is necessary to develop a Pretreatment Program, the Permittee will be notified in writing by the Approval Authority after submittal of the industrial inventory discussed in the schedule below. This program, if required, shall enable the Permittee to detect and enforce against violations of Pretreatment Standards promulgated under Sections 307(b) and 307(c) of the Clean Water Act, prohibitive discharge standards as set forth in 40 CFR § 403.5, and state and local limits.

The Permittee should submit a copy of each activity to the IEPA and to USEPA, Region 5.

The schedule for the development of this Pretreatment Program is as follows:

ITEM	COMPLETION DATE
1. Develop an industrial user inventory pursuant to 40 CFR § 403.8(f)(2)(i-iii), including identification of industrial users and the character and volume of pollutants contributed to the publicly owned treatment works (POTW) by the industrial users. The inventory shall include a list of all industrial users (Ius) discharging to the Permittee that are subject to categorical pretreatment standards under 40 CFR § 403.6 and 40 CFR Chapter I, Subchapter N, or would otherwise be considered significant under 40 CFR § 403.3(t).	9 months from the effective date of this Permit
2. Submit a proposed Pretreatment Program consistent with 40 CFR §§ 403.8 and 403.9(f). The proposed Pretreatment Program shall contain the following elements: a. A statement from an official representative of the Permittee or their legal counsel regarding the adequacy of the Permittee's legal authority; b. A sewer use ordinance or other authorities to be relied upon by the POTW for administration of the Pretreatment Program; c. An Enforcement Response Plan (with monitoring and inspection program procedures); d. Local limitations developed pursuant to 40 CFR 403.5(c) and USEPA guidance; e. A description of the Permittee's organization which will administer the Pretreatment Program; and f. A description of funding and resources available to implement the Pretreatment Program.	24 months from the date of notification by the Approval Authority that development of a Pretreatment Program is necessary

Special Conditions

Upon approval by the Regional Administrator or the Director, when appropriate, of the Pretreatment Program, this Permit will be modified or, alternatively, upon request, revoked and reissued to incorporate the conditions of that Pretreatment Program.

This Permit may be modified to eliminate the requirement to develop a Pretreatment Program should further developments during the preparation of the program warrant its discontinuance.

All items in the schedule shall be sent to IEPA and USEPA at the following addresses:

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section

United States Environmental Protection Agency
Region 5
NPDES Support and Technical Assistance Branch
77 West Jackson Boulevard
Chicago, Illinois 60604-3950

Attention: Pretreatment Coordinator WN-16J

Removal Allowances

Any application for authority to revise categorical pretreatment standards to reflect POTW removal of pollutants must be submitted to the Approval Authority in accordance with 40 CFR § 403.7(c).

SPECIAL CONDITION 19. A barium limit of 2.0 mg/L (Monthly Average) and 4.0 mg/L (Daily Maximum) shall become effective three (3) years from the effective date of this Permit.

In order for the Permittee to achieve the above limit, it will be necessary to modify existing treatment facilities to include barium removal, reduce barium sources, or explore other ways to prevent discharges that exceed the above limit in accordance with the following schedule:

1.	Interim Report on barium reductions to date and what measures are necessary to comply with Final Barium Effluent Limitations	6 months from effective date of permit
2.	Preliminary Report on construction of barium reduction facilities	12 months from effective date of permit
3.	Plans and Specifications submitted to IEPA	18 months from effective date of permit
4.	Commence Construction	24 months from effective date of permit
5.	Progress Report	30 months from effective date of permit
6.	Obtain Operational Compliance	36 months from effective date of permit

Compliance dates set out in this Permit may be superseded or supplemented by compliance dates in judicial orders, Illinois Pollution Control Board orders. This Permit may be modified with Public Notice, to include such revised compliance dates.

REPORTING

The Permittee shall submit progress reports for items 1, 2,4, 5 and 6 of the compliance schedule indicating: a) the date the item was completed, or b) that the item was not completed, the reasons for non-completion and the anticipated completion date to the Agency Compliance Section.

SPECIAL CONDITION 20. The Permittee shall operate the facilities designed for biological nutrient removal (BNR). Monitoring for Total Nitrogen is required to document the actual total nitrogen effluent concentration. The Permittee shall monitor the effluent for total nitrogen 3 day per week. The monitoring shall be a composite sample and the results reported as a daily maximum on the Permittee's Discharge Monitoring Forms.

ATTACHMENT H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act, Ch. 111 1/2 Ill. Rev. Stat., Sec. 1001-1052 as Amended.

Agency means the Illinois Environmental Protection Agency.

Board means the Illinois Pollution Control Board.

Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) means Pub. L. 92-500, as amended. 33 U.S.C. 1251 et seq.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318 and 405 of the Clean Water Act.

USEPA means the United States Environmental Protection Agency.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Discharge Limitation (7 day average) means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

24 Hour Composite Sample means a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

8 Hour Composite Sample means a combination of at least 3 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over an 8-hour period.

Flow Proportional Composite Sample means a combination of sample aliquots of at least 100 milliliters collected at periodic intervals such that either the time interval between each aliquot or the volume of each aliquot is proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot.

(1) **Duty to comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(2) **Duty to reapply.** If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper application as required by the Agency no later than 180 days prior to the expiration date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.

(3) **Need to halt or reduce activity not a defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(4) **Duty to mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(5) **Proper operation and maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up, or auxiliary facilities, or similar systems only when necessary to achieve compliance with the conditions of the permit.

(6) **Permit actions.** This permit may be modified, revoked and reissued, or terminated for cause by the Agency pursuant to 40 CFR 122.62. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(7) **Property rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

(8) **Duty to provide information.** The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency, upon request, copies of records required to be kept by this permit.

(9) **Inspection and entry.** The permittee shall allow an authorized representative of the Agency, upon the presentation of credentials and other documents as may be required by law, to:

- (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- (d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any location.

(10) **Monitoring and records.**

- (a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
- (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of this permit, measurement, report or application. This period may be extended by request of the Agency at any time.
- (c) Records of monitoring information shall include:
  - (1) The date, exact place, and time of sampling or measurements;
  - (2) The individual(s) who performed the sampling or measurements;
  - (3) The date(s) analyses were performed;
  - (4) The individual(s) who performed the analyses;
  - (5) The analytical techniques or methods used; and
  - (6) The results of such analyses.
- (d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test method for approval. The ~~permittee shall calibrate and perform~~ maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.

(11) **Signatory requirement.** All applications, reports or information submitted to the Agency shall be signed and certified.

- (a) **Application.** All permit applications shall be signed as follows:
  - (1) **For a corporation:** by a principal executive officer of at least the level of vice president or a person or position having overall responsibility for environmental matters for the corporation;
  - (2) **For a partnership or sole proprietorship:** by a general partner or the proprietor, respectively; or
  - (3) **For a municipality, State, Federal, or other public agency:** by either a principal executive officer or ranking elected official.
- (b) **Reports.** All reports required by permits, or other information requested by the Agency shall be signed by a person described in paragraph (a) or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - (1) The authorization is made in writing by a person described in paragraph (a); and
  - (2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge originates, such as a plant manager, superintendent or person of equivalent responsibility; and
  - (3) The written authorization is submitted to the Agency.

Appendix C

East WWTF Effluent Water Quality Summary (2009 – 2013)

East Wastewater Treatment Facility Analysis
WWTF Characterization for 5-Day BOD (2009-2013)

Village of Huntley, Illinois

Month - Year	Existing WWTF eDMR Values										
	Measured Flow				Influent BOD (5-Day)		Effluent BOD (5-Day)				Removal %
	Influent		Effluent		Loading	Concentration	Loading		Concentration		Loading
	Avg (MGD)	Max (MGD)	Avg (MGD)	Max (MGD)	Average (lbs/day)	Average (mg/L)	Average (lbs/day)	Maximum (lbs/day)	Average (mg/L)	Maximum (mg/L)	Average (lbs/day)
Permit Requirement	**1.8**	**N/A**	**1.8**	**N/A**	**N/A**	**N/A**	**Mo. Avg. = 375**	**Daily Max. = 751**	**Mo. Avg. = 10**	**Daily Max. = 20**	**N/A**
Jan-09	0.956	1.132	0.885	1.141	2893	304	33.2	53.2	4.5	7.9	98.9%
Feb-09	1.1	1.4	1.062	1.695	4538	321	63.0	109.0	7.1	8.1	98.6%
Mar-09	--	--	--	--	--	--	--	--	--	--	--
Apr-09	1.34	1.754	1.21	1.664	4094	295	40.3	96.0	4.0	7.8	99.0%
May-09	0.99	1.399	0.971	1.377	3284	286	33.2	60.0	4.1	6.7	99.0%
Jun-09	1.052	1.241	1.101	2.435	5158	254	36.0	56.0	3.9	7.3	99.3%
Jul-09	0.846	1.15	0.792	1.051	3015	344	31.0	56.5	4.7	8.2	99.0%
Aug-09	1.097	1.907	0.83	1.685	4652	331	42.0	60.0	6.0	9.6	99.1%
Sep-09	1.048	1.219	0.739	1.012	3022	358	31.0	42.3	5.0	9.2	99.0%
Oct-09	1.151	1.678	0.868	1.395	4247	365	24.6	41.5	3.4	6.3	99.4%
Nov-09	1.052	1.376	0.787	1.125	3396	362	21.0	54.0	3.2	8.2	99.4%
Dec-09	1.616	2.156	1.616	3.234	9224	342	50.0	79.0	3.7	6.8	99.5%
Jan-10	1.154	2.177	1.154	2.177	6663	367	44.2	55.2	3.6	4.8	99.3%
Feb-10	1.045	1.242	0.998	1.351	3155	280	23.3	27.7	2.8	3.4	99.3%
Mar-10	1.161	1.632	1.187	1.753	3962	271	33.0	35.6	3.3	4.2	99.2%
Apr-10	1.035	1.239	1.065	1.245	3624	349	32.0	43.5	3.6	5.4	99.1%
May-10	1.275	3.369	1.298	3.215	9706	362	64.0	136.0	5.9	13.8	99.3%
Jun-10	1.104	--	1.171	--	--	377	56.6	129.2	5.8	12.2	--
Jul-10	1.157	--	1.204	--	--	507	43.1	51.0	4.3	6.0	--
Aug-10	1.136	1.389	1.18	1.403	4610	394	39.3	67.5	4.0	7.1	99.1%
Sep-10	0.963	1.167	0.996	1.368	4860	426	29.1	69.5	3.5	6.1	99.4%
Oct-10	0.931	1.141	0.934	1.064	4251	479	24.1	37.0	3.1	4.5	99.4%
Nov-10	0.964	1.136	0.912	1.074	4496	502	31.9	57.5	4.2	7.7	99.3%
Dec-10	0.974	1.141	0.922	1.185	5228	529	29.9	45.0	3.9	5.3	99.4%
Jan-11	0.955	1.023	0.928	1.083	4615	511	32.5	57.4	4.2	7.2	99.3%
Feb-11	1.13	1.628	1.12	1.714	6804	476	40.1	47.4	4.3	6.2	99.4%
Mar-11	1.283	1.619	1.274	1.679	6329	452	39.3	57.2	3.7	4.9	99.4%
Apr-11	1.263	1.779	1.313	1.885	5785	368	42.7	74.6	3.9	7.8	99.3%
May-11	1.128	1.598	1.195	1.742	5957	410	35.8	53.6	3.6	6.5	99.4%
Jun-11	1.163	1.713	1.184	1.743	3591	247	31.5	65.4	3.2	4.5	99.1%
Jul-11	1.186	1.72	1.114	1.794	5416	362	26.0	27.3	2.8	3.3	99.5%
Aug-11	1.164	1.534	1.039	1.532	4510	353	28.1	50.0	3.3	5.5	99.4%
Sep-11	1.03	1.645	0.916	1.598	4851	364	18.3	35.6	2.4	4.3	99.6%
Oct-11	0.956	1.252	0.867	1.154	3436	357	28.2	53.5	3.9	7.2	99.2%
Nov-11	1.067	1.572	0.987	1.589	4294	324	31.2	49.9	3.8	7.1	99.3%
Dec-11	1.119	1.483	1.022	1.46	4396	361	30.6	54.5	3.6	6.7	99.3%
Jan-12	--	--	--	--	--	--	--	--	--	--	--
Feb-12	1.063	1.424	--	--	--	354	--	--	--	--	--
Mar-12	1.094	1.248	1.012	1.225	3811	373	26.1	49.9	3.1	6.3	99.3%
Apr-12	1.005	1.268	0.906	1.246	4624	445	23.4	39.7	3.1	4.4	99.5%
May-12	0.995	1.207	0.914	1.194	3525	354	25.1	46.4	3.3	7.0	99.3%
Jun-12	0.933	1.051	0.857	1.027	3589	419	24.3	51.6	3.4	6.7	99.3%
Jul-12	0.903	1.004	1.012	1.104	6077	660	27.0	69.2	3.2	7.6	99.6%
Aug-12	0.863	1.001	0.77	0.892	2797	376	19.2	40.6	3.0	6.2	99.3%
Sep-12	0.844	0.967	0.752	0.88	2972	405	22.5	41.5	3.6	7.2	99.2%
Oct-12*	0.85	0.987	0.612	0.922	2976	387	27.6	54.8	4.3	10.0	99.1%
Nov-12	0.851	0.985	0.74	0.88	3802	518	19.7	28.2	3.2	4.0	99.5%
Dec-12	0.873	1.109	0.774	1.111	5013	541	17.4	22.0	2.7	3.2	99.7%
Jan-13	0.966	1.563	0.838	1.493	5354	430	22.3	48.5	3.2	3.9	99.6%
Feb-13	1.023	1.46	0.928	1.416	5373	455	25.5	39.1	3.3	5.0	99.5%
Mar-13	1.095	1.709	0.977	1.707	6136	431	28.5	30.0	3.5	4.4	99.5%
Apr-13	1.463	4.562	1.345	4.107	17708	517	51.5	80.6	4.6	7.7	99.7%
May-13	1.16	1.418	0.995	1.311	4089	374	34.8	45.8	4.2	5.8	99.1%
Jun-13	1.164	2.184	1.016	2.132	6383	359	27.1	37.3	3.2	4.4	99.6%
Jul-13	1.09	1.53	0.91	1.1	3715	405	22.7	41.2	3.0	4.9	99.4%
Aug-13	1.035	1.13	0.831	0.993	3031	366	18.3	36.1	2.6	4.8	99.4%
Sep-13	0.986	1.16	0.816	0.97	2791	345	21.1	28.4	3.1	4.0	99.2%
Oct-13	0.982	1.11	0.791	0.9	2770	369	21.0	47.0	3.2	6.4	99.2%
Nov-13	1.077	1.45	0.918	1.4	3585	307	24.0	33.5	3.1	4.2	99.3%
Dec-13	0.975	1.31	0.833	1.19	3662	369	21.5	28.8	3.1	4.0	99.4%
Average	1.067	1.490	0.989	1.488	4761	389	31.4	53.1	3.7	6.3	99.3%
Maximum	1.616	4.562	1.616	4.107	17708	660	64.0	136.0	7.1	13.8	99.7%
Minimum	0.844	0.967	0.612	0.880	2770	247	17.4	22.0	2.4	3.2	98.6%

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* The Effluent Avg. Flow for Oct-12 was reported as 0.0612 MGD on the DMR. It was assumed that this was a decimal error and the actual average flow was 0.612 MGD.

