

CMAP



Orland Park Water Conservation Program DRAFT



June 2012



Chicago Metropolitan
Agency for Planning

The Chicago Metropolitan Agency for Planning (CMAP) is the region's official comprehensive planning organization. Its GO TO 2040 planning campaign is helping the region's seven counties and 284 communities to implement strategies that address transportation, housing, economic development, open space, the environment, and other quality of life issues. See www.cmap.illinois.gov for more information.



Orland Park

Water

Conservation

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Introduction

The Village of Orland Park plays a leading role in environmentally sustainable practices and initiatives. It boasts the nation's first LEED Gold Certified police station headquarters, as well as many organizations, agencies, and individuals committed to sustainable economic development cognizant of human and environmental needs. The Village recognizes these businesses and individuals through various initiatives such as Smart Business Orland Park, Residential Rewards programs, and the Green Tent Challenge.¹

With a population of 58,000, the Village of Orland Park is also home to one of the largest commercial centers in the southwest suburbs. Located 25 miles southwest of downtown Chicago, Orland Park boasts a well-connected transportation system of roads, commuter trains, and highways, and many attractive recreational amenities including the Cook County forest preserves that encircle the community.

In 2009, the Village created the Energy Efficiency and Conservation Municipal Action Plan (ECOMAP)² to reduce the amount of energy used by municipal operations. A key goal of ECOMAP is to educate and provide information to major water consumers on water conservation. In 2011, the Village partnered with the Chicago Metropolitan Agency for Planning's (CMAP) Local Technical Assistance (LTA) program to tailor the 2010 CMAP Model Water Use Conservation Ordinance and use recommendations from the Water 2050³ and GO TO 2040⁴ plans to emphasize water conservation and efficiency through Orland Park's codes and programs. The Village of Orland Park currently has several ordinances and programs that address water use conservation. The goal of this study is to build and add value to existing efforts so that the Village continues its leadership role in sustainable practices by encouraging increased commitment from the community in water conservation efforts.

1 Additional information on these programs can be found at: <http://www.orland-park.il.us/index.aspx?NID=940>

2 <http://www.orland-park.il.us/DocumentView.aspx?DID=1964>

3 <http://www.cmap.illinois.gov/water-2050>

4 <http://www.cmap.illinois.gov/2040/main>

Goals and objectives

In its continuing leadership role in sustainable practices, the Village of Orland Park seeks to work with the various sectors in the community to protect water resources and save energy and money through decreased water use. Additionally, the Village seeks to reduce overall water use to maximize the utility of existing infrastructure, without the need for expansion, while providing optimum service to the community. These goals can be accomplished through the following objectives:

- 1. Reduce water use in all new and renovated construction through water conservation ordinances.**
- 2. Reduce water use in existing buildings through programs.**
- 3. Increase awareness of water use and conservation through outreach and education.**