-- Represents non reported or inconsistent value on eDMR.

Red highlighted cells represent effluent violation.

East Wastewater Treatment Facility Analysis
WWTF Characterization for TSS (2009-2013)

Village of Huntley, Illinois

	Existing WWTF eDMR Values								
	Measured Flow		Influent TSS		Effluent TSS				Removal %
	Influent	Effluent	Loading	Concentration	Loading		Concentration		Loading
Month - Year	Average (MGD)	Average (MGD)	Average (lbs/day)	Average (mg/L)	Average (lbs/day)	Maximum (lbs/day)	Average (mg/L)	Maximum (mg/L)	Average (lbs/day)
Permit Requirement	1.8	1.8	N/A	N/A	Mo. Avg. = 450	Daily Max. = 901	Mo. Avg. = 12	Daily Max. = 24	N/A
Jan-09	0.956	0.885	2362	320	15.5	34.7	2.1	5.0	99.3%
Feb-09	1.1	1.062	2471	279	16.8	59.0	1.9	5.0	99.3%
Mar-09	--	--	--	--	--	--	--	--	--
Apr-09	1.34	1.21	2402	238	19.2	46.0	1.9	5.0	99.2%
May-09	0.99	0.971	2551	315	22.7	55.0	2.8	7.0	99.1%
Jun-09	1.052	1.101	3287	358	17.0	47.0	1.8	5.5	99.5%
Jul-09	0.846	0.792	3071	465	25.1	53.3	3.8	8.0	99.2%
Aug-09	1.097	0.83	2097	303	15.0	26.0	2.1	4.5	99.3%
Sep-09	1.048	0.739	1867	303	12.3	27.4	2.0	4.0	99.3%
Oct-09	1.151	0.868	2302	318	8.7	11.7	1.2	2.0	99.6%
Nov-09	1.052	0.787	1602	244	9.2	26.2	1.4	4.0	99.4%
Dec-09	1.616	1.616	3639	270	22.0	31.2	1.6	2.5	99.4%
Jan-10	1.154	1.154	2319	241	12.3	43.4	1.0	3.5	99.5%
Feb-10	1.045	0.998	2913	350	10.0	20.2	1.2	2.5	99.7%
Mar-10	1.161	1.187	3396	343	25.0	40.0	2.5	5.0	99.3%
Apr-10	1.035	1.065	2780	313	19.0	43.1	2.1	5.0	99.3%
May-10	1.275	1.298	3096	286	37.0	78.2	3.4	9.0	98.8%
Jun-10	1.104	1.171	3369	345	21.0	58.0	2.1	5.0	99.4%
Jul-10	1.157	1.204	3424	341	22.1	39.0	2.2	5.0	99.4%
Aug-10	1.136	1.18	4114	418	18.0	48.0	1.8	5.0	99.6%
Sep-10	0.963	0.996	3265	393	15.0	33.4	1.8	4.5	99.5%
Oct-10	0.931	0.934	3295	423	17.9	46.2	2.3	7.0	99.5%
Nov-10	0.964	0.912	--	--	25.1	85.7	3.3	11.0	--
Dec-10	0.974	0.922	2076	270	17.3	55.1	2.3	7.5	99.2%
Jan-11	0.955	0.928	2190	283	18.5	41.0	2.4	5.5	99.2%
Feb-11	1.13	1.12	3204	343	41.0	78.4	4.4	8.5	98.7%
Mar-11	1.283	1.274	3156	297	39.3	80.5	3.7	7.5	98.8%
Apr-11	1.263	1.313	4249	388	30.6	53.3	2.8	6.0	99.3%
May-11	1.128	1.195	4575	459	45.8	85.3	4.6	8.0	99.0%
Jun-11	1.163	1.184	3367	341	4.9	63.0	0.5	6.5	99.9%
Jul-11	1.186	1.114	3252	350	24.1	41.3	2.6	5.0	99.3%
Aug-11	1.164	1.039	--	--	19.0	35.1	2.2	5.0	--
Sep-11	1.03	0.916	2552	334	35.9	60.7	4.7	8.0	98.6%
Oct-11	0.956	0.867	2213	306	44.1	70.5	6.1	9.0	98.0%
Nov-11	1.067	0.987	--	--	37.8	125.8	4.6	9.5	--
Dec-11	1.119	1.022	3009	353	41.7	66.2	4.9	8.5	98.6%
Jan-12	--	--	--	--	--	--	--	--	--
Feb-12	1.063	--	--	473	35.0	48.1	4.5	6.5	--
Mar-12	1.094	1.012	4591	544	44.7	81.4	5.3	9.5	99.0%
Apr-12	1.005	0.906	3174	420	38.5	62.5	5.1	8.5	98.8%
May-12	0.995	0.914	3072	403	30.4	54.0	4.0	7.5	99.0%
Jun-12	0.933	0.857	3023	423	35.7	46.4	5.0	7.5	98.8%
Jul-12	0.903	1.012	3705	439	26.6	50.0	3.1	5.5	99.3%
Aug-12	0.863	0.77	2999	467	28.8	34.9	4.5	6.5	99.0%
Sep-12	0.844	0.752	3236	516	21.3	39.5	3.4	6.0	99.3%
Oct-12	0.85	0.612	1669	327	39.7	64.8	5.6	9.5	97.6%
Nov-12	0.851	0.74	2129	345	30.2	51.6	4.9	8.0	98.6%
Dec-12	0.873	0.774	10070	1560	32.2	53.0	5.0	8.5	99.7%
Jan-13	0.966	0.838	4096	586	25.1	59.5	3.6	7.5	99.4%
Feb-13	1.023	0.928	3599	465	38.6	89.9	5.0	9.0	98.9%
Mar-13	1.095	0.977	4074	500	41.5	67.9	5.1	9.5	99.0%
Apr-13	1.463	1.345	3567	318	65.0	104.7	5.8	10.0	98.2%
May-13	1.16	0.995	3170	382	49.7	105.1	6.0	12.5	98.4%
Jun-13	1.164	1.016	4050	478	27.5	50.4	3.3	6.5	99.3%
Jul-13	1.09	0.91	4379	577	27.3	46.9	3.6	7.5	99.4%
Aug-13	1.035	0.831	2966	428	27.7	41.0	4.0	7.5	99.1%
Sep-13	0.986	0.816	2709	398	27.0	64.7	4.0	8.0	99.0%
Oct-13	0.982	0.791	2889	438	29.4	58.7	4.5	8.0	99.0%
Nov-13	1.077	0.918	3070	401	29.1	55.0	3.8	7.5	99.1%
Dec-13	0.975	0.833	3550	511	28.5	32.1	4.1	7.0	99.2%
Average	1.067	0.989	3208	400	27.3	54.7	3.4	6.8	99.1%
Maximum	1.616	1.616	10070	1560	65.0	125.8	6.1	12.5	99.9%
Minimum	0.844	0.612	1602	238	4.9	11.7	0.5	2.0	97.6%

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-- Represents non reported or inconsistent value on eDMR.

East Wastewater Treatment Facility Analysis
WWTF Characterization for NH_3-N (2009-2013)
Village of Huntley, Illinois

	Existing WWTF eDMR Values													
	Measured Flow		Effluent NH_3-N											
	Influent	Effluent	Loading						Concentration					
Month - Year	Average (MGD)	Average (MGD)	Average (lbs/day)		Maximum (lbs/day)		Weekly Avg. (lbs/day)		Average (mg/L)		Maximum (mg/L)		Weekly Avg. (mg/L)	
Permit Requirement	1.8	1.8	Monthly	Permit Limit Varies	Daily	Permit Limit Varies	Weekly	Permit Limit Varies	Monthly	Permit Limit Varies	Daily	Permit Limit Varies	Weekly	Permit Limit Varies
Jan-09	0.956	0.885	0.59	53.0	0.74	188.0			0.08	1.4	0.10	5.0		
Feb-09	1.1	1.062	0.62	53.0	0.93	188.0			0.07	1.4	0.10	5.0		
Mar-09	--	--	--	53.0	--	188.0	--	--	--	1.4	--	5.0	--	--
Apr-09	1.34	1.21	0.53	41.0	0.71	184.0	0.81	169.0	0.07	1.1	0.07	4.9	0.07	4.5
May-09	0.99	0.971	0.52	41.0	0.56	184.0	0.58	169.0	0.07	1.1	0.07	4.9	0.07	4.5
Jun-09	1.052	1.101	0.60	41.0	0.64	184.0	0.55	124.0	0.07	1.1	0.08	4.9	0.07	3.3
Jul-09	0.846	0.792	0.52	41.0	0.82	184.0	0.53	124.0	0.08	1.1	0.13	4.9	0.08	3.3
Aug-09	1.097	0.83	0.45	41.0	0.48	184.0	0.47	124.0	0.07	1.1	0.08	4.9	0.07	3.3
Sep-09	1.048	0.739	0.43	41.0	0.51	184.0	0.42	169.0	0.07	1.1	0.07	4.9	0.07	4.5
Oct-09	1.151	0.868	0.38	41.0	0.50	184.0	0.46	169.0	0.07	1.1	0.07	4.9	0.07	4.5
Nov-09	1.052	0.787	0.43	53.0	0.46	188.0			0.07	1.4	0.07	5.0		
Dec-09	1.616	1.616	0.90	53.0	1.10	188.0			0.07	1.4	0.07	5.0		
Jan-10	1.154	1.154	0.85	53.0	0.86	188.0			0.07	1.4	0.07	5.0		
Feb-10	1.045	0.998	2.50	53.0	23.20	188.0			0.30	1.4	2.50	5.0		
Mar-10	1.161	1.187	0.98	53.0	8.30	188.0	3.21	169.0	0.10	1.4	0.70	5.0	0.30	4.5
Apr-10	1.035	1.065	0.71	41.0	0.80	184.0	0.58	169.0	0.08	1.1	0.10	4.9	0.07	4.5
May-10	1.275	1.298	11.00	41.0	35.40	184.0	10.70	169.0	1.00	1.1	3.60	4.9	1.00	4.5
Jun-10	1.104	1.171	4.90	41.0	23.40	184.0	4.80	124.0	0.50	1.1	2.50	4.9	0.50	3.3
Jul-10	1.157	1.204	1.00	41.0	2.50	184.0	4.00	124.0	0.10	1.1	0.30	4.9	0.40	3.3
Aug-10	1.136	1.18	1.90	41.0	8.40	184.0	4.20	124.0	0.20	1.1	0.90	4.9	0.40	3.3
Sep-10	0.963	0.996	0.83	41.0	2.60	184.0	1.60	169.0	0.10	1.1	0.30	4.9	0.17	4.5
Oct-10	0.931	0.934	0.70	41.0	0.86	184.0	3.20	169.0	0.09	1.1	0.10	4.9	0.40	4.5
Nov-10	0.964	0.912	0.52	53.0	0.53	188.0			0.07	1.4	0.07	5.0		
Dec-10	0.974	0.922	0.76	53.0	11.60	188.0			0.10	1.4	1.40	5.0		
Jan-11	0.955	0.928	0.54	53.0	0.69	188.0			0.07	1.4	0.10	5.0		
Feb-11	1.13	1.12	0.90	53.0	3.80	188.0			0.10	1.4	0.50	5.0		
Mar-11	1.283	1.274	0.74	53.0	0.75	188.0	0.07	169.0	0.07	1.4	0.07	5.0	0.07	4.5
Apr-11	1.263	1.313	3.20	41.0	23.60	184.0	3.20	169.0	0.30	1.1	1.70	4.9	0.30	4.5
May-11	1.128	1.195	2.90	41.0	10.10	184.0	6.20	169.0	0.30	1.1	1.10	4.9	0.70	4.5
Jun-11	1.163	1.184	0.69	41.0	1.00	184.0	0.80	124.0	0.07	1.1	0.10	4.9	0.09	3.3
Jul-11	1.186	1.114	2.70	41.0	13.90	184.0	2.50	124.0	0.30	1.1	1.00	4.9	0.38	3.3
Aug-11	1.164	1.039	0.60	41.0	9.20	184.0	3.40	124.0	0.07	1.1	1.00	4.9	0.39	3.3
Sep-11	1.03	0.916	2.20	41.0	22.60	184.0	13.40	169.0	0.30	1.1	1.70	4.9	2.00	4.5
Oct-11	0.956	0.867	5.00	41.0	19.60	184.0	11.00	169.0	0.70	1.1	2.80	4.9	1.50	4.5
Nov-11	1.067	0.987	4.10	53.0	17.50	188.0			0.50	1.4	2.50	5.0		
Dec-11	1.119	1.022	0.80	53.0	1.80	188.0			0.10	1.4	0.20	5.0		
Jan-12	--	--	--	53.0	--	188.0			--	1.4	--	5.0		
Feb-12	1.063	--	0.62	53.0	0.75	188.0			--	1.4	--	5.0		
Mar-12	1.094	1.012	0.59	53.0	0.90	188.0	0.80	169.0	0.07	1.4	0.10	5.0	0.09	4.5
Apr-12	1.005	0.906	0.60	41.0	0.90	184.0	0.63	169.0	0.08	1.1	0.10	4.9	0.08	4.5
May-12	0.995	0.914	1.50	41.0	6.00	184.0	4.50	169.0	0.20	1.1	0.80	4.9	0.60	4.5
Jun-12	0.933	0.857	1.40	41.0	5.60	184.0	2.80	124.0	0.20	1.1	0.80	4.9	0.40	3.3
Jul-12	0.903	1.012	0.60	65.0	0.80	276.0	0.70	190.0	0.07	1.2	0.10	5.1	0.08	3.5
Aug-12	0.863	0.77	1.90	41.0	14.00	184.0	6.70	124.0	0.30	1.1	2.50	4.9	1.10	3.3
Sep-12	0.844	0.752	1.30	41.0	6.20	184.0	4.20	169.0	0.20	1.1	1.30	4.9	0.70	4.5
Oct-12	0.85	0.612	6.40	41.0	47.70	184.0	78.70	169.0	1.10	1.1	7.60	4.9	4.00	4.5
Nov-12	0.851	0.74	0.60	53.0	3.90	188.0			0.10	1.4	0.70	5.0		
Dec-12	0.873	0.774	0.58	53.0	1.20	188.0			0.09	1.4	0.20	5.0		
Jan-13	0.966	0.838	0.62	53.0	0.79	188.0			0.09	1.4	0.10	5.0		
Feb-13	1.023	0.928	0.50	53.0	4.50	188.0			0.07	1.4	0.70	5.0		
Mar-13	1.095	0.977	0.57	53.0	0.74	188.0	0.60	169.0	0.07	1.4	0.10	5.0	0.09	4.5
Apr-13	1.463	1.345	1.10	41.0	4.60	184.0	2.00	169.0	0.10	1.1	0.70	4.9	0.29	4.5
May-13	1.16	0.995	0.80	41.0	4.80	184.0	2.50	169.0	0.10	1.1	0.60	4.9	0.30	4.5
Jun-13	1.164	1.016	4.20	41.0	21.20	184.0	10.80	124.0	0.50	1.1	2.50	4.9	1.00	3.3
Jul-13	1.09	0.91	0.70	41.0	2.30	184.0	0.60	124.0	0.10	1.1	0.30	4.9	0.09	3.3
Aug-13	1.035	0.831	1.75	41.0	5.94	184.0	2.99	124.0	0.25	1.1	0.90	4.9	0.23	3.3
Sep-13	0.986	0.816	1.00	41.0	2.48	184.0	1.31	169.0	0.15	1.1	0.38	4.9	0.15	4.5
Oct-13	0.982	0.791	0.92	41.0	5.00	184.0	1.70	169.0	0.10	1.1	0.70	4.9	0.24	4.5
Nov-13	1.077	0.918	0.57	53.0	1.01	188.0			0.07	1.4	0.13	5.0		
Dec-13	0.975	0.833	0.52	53.0	0.62	188.0			0.07	1.4	0.11	5.0		
Average	1.067	0.989	1.488		6.765		5.082		0.184		0.836		0.477	
Maximum	1.616	1.616	11.000		47.700		78.700		1.100		7.600		4.000	
Minimum	0.844	0.612	0.380		0.460		0.070		0.070		0.070		0.070	

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-- Represents non reported or inconsistent value on eDMR.

Red highlighted cells represent effluent violation.

East Wastewater Treatment Facility Analysis
WWTF Characterization for Barium (2009-2013)
Village of Huntley, Illinois

Month - Year	Existing WWTF eDMR Values					
	Measured Flow		Effluent Barium			
	Influent	Effluent	Loading		Concentration	
	Average (MGD)	Average (MGD)	Average (lbs/day)	Maximum (lbs/day)	Average (mg/L)	Maximum (mg/L)
Permit Requirement	**1.8**	**1.8**	**Mo. Avg. = 75**	**Daily Max. = 150**	**Mo. Avg. = 2**	**Daily Max. = 4**
Jan-09	0.956	0.885	--	--	--	--
Feb-09	1.1	1.062	--	--	--	--
Mar-09	--	--	--	--	--	--
Apr-09	1.34	1.21	13.1	17.0	1.3	1.3
May-09	0.99	0.971	7.9	8.1	1.0	1.0
Jun-09	1.052	1.101	9.9	11.5	1.3	1.3
Jul-09	0.846	0.792	--	--	1.6	1.6
Aug-09	1.097	0.83	12.5	13.0	1.8	1.8
Sep-09	1.048	0.739	9.2	9.8	1.6	1.6
Oct-09	1.151	0.868	11.4	13.0	1.8	1.8
Nov-09	1.052	0.787	7.2	7.2	1.1	1.1
Dec-09	1.616	1.616	15.8	15.8	1.2	1.2
Jan-10	1.154	1.154	14.7	15.9	1.2	1.2
Feb-10	1.045	0.998	10.8	11.5	1.3	1.3
Mar-10	1.161	1.187	14.6	17.8	1.8	1.8
Apr-10	1.035	1.065	12.4	12.6	1.4	1.4
May-10	1.275	1.298	15.1	15.3	1.4	1.4
Jun-10	1.104	1.171	16.7	19.5	2.0	2.0
Jul-10	1.157	1.204	17.1	18.1	1.8	1.8
Aug-10	1.136	1.18	14.5	14.7	1.5	1.5
Sep-10	0.963	0.996	19.9	24.9	2.4	2.4
Oct-10	0.931	0.934	14.6	14.7	1.9	1.9
Nov-10	0.964	0.912	13.6	15.2	1.8	1.8
Dec-10	0.974	0.922	10.7	11.1	1.4	1.4
Jan-11	0.955	0.928	13.1	13.6	1.7	1.7
Feb-11	1.13	1.12	20.5	30.0	2.2	2.2
Mar-11	1.283	1.274	18.0	18.6	1.7	1.7
Apr-11	1.263	1.313	18.6	21.6	1.7	1.7
May-11	1.128	1.195	16.9	17.3	1.7	1.7
Jun-11	1.163	1.184	18.7	19.5	1.9	1.9
Jul-11	1.186	1.114	27.8	28.7	3.0	3.0
Aug-11	1.164	1.039	13.5	16.4	1.9	1.9
Sep-11	1.03	0.916	13.1	15.2	2.0	2.0
Oct-11	0.956	0.867	13.7	14.1	1.9	1.9
Nov-11	1.067	0.987	12.3	13.0	1.5	1.5
Dec-11	1.119	1.022	14.4	17.3	1.7	1.7
Jan-12	--	--	--	--	--	--
Feb-12	1.063	--	--	--	--	--
Mar-12	1.094	1.012	16.0	16.3	1.9	1.9
Apr-12	1.005	0.906	7.5	7.8	1.0	1.0
May-12	0.995	0.914	13.7	15.0	1.8	1.8
Jun-12	0.933	0.857	18.1	20.0	2.8	2.8
Jul-12	0.903	1.012	--	--	--	--
Aug-12	0.863	0.77	20.8	21.9	3.3	3.3
Sep-12	0.844	0.752	16.1	16.3	2.6	2.6
Oct-12	0.85	0.612	--	--	2.4	2.4
Nov-12	0.851	0.74	12.3	12.7	2.0	2.0
Dec-12	0.873	0.774	13.5	19.4	2.1	2.1
Jan-13	0.966	0.838	9.7	10.3	1.4	1.4
Feb-13	1.023	0.928	9.2	9.9	1.2	1.2
Mar-13	1.095	0.977	6.9	8.1	1.0	1.0
Apr-13	1.463	1.345	5.6	9.5	0.9	0.9
May-13	1.16	0.995	11.6	12.1	1.4	1.4
Jun-13	1.164	1.016	14.4	30.2	1.7	1.7
Jul-13	1.09	0.91	13.6	14.1	1.8	1.8
Aug-13	1.035	0.831	--	--	--	--
Sep-13	0.986	0.816	--	--	--	--
Oct-13	0.982	0.791	11.8	12.6	1.8	1.8
Nov-13	1.077	0.918	11.9	13.0	1.7	1.7
Dec-13	0.975	0.833	--	--	--	--
Average	1.067	0.989	13.78	15.53	1.73	1.73
Maximum	1.616	1.616	27.80	30.20	3.30	3.30
Minimum	0.844	0.612	5.60	7.20	0.85	0.85

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-- Represents non reported or inconsistent value on eDMR.

Red highlighted cells represent permit violation.

Appendix D

West WWTF Effluent Water Quality Summary (2009 – 2013)

West Wastewater Treatment Facility Analysis
WWTF Characterization for 5-Day BOD (2009-2013)

Village of Huntley, Illinois

	Existing WWTF eDMR Values										
	Measured Flow				Influent BOD (5-Day)		Effluent BOD (5-Day)				Removal %
	Influent		Effluent		Loading	Concentration	Loading		Concentration		Loading
Month - Year	Avg (MGD)	Max (MGD)	Avg (MGD)	Max (MGD)	Average (lbs/day)	Average (mg/L)	Average (lbs/day)	Maximum (lbs/day)	Average (mg/L)	Maximum (mg/L)	Average (lbs/day)
Permit Requirement	**2.6**	**N/A**	**2.6**	**N/A**	**N/A**	**N/A**	**Mo. Avg. = 542**	**Daily Max. = 1084**	**Mo. Avg. = 10**	**Daily Max. = 20**	**N/A**
Jan-09	1.033	1.212	0.742	1.043	1696	195	14.2	16.8	2.3	3.2	99.2%
Feb-09	1.161	1.875	0.753	1.303	2206	203	24.5	53.5	3.9	7.7	98.9%
Mar-09	--	--	--	--	--	--	--	--	--	--	--
Apr-09	1.141	1.638	0.877	1.332	2699	243	27.1	49.2	3.7	5.5	99.0%
May-09	1.093	1.215	0.881	1.057	1648	187	24.2	38.0	3.3	5.0	98.5%
Jun-09	1.163	1.846	0.898	1.438	2686	224	26.2	70.0	3.5	7.4	99.0%
Jul-09	1.0	1.141	0.801	0.921	1421	185	16.0	30.0	2.4	4.2	98.9%
Aug-09	1.03	1.954	0.875	1.597	3103	233	19.0	26.0	2.6	3.3	99.4%
Sep-09	0.939	1.075	0.794	0.91	2057	271	17.0	28.0	2.5	4.1	99.2%
Oct-09	1.02	1.384	1.02	1.273	2888	272	21.2	26.4	2.9	4.5	99.3%
Nov-09	0.95	1.213	0.827	1.265	2500	237	17.9	26.3	2.6	4.2	99.3%
Dec-09	1.024	1.862	0.893	1.543	3076	239	22.0	43.0	2.9	5.8	99.3%
Jan-10	0.938	1.438	0.92	1.293	2189	203	15.0	23.2	1.9	3.0	99.3%
Feb-10	0.833	0.896	0.858	1.114	2044	220	21.0	56.3	2.9	8.4	99.0%
Mar-10	0.943	1.431	0.90	1.20	2152	215	19.5	38.0	2.6	3.8	99.1%
Apr-10	0.839	0.998	0.839	0.998	2014	242	18.1	19.1	2.6	3.0	99.1%
May-10	1.045	2.181	0.973	2.023	4049	240	2.4	25.1	3.1	4.3	99.9%
Jun-10	1.029	1.326	0.951	1.534	3621	283	28.5	45.7	3.6	6.1	99.2%
Jul-10	1.045	1.698	0.94	1.789	4566	306	22.7	27.3	2.9	4.1	99.5%
Aug-10	1.002	1.193	0.924	1.207	2517	250	20.0	41.0	2.6	4.6	99.2%
Sep-10	0.883	0.978	0.77	1.001	2496	299	16.1	25.0	2.5	3.0	99.4%
Oct-10	0.839	0.924	0.711	0.769	1796	280	15.4	19.3	2.6	3.2	99.1%
Nov-10	0.829	0.929	0.804	2.398	6080	304	17.4	22.4	2.6	3.0	99.7%
Dec-10	0.867	1.091	0.785	0.973	2378	293	20.2	29.6	3.1	4.3	99.2%
Jan-11	0.814	0.931	0.678	0.791	1656	251	14.7	16.5	2.6	2.9	99.1%
Feb-11	0.897	1.525	0.789	1.417	3297	279	18.4	28.2	2.8	3.9	99.4%
Mar-11	0.96	1.246	0.886	1.3	2602	240	20.6	21.3	2.8	3.3	99.2%
Apr-11	1.012	1.35	0.897	1.339	3004	269	25.4	43.3	3.4	5.9	99.2%
May-11	1.019	1.438	0.857	1.184	2370	240	21.4	24.7	3.0	3.7	99.1%
Jun-11	1.035	1.349	0.889	1.199	2480	248	20.7	25.3	2.8	3.1	99.2%
Jul-11	0.983	1.317	1.24	1.655	3879	281	29.9	56.7	2.9	4.7	99.2%
Aug-11	1.017	1.28	1.103	1.637	4546	333	21.1	25.8	2.3	3.0	99.5%
Sep-11*	0.985	1.684	1.03	1.421	2275	192	19.7	18.4	2.3	2.6	99.1%
Oct-11	0.913	1.022	0.985	1.09	2364	260	13.9	20.1	1.7	2.6	99.4%
Nov-11	0.99	1.404	1.057	1.231	2177	212	16.7	33.9	1.9	4.0	99.2%
Dec-11	1.032	1.392	1.032	1.392	2484	214	16.5	18.2	1.8	2.1	99.3%
Jan-12	0.941	1.118	1.027	1.235	2544	247	19.6	21.6	2.3	2.6	99.2%
Feb-12	0.881	1.078	0.995	1.22	3052	300	19.0	22.0	2.3	2.7	99.4%
Mar-12	0.895	1.098	1.012	1.196	2194	220	20.2	23.8	2.4	2.5	99.1%
Apr-12	0.881	1.055	1.006	1.162	2171	224	20.1	24.0	2.4	3.0	99.1%
May-12	0.918	1.05	1.016	1.231	2423	236	21.1	25.0	2.5	2.8	99.1%
Jun-12	0.914	1.014	0.988	1.11	2574	278	21.6	25.1	2.6	3.1	99.2%
Jul-12	0.964	2.763	1.012	1.104	2118	230	27.0	69.2	3.2	7.6	98.7%
Aug-12	0.862	0.941	0.999	1.255	3391	324	21.6	38.0	2.6	4.5	99.4%
Sep-12	0.836	0.961	0.984	1.138	2866	302	22.1	40.9	2.7	4.9	99.2%
Oct-12	0.833	1.032	1.003	1.211	2101	208	22.6	32.3	2.7	3.2	98.9%
Nov-12	0.817	0.943	0.983	1.04	1735	200	20.4	26.3	2.5	3.1	98.8%
Dec-12	0.844	1.398	0.978	1.253	2936	281	19.5	23.2	2.4	2.7	99.3%
Jan-13	--	--	0.982	1.44	--	--	20.4	26.3	2.5	3.5	--
Feb-13	1.029	1.422	--	--	0	234	--	--	--	--	--
Mar-13	0.976	1.869	1.087	1.471	2613	213	29.9	39.6	3.3	4.3	98.9%
Apr-13	1.173	2.551	1.16	2.549	4634	218	26.1	33.5	2.7	4.2	99.4%
May-13	1.023	1.163	1.097	1.267	2737	259	23.7	32.2	2.6	3.5	99.1%
Jun-13	1.055	1.367	1.115	1.335	2561	230	21.3	24.2	2.3	2.8	99.2%
Jul-13	1.041	1.198	1.089	1.206	2454	244	22.7	31.4	2.5	3.6	99.1%
Aug-13	0.94	1.018	1.048	1.17	2576	264	22.4	26.4	2.6	3.1	99.1%
Sep-13	0.915	1.04	1.036	1.148	2221	232	22.1	27.2	2.6	3.0	99.0%
Oct-13	0.897	0.96	1.016	1.106	2490	270	20.6	22.4	2.4	2.7	99.2%
Nov-13	1.005	1.33	1.105	1.386	2485	215	22.7	27.5	2.5	2.8	99.1%
Dec-13	0.985	1.37	1.056	1.407	2593	221	24.6	30.4	2.8	3.5	99.1%
Average	0.964	1.331	0.948	1.298	2629	246	20.6	31.1	2.7	3.9	99.2%
Maximum	1.173	2.763	1.240	2.549	6080	333	29.9	70.0	3.9	8.4	99.9%
Minimum	0.814	0.896	0.678	0.769	0	185	2.4	16.5	1.7	2.1	98.5%

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-- Represents non reported or inconsistent value on eDMR.