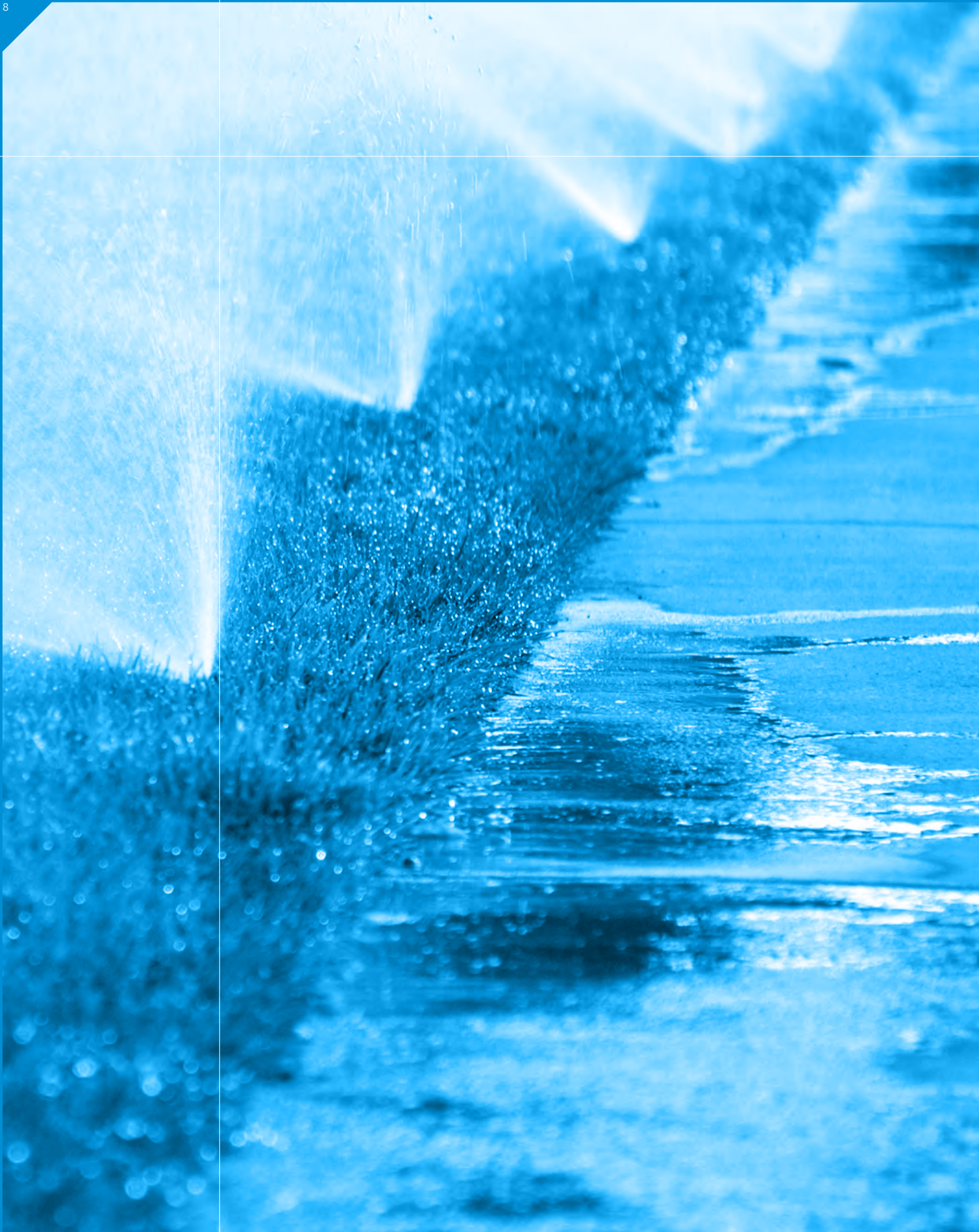
Planning Process

A Steering Committee of Village officials and community stakeholders guided this planning process, which officially started towards the end of 2011. The Steering Committee and CMAP met monthly to review project documentation and discuss necessary actions and steps towards successful completion of the project. Two public meetings were held in February and March 2012 to inform the community of the project and solicit input. These meetings, which were held in the Orland Park Public Library, were widely publicized through the various Village channels, as well as through posters and postcards distributed at key locations around Orland Park. Additional discussions and opportunities for public input were offered through several presentations to the Orland Park Plan Commission and Development Services Committee. The project website (www.cmap.illinois.gov/orland-park) presented an additional mechanism for communicating project updates.

Water Conservation in Orland Park

Currently, the Village of Orland Park receives Lake Michigan Water purchased from the Village of Oak Lawn. Oak Lawn is a wholesaler that provides water purchased from the City of Chicago to the communities of Mokena, New Lenox, Oak Forest, Tinley Park, and Orland Park, as well as other downstream communities. Use of Lake Michigan water is regulated by the Illinois Department of Natural Resources (IDNR) which uses a permit system to track annual consumption. IDNR is charged with the administration of and compliance with the Level of Lake Michigan Act (615 ILCS 50) that governs water use for northeastern Illinois communities that have been granted an allocation of lake water.⁵ The Level of Lake Michigan Act was passed in response to a 1967 U.S. Supreme Court Consent Decree that placed limits on the Illinois diversion of Lake Michigan. Communities that have an allocation are required to submit an annual water use audit form (LMO-2) and adopt several conservation practices including leak detection and monitoring, metering, and ordinances that restrict nonessential outside water uses during peak summer months.

5. CMAP 2010. *Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan*.



Water Use

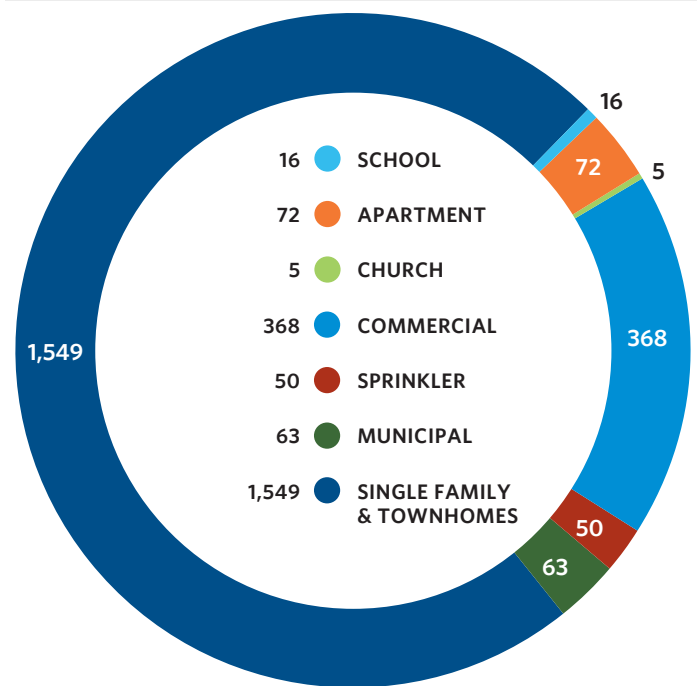
Annual water use in Orland Park has averaged approximately two billion gallons between 2001-11.⁶ This is equivalent to 108 gallons per capita per day (GPCD). In 2005, the average consumption for Cook County was 193 GPCD, while for the northeastern Illinois region, water usage averaged 183 GPCD.⁷

The seven sectors that the Village of Orland Park bills for water use are: apartments, commercial, municipal, single family households and townhomes accounts, schools, places of worship, and sprinkler accounts. Sprinkler accounts refer to separately metered landscaped areas mostly associated with commercial accounts. The municipal sector includes all buildings owned by the Village, the Orland Park Public Library, the Orland Fire Protection District, and the Orland Township.