* Average Loading for Effluent 5-Day BOD was reported as higher than the Maximum Loading in September 2011.

Red highlighted cells represent effluent violation.

West Wastewater Treatment Facility Analysis
WWTF Characterization for TSS (2009-2013)
Village of Huntley, Illinois

	Existing WWTF eDMR Values								
	Measured Flow		Influent TSS		Effluent TSS				Removal %
	Influent	Effluent	Loading	Concentration	Loading		Concentration		Loading
Month - Year	Average (MGD)	Average (MGD)	Average (lbs/day)	Average (mg/L)	Average (lbs/day)	Maximum (lbs/day)	Average (mg/L)	Maximum (mg/L)	Average (lbs/day)
Permit Requirement	2.6	2.6	N/A	N/A	Mo. Avg. = 320	Daily Max. = 641	Mo. Avg. = 12	Daily Max. = 24	N/A
Jan-09	1.033	0.742	712	115	15.5	47.0	2.5	5.5	97.8%
Feb-09	1.161	0.753	804	128	20.4	59.0	3.3	8.0	97.5%
Mar-09	--	--	--	--	--	--	--	--	--
Apr-09	1.141	0.877	1799	246	23.0	44.4	3.1	7.0	98.7%
May-09	1.093	0.881	1499	204	27.2	75.6	3.7	9.5	98.2%
Jun-09	1.163	0.898	1049	140	34.5	137.0	4.6	14.5	96.7%
Jul-09	1	0.801	1129	169	24.0	57.0	3.6	9.0	97.9%
Aug-09	1.03	0.875	1605	220	23.0	73.0	3.1	10.0	98.6%
Sep-09	0.939	0.794	2351	355	19.0	28.2	2.8	4.0	99.2%
Oct-09	1.02	1.02	1906	224	13.1	23.5	1.8	3.5	99.3%
Nov-09	0.95	0.827	1552	225	16.5	42.2	2.4	6.0	98.9%
Dec-09	1.024	0.893	1504	202	16.4	31.0	2.2	5.0	98.9%
Jan-10	0.938	0.92	1588	207	11.0	15.2	1.4	2.0	99.3%
Feb-10	0.833	0.858	1503	210	20.0	49.2	2.8	7.0	98.7%
Mar-10	0.943	0.9	1877	250	18.7	34.8	2.5	5.0	99.0%
Apr-10	0.839	0.839	1644	235	15.0	28.0	2.1	4.0	99.1%
May-10	1.045	0.973	2678	330	17.8	33.4	2.2	3.5	99.3%
Jun-10	1.029	0.951	2673	337	38.1	106.8	4.8	14.0	98.6%
Jul-10	1.045	0.94	2713	346	32.1	55.1	4.1	7.5	98.8%
Aug-10	1.002	0.924	2774	360	21.5	51.7	2.8	7.5	99.2%
Sep-10	0.883	0.77	1946	303	18.6	45.9	2.9	5.5	99.0%
Oct-10	0.839	0.711	1654	279	13.6	23.9	2.3	4.0	99.2%
Nov-10	0.829	0.804	2521	376	12.7	28.2	1.9	3.5	99.5%
Dec-10	0.867	0.785	2527	386	13.7	28.8	2.1	5.0	99.5%
Jan-11	0.814	0.678	1504	266	17.5	46.1	3.1	7.0	98.8%
Feb-11	0.897	0.789	1698	258	13.1	21.7	2.0	3.5	99.2%
Mar-11	0.96	0.886	2017	273	17.7	23.1	2.4	3.5	99.1%
Apr-11	1.012	0.897	2057	275	17.9	43.9	2.4	5.0	99.1%
May-11	1.019	0.857	1930	270	18.5	52.4	2.6	8.0	99.0%
Jun-11	1.035	0.889	1720	232	17.7	42.1	2.4	5.5	99.0%
Jul-11	0.983	1.24	4002	387	26.8	67.7	2.6	6.5	99.3%
Aug-11	1.017	1.103	2677	291	23.9	43.1	2.6	5.0	99.1%
Sep-11	0.985	1.03	2740	319	17.2	64.9	2.0	7.0	99.4%
Oct-11	0.913	0.985	2941	358	15.6	50.5	1.9	6.0	99.5%
Nov-11	0.99	1.057	2292	260	15.8	33.9	1.8	4.0	99.3%
Dec-11	1.032	1.032	2126	247	17.5	37.7	1.9	4.0	99.2%
Jan-12	0.941	1.027	2218	259	15.4	26.8	1.8	3.0	99.3%
Feb-12	0.881	0.995	5493	662	21.5	39.4	2.6	4.5	99.6%
Mar-12	0.895	1.012	2118	251	17.7	39.2	2.1	4.5	99.2%
Apr-12	0.881	1.006	2819	336	15.1	38.2	1.8	4.5	99.5%
May-12	0.918	1.016	2576	304	27.1	49.3	3.2	6.0	98.9%
Jun-12	0.914	0.988	2942	357	29.1	55.9	3.5	7.0	99.0%
Jul-12	0.964	1.012	2718	322	26.6	50.0	3.1	5.5	99.0%
Aug-12	0.862	0.999	2774	333	24.1	50.7	2.9	6.0	99.1%
Sep-12	0.836	0.984	2807	342	23.7	45.9	2.9	5.5	99.2%
Oct-12	0.833	1.003	2878	344	21.7	36.4	2.6	4.5	99.2%
Nov-12	0.817	0.983	2410	294	22.1	67.9	2.7	8.0	99.1%
Dec-12	0.844	0.978	2716	333	17.9	31.7	2.2	4.0	99.3%
Jan-13	--	0.982	--	--	15.5	32.6	1.9	4.0	--
Feb-13	1.029	--	--	234	--	--	--	--	--
Mar-13	0.976	1.087	2230	246	29.9	47.6	3.3	5.5	98.7%
Apr-13	1.173	1.16	2283	236	33.8	55.8	3.5	7.0	98.5%
May-13	1.023	1.097	2672	292	25.6	58.1	2.8	5.5	99.0%
Jun-13	1.055	1.115	2501	269	22.3	65.9	2.4	7.0	99.1%
Jul-13	1.041	1.089	2825	311	26.3	70.8	2.9	7.5	99.1%
Aug-13	0.94	1.048	2718	311	24.2	50.1	2.8	6.0	99.1%
Sep-13	0.915	1.036	2748	318	20.6	47.2	2.4	5.5	99.2%
Oct-13	0.897	1.016	2728	322	19.6	37.9	2.3	4.5	99.3%
Nov-13	1.005	1.105	2249	244	23.4	54.9	2.5	6.0	99.0%
Dec-13	0.985	1.056	2043	232	34.5	50.9	3.9	6.5	98.3%
Average	0.964	0.948	2266	283	21.1	47.4	2.7	5.9	99.0%
Maximum	1.173	1.240	5493	662	38.1	137.0	4.8	14.5	99.6%
Minimum	0.814	0.678	712	115	11.0	15.2	1.4	2.0	96.7%

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-- Represents non reported or inconsistent value on eDMR.

West Wastewater Treatment Facility Analysis
WWTF Characterization for NH_3-N (2009-2013)

Village of Huntley, Illinois

	Existing WWTF eDMR Values													
	Measured Flow		Effluent NH_3-N											
	Influent	Effluent	Loading						Concentration					
Month - Year	Average (MGD)	Average (MGD)	Average (lbs/day)		Maximum (lbs/day)		Weekly Avg. (lbs/day)		Average (mg/L)		Maximum (mg/L)		Weekly Avg. (mg/L)	
Permit Requirement	2.6	2.6	Monthly	Permit Limit Varies	Daily	Permit Limit Varies	Weekly	Permit Limit Varies	Monthly	Permit Limit Varies	Daily	Permit Limit Varies	Weekly	Permit Limit Varies
Jan-09	1.033	0.742	0.50	40.0	0.54	136.0			0.08	1.5	0.10	5.1		
Feb-09	1.161	0.753	1.30	40.0	2.40	136.0			0.20	1.5	0.40	5.1		
Mar-09	--	--	--	40.0	--	136.0	--	--	--	1.5	--	5.1	--	--
Apr-09	1.141	0.877	1.50	32.0	3.80	136.0	--	--	0.20	1.2	0.60	5.1	--	--
May-09	1.093	0.881	2.20	32.0	3.80	136.0	--	--	0.30	1.2	0.50	5.1	--	--
Jun-09	1.163	0.898	1.50	32.0	2.20	136.0	--	--	0.20	1.2	0.30	5.1	--	--
Jul-09	1	0.801	0.67	32.0	1.40	136.0	--	--	0.10	1.2	0.20	5.1	--	--
Aug-09	1.03	0.875	0.51	32.0	0.56	136.0	--	--	0.07	1.2	0.09	5.1	--	--
Sep-09	0.939	0.794	0.70	32.0	1.90	136.0	--	--	0.10	1.2	0.30	5.1	--	--
Oct-09	1.02	1.02	0.51	32.0	0.90	136.0	--	--	0.07	1.2	0.09	5.1	--	--
Nov-09	0.95	0.827	0.69	40.0	2.90	136.0			0.10	1.5	0.40	5.1		
Dec-09	1.024	0.893	0.74	40.0	1.50	136.0			0.10	1.5	0.20	5.1		
Jan-10	0.938	0.92	0.50	40.0	0.90	136.0			0.07	1.5	0.09	5.1		
Feb-10	0.833	0.858	0.57	40.0	0.59	136.0			0.08	1.5	0.09	5.1		
Mar-10	0.943	0.9	0.52	40.0	0.68	136.0	--	--	0.07	1.5	0.10	5.1	--	--
Apr-10	0.839	0.839	0.49	32.0	0.58	136.0	--	--	0.07	1.2	0.08	5.1	--	--
May-10	1.045	0.973	2.40	32.0	12.60	136.0	--	--	0.30	1.2	1.44	5.1	--	--
Jun-10	1.029	0.951	7.10	32.0	23.70	136.0	--	--	0.90	1.2	3.20	5.1	--	--
Jul-10	1.045	0.94	5.50	32.0	24.20	136.0	--	--	0.70	1.2	3.50	5.1	--	--
Aug-10	1.002	0.924	2.30	65.0	6.20	276.0	3.20	190.0	0.30	1.2	0.90	5.1	0.40	3.5
Sep-10	0.883	0.77	0.44	65.0	0.75	276.0	0.50	244.0	0.07	1.2	0.09	5.1	0.08	4.5
Oct-10	0.839	0.711	0.41	65.0	0.49	276.0	0.40	244.0	0.07	1.2	0.08	5.1	0.07	4.5
Nov-10	0.829	0.804	0.46	81.0	0.58	276.0			0.07	1.5	0.08	5.1		
Dec-10	0.867	0.785	0.52	81.0	0.61	276.0			0.08	1.5	0.10	5.1		
Jan-11	0.814	0.678	0.45	81.0	0.61	276.0			0.08	1.5	0.10	5.1		
Feb-11	0.897	0.789	0.46	81.0	0.65	276.0			0.07	1.5	0.09	5.1		
Mar-11	0.96	0.886	0.50	81.0	0.70	276.0	1.50	244.0	0.07	1.5	0.10	5.1	0.20	4.5
Apr-11	1.012	0.897	0.59	65.0	0.73	276.0	0.67	244.0	0.08	1.2	0.10	5.1	0.09	4.5
May-11	1.019	0.857	0.50	65.0	0.71	276.0	0.50	244.0	0.07	1.2	0.10	5.1	0.08	4.5
Jun-11	1.035	0.889	0.51	65.0	0.62	276.0	0.84	190.0	0.07	1.2	0.10	5.1	0.09	3.5
Jul-11	0.983	1.24	0.72	65.0	1.00	276.0	0.93	190.0	0.07	1.2	0.10	5.1	0.08	3.5
Aug-11	1.017	1.103	0.60	65.0	0.80	276.0	3.10	190.0	0.07	1.2	0.10	5.1	0.30	3.5
Sep-11	0.985	1.03	0.60	65.0	0.81	276.0	2.10	244.0	0.07	1.2	0.09	5.1	0.24	4.5
Oct-11	0.913	0.985	0.50	65.0	0.70	276.0	0.60	244.0	0.07	1.2	0.10	5.1	0.08	4.5
Nov-11	0.99	1.057	0.80	81.0	3.50	276.0			0.10	1.5	0.39	5.1		
Dec-11	1.032	1.032	0.70	81.0	0.90	276.0			0.08	1.5	0.10	5.1		
Jan-12	0.941	1.027	0.68	81.0	0.78	276.0			0.08	1.5	0.10	5.1		
Feb-12	0.881	0.995	1.60	81.0	6.10	276.0			0.20	1.5	0.60	5.1		
Mar-12	0.895	1.012	3.30	81.0	40.20	276.0	14.20	244.0	0.40	1.5	4.90	5.1	1.70	4.5
Apr-12	0.881	1.006	1.10	65.0	3.10	276.0	2.20	244.0	0.13	1.2	0.35	5.1	0.30	4.5
May-12	0.918	1.016	0.60	65.0	0.80	276.0	0.70	244.0	0.07	1.2	0.10	5.1	0.09	4.5
Jun-12	0.914	0.988	0.50	65.0	0.80	276.0	0.60	190.0	0.07	1.2	0.10	5.1	0.08	3.5
Jul-12	0.964	1.012	0.60	65.0	0.80	276.0	0.70	190.0	0.07	1.2	0.10	5.1	0.08	3.5
Aug-12	0.862	0.999	0.80	65.0	4.10	276.0	1.50	190.0	0.10	1.2	0.50	5.1	0.20	3.5
Sep-12	0.836	0.984	0.57	65.0	0.83	276.0	0.75	244.0	0.07	1.2	0.10	5.1	0.09	4.5
Oct-12	0.833	1.003	0.70	65.0	0.80	276.0	0.80	244.0	0.08	1.2	0.10	5.1	0.09	4.5
Nov-12	0.817	0.983	0.65	81.0	0.83	276.0			0.08	1.5	0.10	5.1		
Dec-12	0.844	0.978	0.60	81.0	0.77	276.0			0.07	1.5	0.10	5.1		
Jan-13	--	0.982	0.60	81.0	0.70	276.0			0.08	1.5	0.10	5.1		
Feb-13	1.029	--	--	81.0	--	276.0			--	1.5	--	5.1		
Mar-13	0.976	1.087	0.81	81.0	0.87	276.0	0.80	244.0	0.09	1.5	0.10	5.1	0.09	4.5
Apr-13	1.173	1.16	0.80	65.0	0.80	276.0	0.80	244.0	0.09	1.2	0.10	5.1	0.10	4.5
May-13	1.023	1.097	0.70	65.0	1.70	276.0	0.90	244.0	0.08	1.2	0.20	5.1	0.10	4.5
Jun-13	1.055	1.115	0.60	65.0	0.80	276.0	0.80	190.0	0.07	1.2	0.09	5.1	0.08	3.5
Jul-13	1.041	1.089	0.70	65.0	0.90	276.0	0.80	190.0	0.08	1.2	0.10	5.1	0.10	3.5
Aug-13	0.94	1.048	0.69	65.0	0.90	276.0	0.82	190.0	0.08	1.2	0.10	5.1	0.08	3.5
Sep-13	0.915	1.036	0.72	65.0	1.03	276.0	0.73	244.0	0.08	1.2	0.12	5.1	0.09	4.5
Oct-13	0.897	1.016	0.79	65.0	1.15	276.0	0.94	244.0	0.09	1.2	0.13	5.1	0.10	4.5
Nov-13	1.005	1.105	0.87	81.0	1.45	276.0			0.09	1.5	0.16	5.1		
Dec-13	0.985	1.056	0.73	81.0	1.52	276.0			0.08	1.5	0.17	5.1		
Average	0.964	0.948	1.012		3.056		1.570		0.130		0.395		0.188	
Maximum	1.173	1.240	7.100		40.200		14.200		0.900		4.900		1.700	
Minimum	0.814	0.678	0.410		0.490		0.400		0.070		0.080		0.070	

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\WWTFs\[Waste Characterization 2009-2013 (West WWTF).xlsx]NH3-N

-- Represents non reported or inconsistent value on eDMR.

Appendix E

Potential Water Conservation Savings From Water Conservation & Efficiency

POTENTIAL ESTIMATED WATER SAVINGS
FROM WATER CONSERVATION AND EFFICIENCY

Village of Huntley, McHenry & Kane Cos., IL

	Village of Huntley 2040 CT Water Demand Estimate	**1,938**	**MG**
(a)	2040 Daily CT Water Demand Estimate	5.31	MGD
Outdoor Water Use			
(b)	Water Supply Spent on Outdoor Use	22.2%	
(c)	Outdoor Water Wasted	50%	
(d)	Assumed Reduction of Outdoor Waste	50%	
(e)	New Landscape Water Waste Reduction	5%	
	All Customers - Water Saved (a x b x c x d) =	**0.295**	**MGD**
	New Landscape - Water Saved (a x b x c x e) =	**0.029**	**MGD**
Utility Water (System Loses)			
(f)	Water Supply Loss from Unidentified Losses	14.0%	
(g)	Assumed Reduction of Unidentified Losses	50%	
	System Loses - Water Saved (a x f x g) =	**0.372**	**MGD**
Indoor Residential			
(h)	Population (1994)	3,764	
(i)	Assumed People per Household (1994)	3	
(j)	No. of Households (1994)	1,255	
(k)	Assumed pre-1994 Flush Rate	3.5	gal/flush
(l)	Assumed HET Flush Rate	1.28	gal/flush
(m)	Assumed Flushes per Person per Day	5.1	
(n)	Assumed Percent Household Upgrade by 2040 for HET	90%	
(o)	Water Savings per Household per Year for HEWM	4,200	gal
(p)	Assumed Percent Household Upgrade by 2040 for HEWM	100%	
(q)	Water Savings per Household per Day for 4 Retrofits	22	gal
(r)	Assumed Percent household upgrade by 2040 for HET	90%	
	HET - Water Saved ((k - l) x m x h x n) =	**0.038**	**MGD**
	HEWM - Water Saved (o x j x p) =	**0.014**	**MGD**
	Retrofits - Water Saved (j x q x r) =	**0.025**	**MGD**
Commercial, Industrial, and Institutional			
(s)	Reduction of CII Accounts Based on No. of Employees	13.5%	
(t)	Percent of Daily Demand (Non-Residential)	11.6%	
(u)	Assumed Percent Employee Participation	50.0%	
	Commercial - Water Saved (a x s x t x u) =	**0.041**	**MGD**

TOTAL ESTIMATED SAVINGS =	**0.815**	**MGD**
LESS RESOURCE INTENSIVE DEMAND (2040) =	**4.495**	**MGD**
PERCENT REDUCTION =	**15.0%**	

Notes:

Values calculated from Village Data

(c) Per EPA

(o) From California Memorandum of Understanding

HET = High Efficiency Toilets; HEWM = High Efficiency Washing Machines

Appendix F

Detailed Cost Estimates – Water Supply & Treatment and Water Storage

WATER SUPPLY & TREATMENT

Cost Estimates

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 12 & Well No. 12 Water Treatment Plant
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (26X22 FOR POTENTIAL DEEPENING)	
	Construction (Casing, Hole, Grout, Etc.)	$1,025,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 2,500 SF)	$848,000
	Forced Draft Aerator	$250,000
	Clearwell	$40,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$116,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$450,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,264,000
	CONTINGENCY (10%)	$526,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,790,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,042,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,892,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 12 & WTP

Notes:
All values are based on 2014 construction costs.
Assumes Well No. 12 constructed at the Well No. 12 WTP site.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 13 & Well No. 13 Water Treatment Plant
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (26X22 FOR POTENTIAL DEEPENING)	
	Construction (Casing, Hole, Grout, Etc.)	$1,025,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 2,500 SF)	$848,000
	Forced Draft Aerator	$250,000
	Clearwell	$40,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$116,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$450,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,264,000
	CONTINGENCY (10%)	$526,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,790,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,042,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION	$50,000
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,942,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 13 & WTP

Notes:

All values are based on 2014 construction costs.

Assumes Well No. 13 constructed at the Well No. 13 WTP site.

Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 14 & Well No. 14 Water Treatment Plant
(Building Sized For Well No. 17 Inclusion)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (26X22 FOR POTENTIAL DEEPENING)	
	Construction (Casing, Hole, Grout, Etc.)	$1,025,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 3,500 SF)	$1,100,000
	Forced Draft Aerator	$250,000
	Clearwell	$60,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$140,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$475,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,585,000
	CONTINGENCY (10%)	$559,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$6,144,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,106,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$7,310,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 14 & WTP (Future Exp)

Notes:

All values are based on 2014 construction costs.
Assumes Well No. 14 constructed at the Well No. 14 WTP site.
Assumes Well No. 17 will be routed to the WTP in the future. The building, clear well and brine tank are sized for the future total capacity of the WTP.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 15 & Well No. 15 Water Treatment Plant
(Building Sized For Well No. 19 Inclusion)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (24X18)	
	Construction (Casing, Hole, Grout, Etc.)	$900,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 3,500 SF)	$1,100,000
	Forced Draft Aerator	$250,000
	Clearwell	$60,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$140,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$475,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,460,000
	CONTINGENCY (10%)	$546,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$6,006,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,081,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of Village's Property)	$0
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$7,147,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 15 & WTP (Future Exp)

Notes:

All values are based on 2014 construction costs.
Assumes Well No. 15 constructed at the Well No. 15 WTP site.
Assumes Well No. 19 will be routed to the WTP in the future. The building, clear well and brine tank are sized for the future total capacity of the WTP.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 16 & Well No. 16 Water Treatment Plant
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (24X18)	
	Construction (Casing, Hole, Grout, Etc.)	$900,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 2,500 SF)	$848,000
	Forced Draft Aerator	$250,000
	Clearwell	$40,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$116,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$450,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,139,000
	CONTINGENCY (10%)	$514,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,653,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,018,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION	$150,000
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,881,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 16 & WTP

Notes:

All values are based on 2014 construction costs.

Assumes Well No. 16 constructed at the Well No. 16 WTP site.

Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST

Well No. 17 & Wells No. 14 & 17 Water Treatment Plant Expansion

Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (26X22 FOR POTENTIAL DEEPENING)	
	Construction (Casing, Hole, Grout, Etc.)	$1,025,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
	Electrical Gear & Enclosure	$464,000
	Yard Piping (Water Main)	$30,000
	Paving	$15,000
	Fencing	$20,000
	Restoration & Landscaping	$25,000
	Raw Water Main (6,000 LF)	$874,000
	Generator	$250,000
	SCADA Integration	$20,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Included In Well No. 14 WTP Construction)	$0
	Forced Draft Aerator	$250,000
	Clearwell (Included in Well No. 14 WTP Construction)	$0
	High Service Pumps	$40,000
	Cation Exchange Treatment Equipment (2 - 9 FT Diameter Units)	$600,000
	Brine Pump & Piping (Included in Well No. 14 WTP Construction)	$0
	Brine Tank (Included in Well No. 14 WTP Construction)	$0
	Miscellaneous Piping and Meters	$35,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$50,000
	Controls and Instrumentation	$40,000
	SCADA Integration	$20,000
	Emergency Generator (Included in Well No. 14 WTP Construction)	$0
	SUB-TOTAL	$4,458,000
	CONTINGENCY (10%)	$446,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$4,904,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$883,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$5,000
	TOTAL ESTIMATED COST OF PROJECT	**$5,822,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 17 & 14-17 WTP Exp

Notes:

All values are based on 2014 construction costs.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 19 & Wells No. 15, 18 & 19 Water Treatment Plant Expansion
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (24X18)	
	Construction (Casing, Hole, Grout, Etc.)	$900,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
	Electrical Gear & Enclosure	$464,000
	Yard Piping (Water Main)	$30,000
	Paving	$15,000
	Fencing	$20,000
	Restoration & Landscaping	$25,000
	Raw Water Main (6,000 LF)	$874,000
	Generator	$250,000
	SCADA Integration	$20,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building Expansion (1,000 SF)	$300,000
	Forced Draft Aerator	$250,000
	Clearwell Expansion	$30,000
	High Service Pumps	$40,000
	Cation Exchange Treatment Equipment (2 - 9 FT Diameter Units)	$600,000
	Brine Pump & Piping (New Brine Pump)	$10,000
	Brine Tank (Assumes Existing Tank Large Enough For Both Wells)	$0
	Miscellaneous Piping and Meters	$35,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$50,000
	Controls and Instrumentation	$40,000
	SCADA Integration	$20,000
	Emergency Generator (Existing)	$0
	SUB-TOTAL	$4,673,000
	CONTINGENCY (10%)	$467,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,140,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$925,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$5,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,100,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 18 & 11-18 WTP Exp

Notes:

All values are based on 2014 construction costs.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 19 & Wells No. 15 & 19 Water Treatment Plant Expansion
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (24X18)	
	Construction (Casing, Hole, Grout, Etc.)	$900,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
	Electrical Gear & Enclosure	$464,000
	Yard Piping (Water Main)	$30,000
	Paving	$15,000
	Fencing	$20,000
	Restoration & Landscaping	$25,000
	Raw Water Main (6,000 LF)	$874,000
	Generator	$250,000
	SCADA Integration	$20,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Included In Well No. 15 WTP Construction)	$0
	Forced Draft Aerator	$250,000
	Clearwell (Included in Well No. 15 WTP Construction)	$0
	High Service Pumps	$40,000
	Cation Exchange Treatment Equipment (2 - 9 FT Diameter Units)	$600,000
	Brine Pump & Piping (Included in Well No. 15 WTP Construction)	$0
	Brine Tank (Included in Well No. 15 WTP Construction)	$0
	Miscellaneous Piping and Meters	$35,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$50,000
	Controls and Instrumentation	$40,000
	SCADA Integration	$20,000
	Emergency Generator (Included in Well No. 15 WTP Construction)	$0
	SUB-TOTAL	$4,333,000
	CONTINGENCY (10%)	$433,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$4,766,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$858,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$5,000
	TOTAL ESTIMATED COST OF PROJECT	**$5,659,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 19 & 15-19 WTP Exp

Notes:

All values are based on 2014 construction costs.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 14 & Well No. 14 Water Treatment Plant (LRI Plan)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (26X22 FOR POTENTIAL DEEPENING)	
	Construction (Casing, Hole, Grout, Etc.)	$1,025,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 2,500 SF)	$848,000
	Forced Draft Aerator	$250,000
	Clearwell	$40,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$116,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$450,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,264,000
	CONTINGENCY (10%)	$526,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,790,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,042,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,892,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 14 & WTP - LRI

Notes:
All values are based on 2014 construction costs.
Assumes Well No. 14 constructed at the Well No. 14 WTP site.
Estimate does not include air scrubbing equipment for aerator exhaust.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
Well No. 15 & Well No. 15 Water Treatment Plant (LRI Plan)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	1,000 GPM IRONTON GALESVILLE WELL (24X18)	
	Construction (Casing, Hole, Grout, Etc.)	$900,000
	Development (Disinfection, Testing, Etc.)	$200,000
	Equipment (Pump/Motor, Pitless Adapter, Etc.)	$400,000
2	TREATMENT BUILDING, EQUIPMENT AND ELECTRICAL	
	Water Treatment Plant Building (Approximately 2,500 SF)	$848,000
	Forced Draft Aerator	$250,000
	Clearwell	$40,000
	High Service Pumps	$169,000
	Cation Exchange Treatment Equipment (3 - 9 FT Diameter Units)	$900,000
	Brine Pump & Piping	$30,000
	Brine Tank	$116,000
	Miscellaneous Piping and Meters	$100,000
	Chemical Feed Equipment	$100,000
	Power Distribution	$450,000
	Controls and Instrumentation	$81,000
	SCADA Integration	$35,000
	Emergency Generator	$250,000
3	SITE WORK	
	Yard Piping (Water Main & Sanitary and Storm Sewer)	$150,000
	Paving	$30,000
	Fencing	$40,000
	Restoration & Landscaping	$50,000
	SUB-TOTAL	$5,139,000
	CONTINGENCY (10%)	$514,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$5,653,000**
	DESIGN AND CONSTRUCTION ENGINEERING (18%)	$1,018,000
	3 PHASE, 480 V ELECTRIC SERVICE TO SITE	$30,000
	LAND ACQUISITION (Assumed Portion of Village's Property)	$0
	SOIL & MATERIAL TESTING	$30,000
	TOTAL ESTIMATED COST OF PROJECT	**$6,731,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Supply & Treatment Cost Estimates.xlsx]Well No. 15 & WTP - LRI

Notes:
All values are based on 2014 construction costs.
Assumes Well No. 15 constructed at the Well No. 15 WTP site.
Estimate does not include air scrubbing equipment for aerator exhaust.

WATER STORAGE

Cost Estimates

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
EWST No. 6 (1.5 MG Waterspheroid)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	ELEVATED WATER STORAGE TANK (1.5 MG & 100 FT TO BCL)	$3,413,000
2	FRESH MIX SYSTEM	$34,000
3	CONTAINMENT	$173,000
4	YARD PIPING AND SITE WORK (Including Electric Actuated Altitude Valve)	$150,000
5	SCADA IMPLEMENTATION	$35,000
	SUB-TOTAL	$3,805,000
	CONTINGENCY (10%)	$381,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$4,186,000**
	DESIGN AND CONSTRUCTION ENGINEERING (10%)	$419,000
	ELECTRIC SERVICE TO SITE (Included in Well & WTP Estimate)	$0
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL AND MATERIAL TESTING	$35,000
	TOTAL ESTIMATED COST OF PROJECT	**$4,640,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Storage Cost Estimates.xlsx]EWST No. 6

Notes:
All values are based on 2014 construction costs.
Assumes EWST at Well and WTP site.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
EWST No. 7 (1.25 MG Waterspheroid)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	ELEVATED WATER STORAGE TANK (1.25 MG & 100 FT TO BCL)	$2,940,000
2	FRESH MIX SYSTEM	$32,000
3	CONTAINMENT	$158,000
4	YARD PIPING AND SITE WORK (Including Electric Actuated Altitude Valve)	$150,000
5	SCADA IMPLEMENTATION	$35,000
	SUB-TOTAL	$3,315,000
	CONTINGENCY (10%)	$332,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$3,647,000**
	DESIGN AND CONSTRUCTION ENGINEERING (10%)	$365,000
	ELECTRIC SERVICE TO SITE (Included in Well & WTP Estimate)	$0
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL AND MATERIAL TESTING	$35,000
	TOTAL ESTIMATED COST OF PROJECT	**$4,047,000**

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Notes:

All values are based on 2014 construction costs.
Assumes EWST at Well and WTP site.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
EWST No. 8 (1.00 MG Waterspheroid)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	ELEVATED WATER STORAGE TANK (1.00 MG & 100 FT TO BCL)	$2,468,000
2	FRESH MIX SYSTEM	$32,000
3	CONTAINMENT	$142,000
4	YARD PIPING AND SITE WORK (Including Electric Actuated Altitude Valve)	$150,000
5	SCADA IMPLEMENTATION	$35,000
	SUB-TOTAL	$2,827,000
	CONTINGENCY (10%)	$283,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$3,110,000**
	DESIGN AND CONSTRUCTION ENGINEERING (10%)	$311,000
	ELECTRIC SERVICE TO SITE (Included in Well & WTP Estimate)	$0
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL AND MATERIAL TESTING	$35,000
	TOTAL ESTIMATED COST OF PROJECT	**$3,456,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Storage Cost Estimates.xlsx]EWST No. 8

Notes:

All values are based on 2014 construction costs.
Assumes EWST at Well and WTP site.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
EWST No. 9 (1.00 MG Waterspheroid)
Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	ELEVATED WATER STORAGE TANK (1.00 MG & 100 FT TO BCL)	$2,468,000
2	FRESH MIX SYSTEM	$32,000
3	CONTAINMENT	$142,000
4	YARD PIPING AND SITE WORK (Including Electric Actuated Altitude Valve)	$150,000
5	SCADA IMPLEMENTATION	$35,000
	SUB-TOTAL	$2,827,000
	CONTINGENCY (10%)	$283,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$3,110,000**
	DESIGN AND CONSTRUCTION ENGINEERING (10%)	$311,000
	ELECTRIC SERVICE TO SITE (Included in Well & WTP Estimate)	$0
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL AND MATERIAL TESTING	$35,000
	TOTAL ESTIMATED COST OF PROJECT	**$3,456,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Storage Cost Estimates.xlsx]EWST No. 9

Notes:

All values are based on 2014 construction costs.

Assumes EWST at Well and WTP site.

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST
EWST No. 7 (1.00 MG Waterspheroid) - LRI Plan

Village of Huntley, McHenry & Kane Cos., IL

ITEM NO.	ITEM	AMOUNT
1	ELEVATED WATER STORAGE TANK (1.00 MG & 100 FT TO BCL)	$2,468,000
2	FRESH MIX SYSTEM	$32,000
3	CONTAINMENT	$142,000
4	YARD PIPING AND SITE WORK (Including Electric Actuated Altitude Valve)	$150,000
5	SCADA IMPLEMENTATION	$35,000
	SUB-TOTAL	$2,827,000
	CONTINGENCY (10%)	$283,000
	TOTAL ESTIMATED COST OF CONSTRUCTION	**$3,110,000**
	DESIGN AND CONSTRUCTION ENGINEERING (10%)	$311,000
	ELECTRIC SERVICE TO SITE (Included in Well & WTP Estimate)	$0
	LAND ACQUISITION (Assumed Portion of New Development)	$0
	SOIL AND MATERIAL TESTING	$35,000
	TOTAL ESTIMATED COST OF PROJECT	**$3,456,000**

G:\Public\Huntley\2014\HU1401 Comprehensive Utility Master Plan\Eng\Cost Estimates\[Storage Cost Estimates.xlsx]EWST No. 7 - LRI

Notes:

All values are based on 2014 construction costs.

Assumes EWST at Well and WTP site.

Appendix G

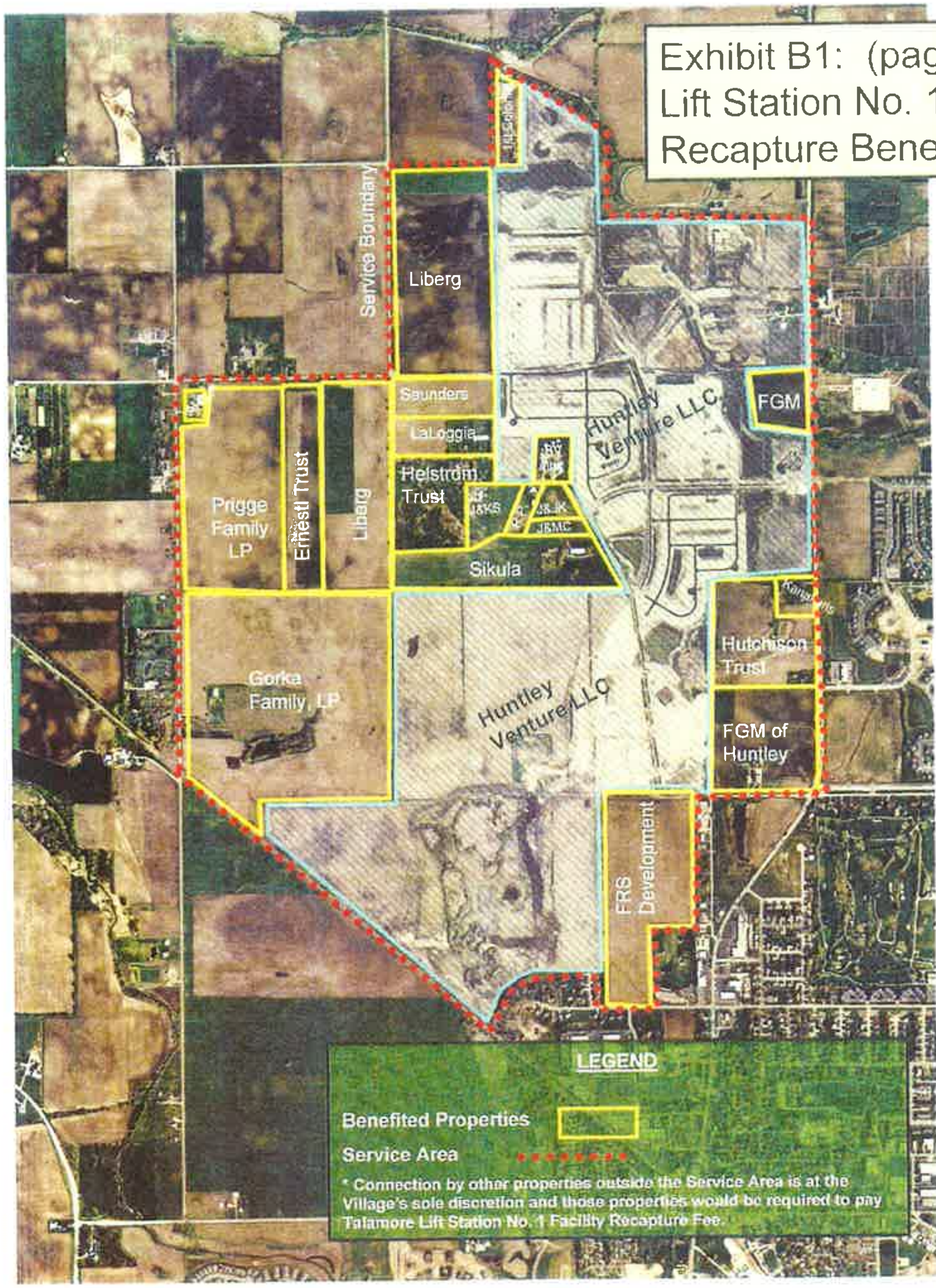
Recapture Areas For Talamore Subdivision Wastewater Collection System Improvements

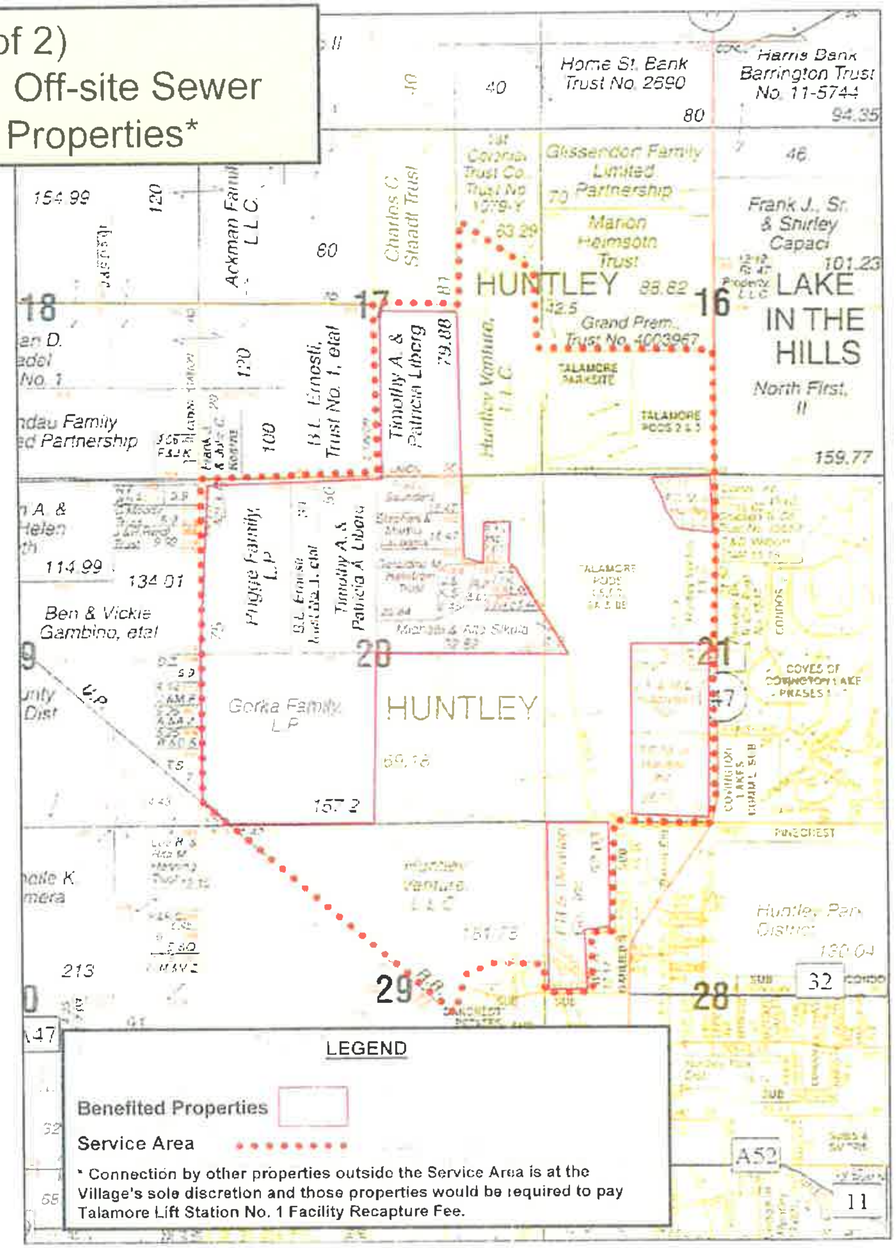
LIFT STATION NO. 1 AND OFF-SITE SEWER

2008R0046187

re-record
2008R0055860

Exhibit B1: (page 1 of 2)
Lift Station No. 1 and Off-site Sewer Recapture Benefited Properties*



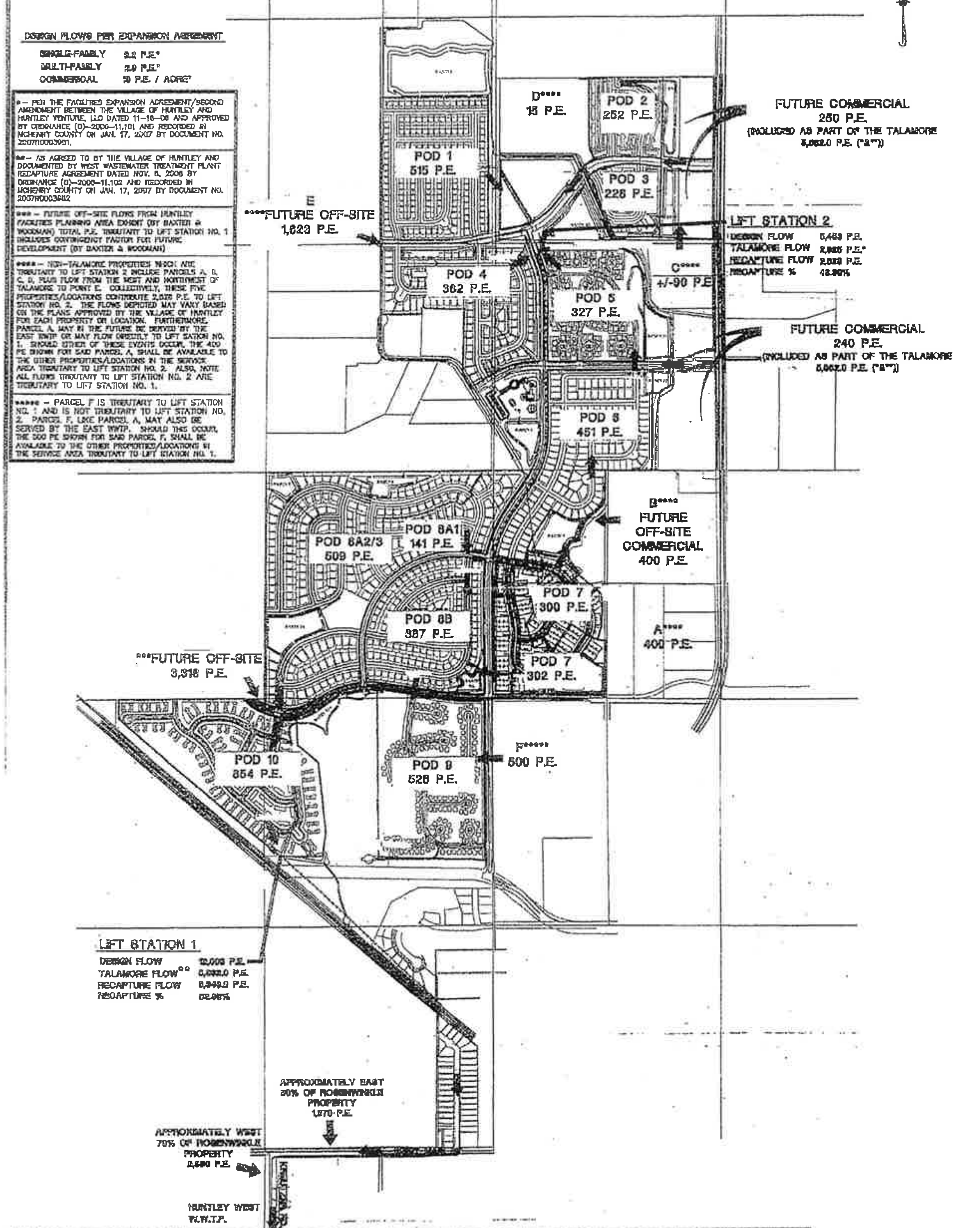


2008R0046187

re·record
2008R0055860

EXHIBIT B-1

(2 OF 2)



TALAMORE DEVELOPMENT

VILLAGE OF HUNTLEY, ILLINOIS

EXHIBIT B-1

Manhard CONSULTING LTD

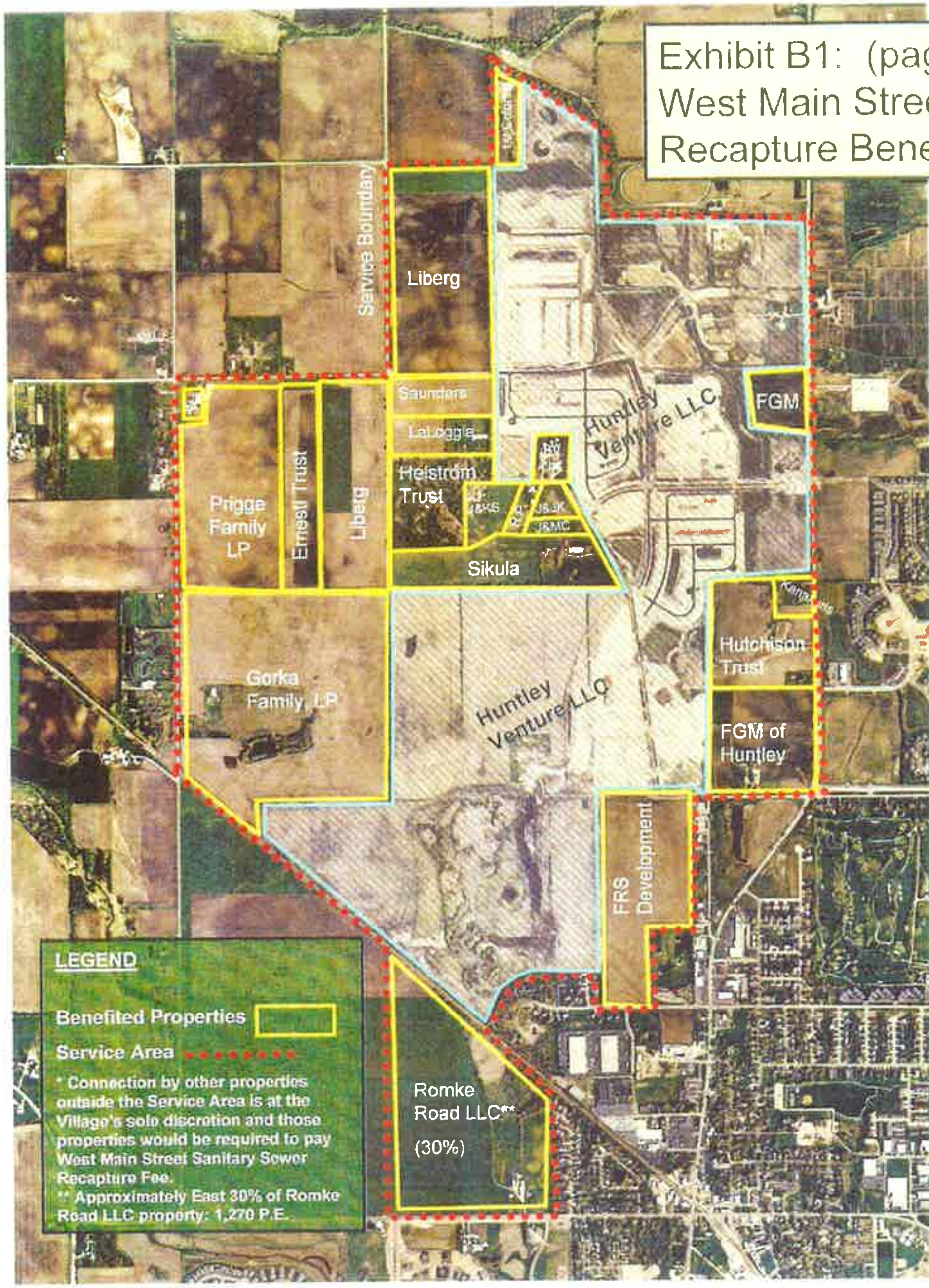
2 of 2

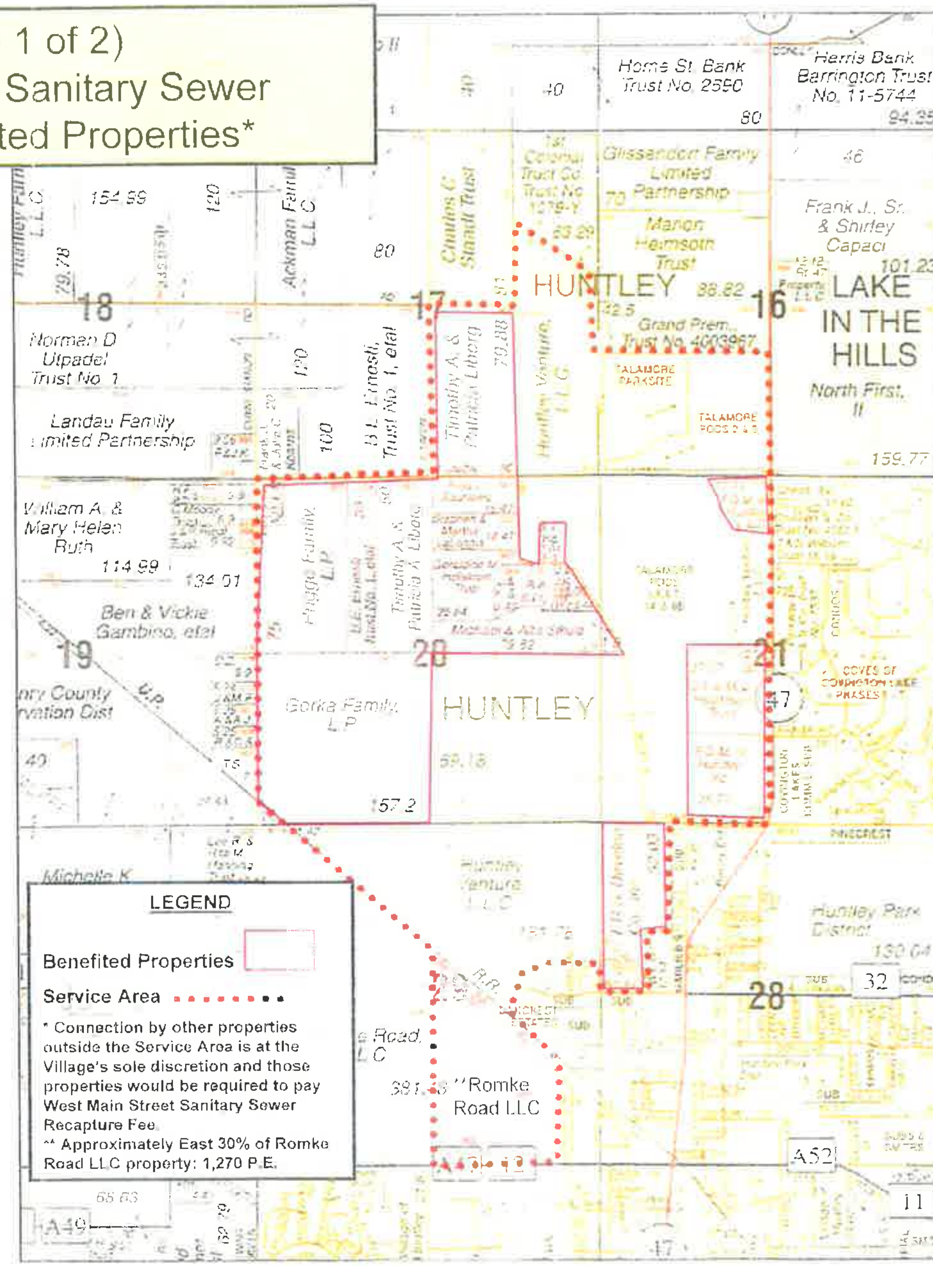
WEST MAIN STREET SANITARY SEWER

2008R0046189

re-record
2008R0055861

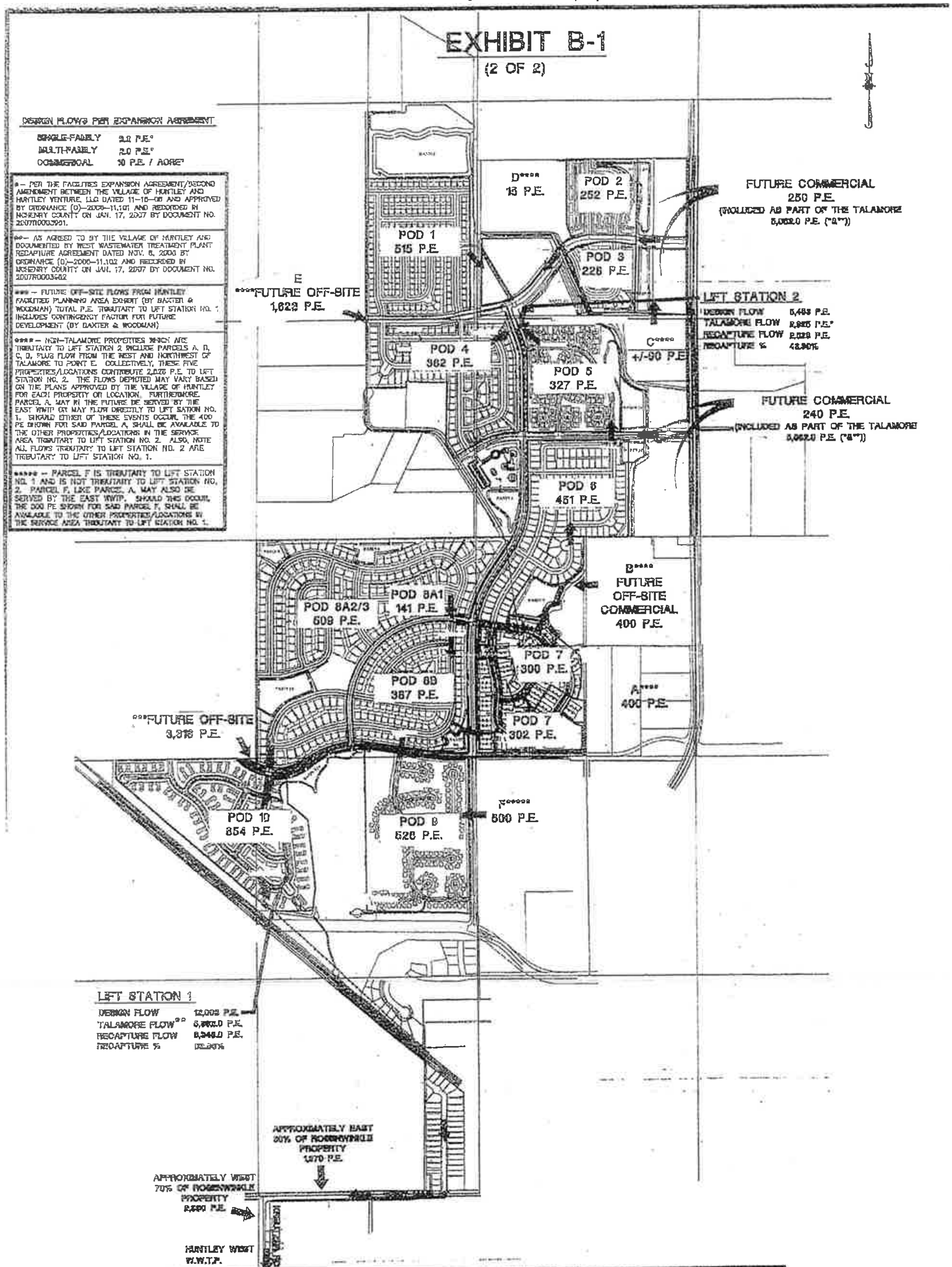
Exhibit B1: (page 1 of 2)
West Main Street Sanitary Sewer Recapture Benefited Properties*





re-record

2008R0046189 2008R0055861



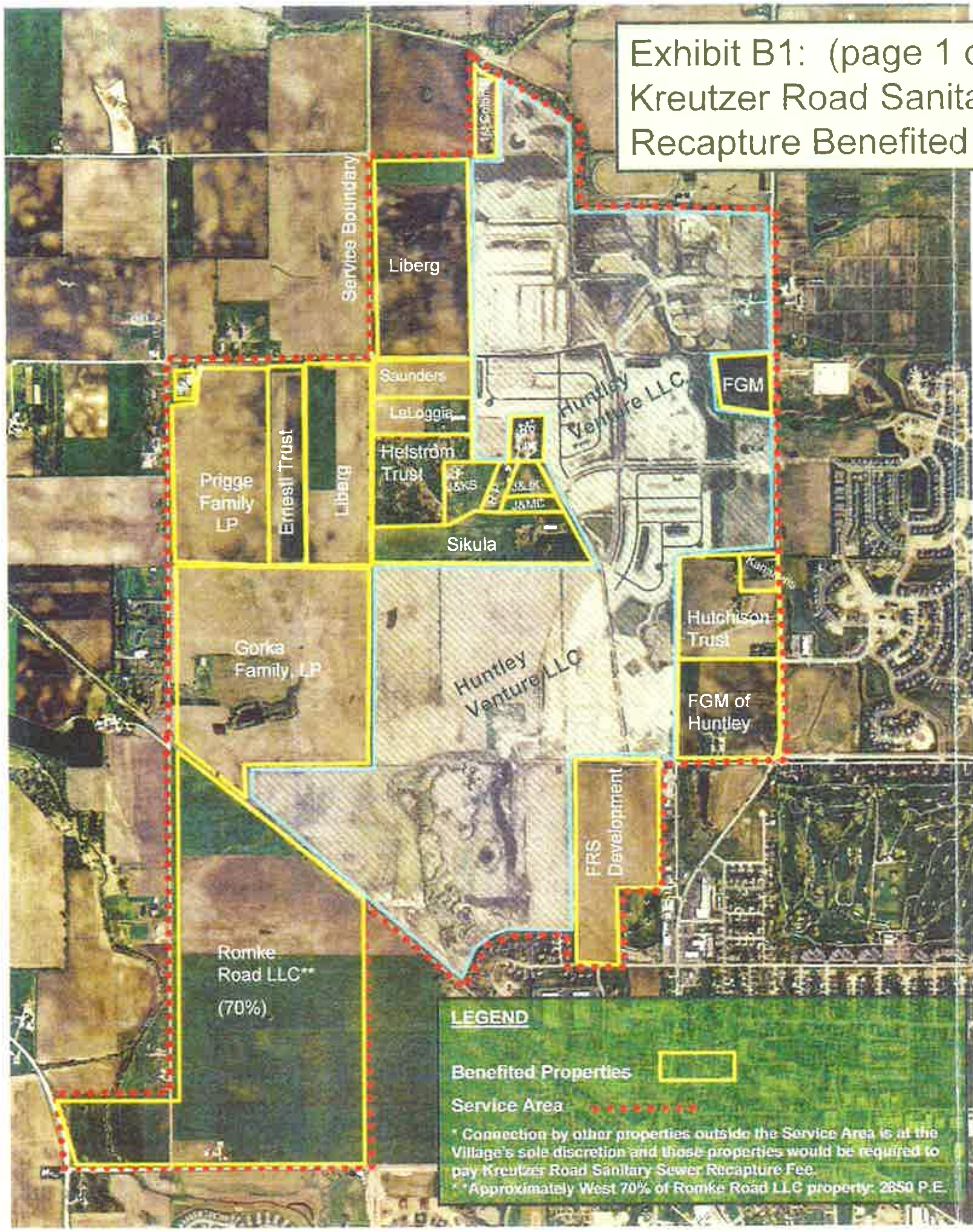
2 of 2	TALAMORE DEVELOPMENT VILLAGE OF HUNTLEY, ILLINOIS EXHIBIT B-1	Manhard CONSULTING LTD

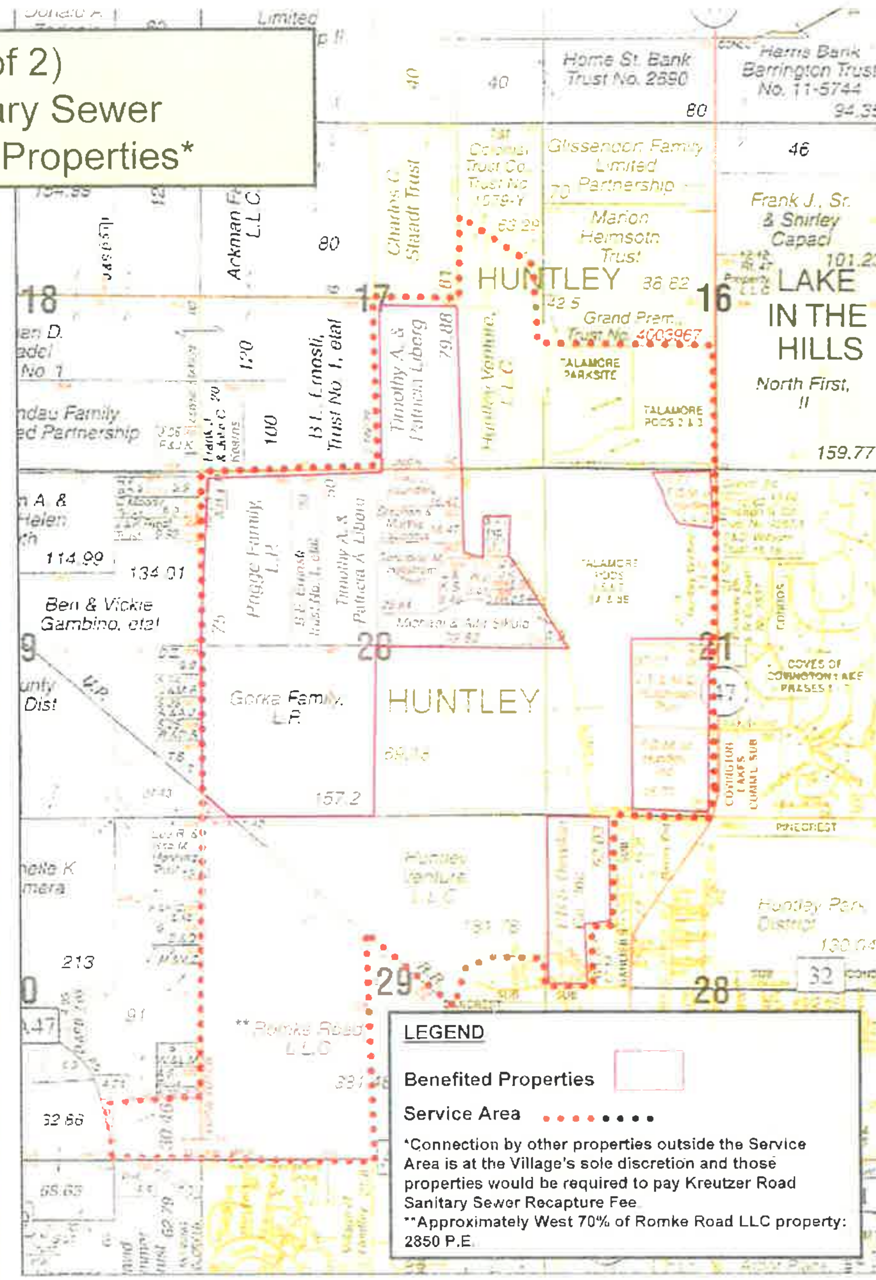
KREUTZER ROAD SANITARY SEWER

2008R0046190

re-record 2008R0055862

Exhibit B1: (page 1 of 2) Kreutzer Road Sanitary Sewer Recapture Benefited Properties*





re-record

2008R0046190 2008R0055862

EXHIBIT B-1
(2 OF 2)

DESIGN FLOWS PER EXPANSION AGREEMENT

SINGLE-FAMILY	3.0 P.E.*
MULTI-FAMILY	2.9 P.E.*
COMMERCIAL	10 P.E. / ACRE*

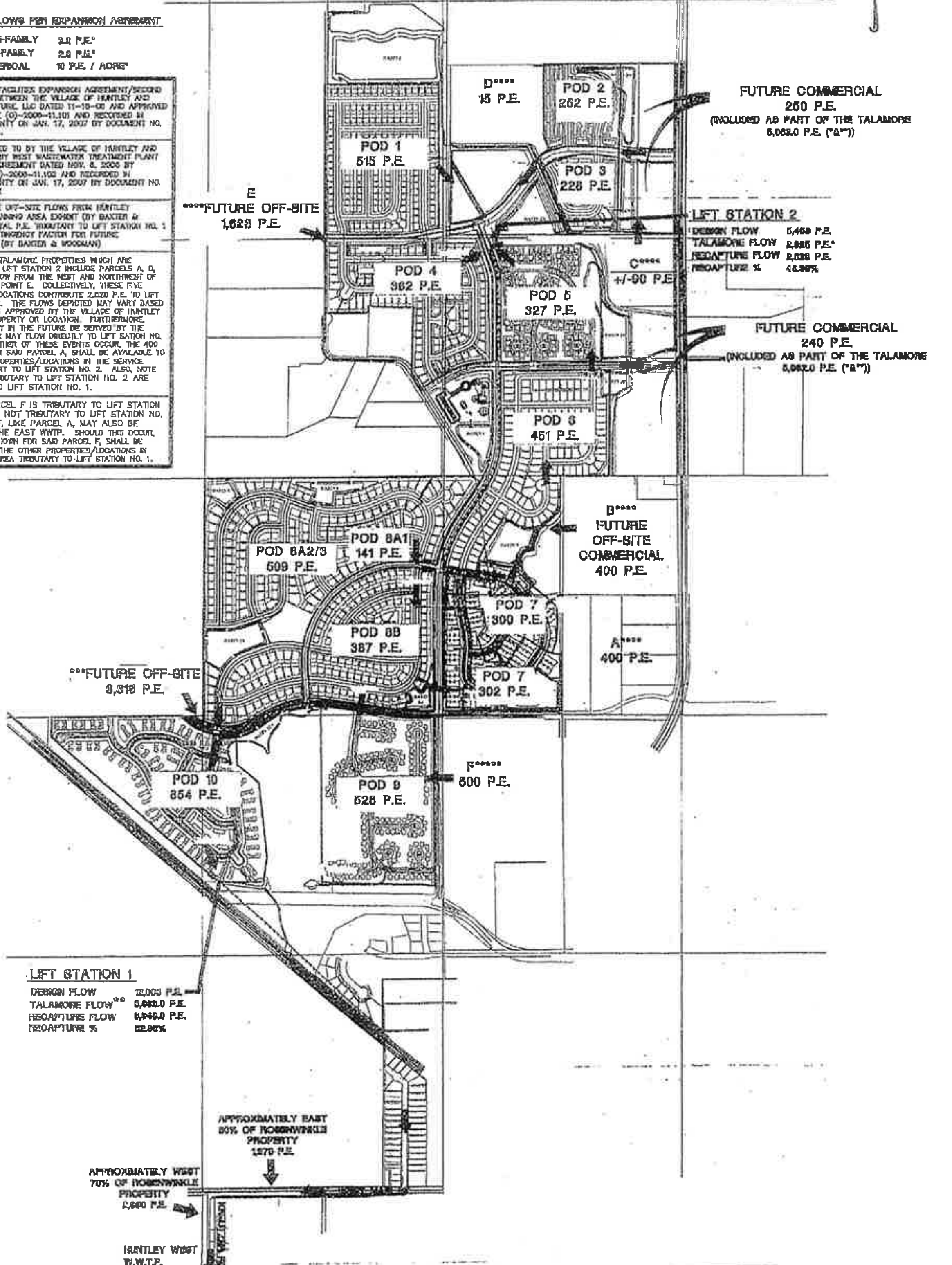
* – PER THE FACILITIES EXPANSION AGREEMENT/SECOND AMENDMENT BETWEEN THE VILLAGE OF HUNTLEY AND HUNTLEY VENTURE, LLC DATED 11-15-06 AND APPROVED BY ORDINANCE (O)-2006-11.101 AND RECORDED IN MCHENRY COUNTY ON JAN. 17, 2007 BY DOCUMENT NO. 2007R0003901.

** – AS AGREED TO BY THE VILLAGE OF HUNTLEY AND DOCUMENTED BY WEST WASTEWATER TREATMENT PLANT RECAPTURE AGREEMENT DATED NOV. 6, 2006 BY ORDINANCE (O)-2006-11.102 AND RECORDED IN MCHENRY COUNTY ON JAN. 17, 2007 BY DOCUMENT NO. 2007R0003902

*** – FUTURE OFF-SITE FLOWS FROM HUNTLEY FACILITIES PLANNING AREA EXHIBIT (BY BAXTER & WOODMAN) TOTAL P.E. TRIBUTARY TO LIFT STATION NO. 1 INCLUDES CONTINGENCY FACTOR FOR FUTURE DEVELOPMENT (BY BAXTER & WOODMAN)

**** – NON-TALAMORE PROPERTIES WHICH ARE TRIBUTARY TO LIFT STATION 2 INCLUDE PARCELS A, B, C, D, PLUS FLOW FROM THE WEST AND NORTHWEST OF TALAMORE TO POINT E. COLLECTIVELY, THESE FIVE PROPERTIES/LOCATIONS CONTRIBUTE 2,020 P.E. TO LIFT STATION NO. 2. THE FLOWS DEPICTED MAY VARY BASED ON THE PLANS APPROVED BY THE VILLAGE OF HUNTLEY FOR EACH PROPERTY OR LOCATION. FURTHERMORE, PARCEL A, MAY IN THE FUTURE BE SERVED BY THE EAST WWTP OR MAY FLOW DIRECTLY TO LIFT STATION NO. 1. SHOULD EITHER OF THESE EVENTS OCCUR, THE 400 PE SHOWN FOR SAID PARCEL A, SHALL BE AVAILABLE TO THE OTHER PROPERTIES/LOCATIONS IN THE SERVICE AREA TRIBUTARY TO LIFT STATION NO. 2. ALSO, NOTE ALL FLOWS TRIBUTARY TO LIFT STATION NO. 2 ARE TRIBUTARY TO LIFT STATION NO. 1.

***** – PARCEL F IS TRIBUTARY TO LIFT STATION NO. 1 AND IS NOT TRIBUTARY TO LIFT STATION NO. 2. PARCEL F, LIKE PARCEL A, MAY ALSO BE SERVED BY THE EAST WWTP. SHOULD THIS OCCUR, THE 500 PE SHOWN FOR SAID PARCEL F, SHALL BE AVAILABLE TO THE OTHER PROPERTIES/LOCATIONS IN THE SERVICE AREA TRIBUTARY TO LIFT STATION NO. 1.



2 of 2	TALAMORE DEVELOPMENT
	VILLAGE OF HUNTLEY, ILLINOIS
	EXHIBIT B-1

Manhard CONSULTING LTD