The residential sector (single family and townhomes) is the largest consumer of water in Orland Park, currently and over the last ten years (Figs. 1 and 2), followed by the commercial sector. However, the sectors that have highest average usage of water per account are municipal buildings and schools, followed by sprinkler accounts (Table 1). The high consumption rate for municipal accounts may be explained by the building types included in this sector, such as the Sportsplex, the Centennial Park Aquatic Center, and various Village Recreation and Parks properties.

Schools in Orland Park are not regulated by Village building regulations, thus attaining increased water conservation in this sector may be best achieved through programs. There is a history of successful collaboration between the Village and the school districts in energy efficiency programs that may form the foundation for water conservation initiatives. For the sprinkler accounts, a combination of ordinances and programs may be the most effective approach for water use reductions. This is further discussed in the recommendations section.

Figure 1: 2011 Total water consumption by sector, in millions of gallons



Sources: Village of Orland Park, 2012; CMAP analysis, 2012.

6. Water consumption data was provided by the Public Works Department of the Village of Orland Park.

7. Dziegielewski, B. and Chowdhury, F.J. 2008. Regional Water Demand Scenarios for Northeastern Illinois: 2005- 2050. Also available at: <http://www.cmap.illinois.gov/water-2050>.

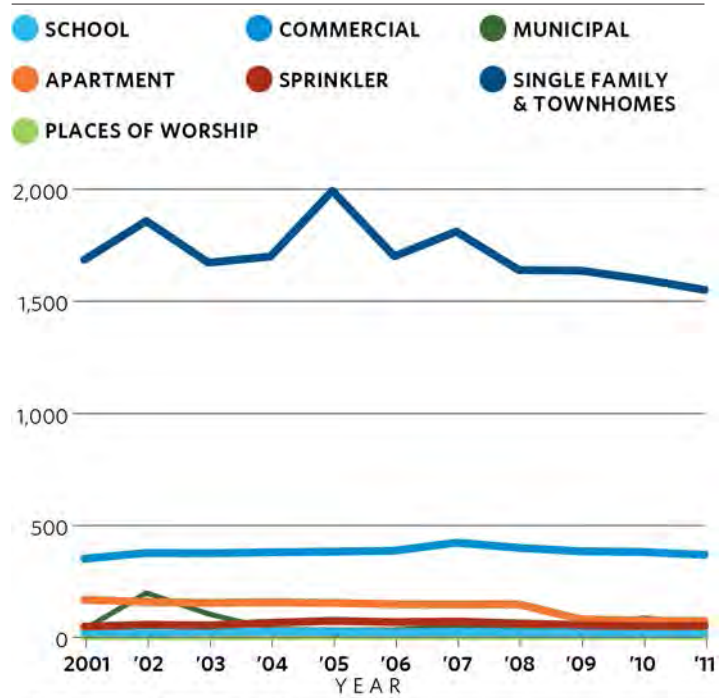
Between 2001 and 2011, several significant changes in water use occurred in Orland Park, most notable is the reduction in apartment water use and the water use increases in municipal and places of worship. The majority of the decrease in apartment water used is most likely attributable to a reclassification of a number of accounts in the Village's water billing system. A number of accounts had been classified as apartments, but upon further review, it was determined that these accounts should be classified as commercial. Accounts included in this reclassification, which occurred in 2009, were assisted living facilities, as well as various condominium complexes. In the municipal sector the expansion of the Centennial Park Aquatic Center was a significant addition between 2001 and 2011, while the increase in water use in places of worship may be explained by the construction and expansion of several facilities during that period. The following subsections offer further analysis of water use in the residential (single family, townhomes, and apartments), commercial, and municipal sectors which are the top three users of water in the Village of Orland Park.

Table 1: 2011 Average annual consumption by account

SECTOR	PERCENTAGE WATER USE	ACCOUNTS/ SECTOR	AVERAGE CONSUMPTION/ ACCOUNT (GALLONS)
Apartments	3	1,357	53,264
Places of worship	1	24	202,818
Commercial	17	1,875	196,229
Municipal	3	52	1,229,765
Single family & townhomes	73	22,376	69,344
Schools	1	22	730,545
Sprinkler	2	130	387,285

Sources: Village of Orland Park, 2012; CMAP analysis, 2012.

Figure 2: Total consumption by sector 2001- 2011, in thousands of gallons



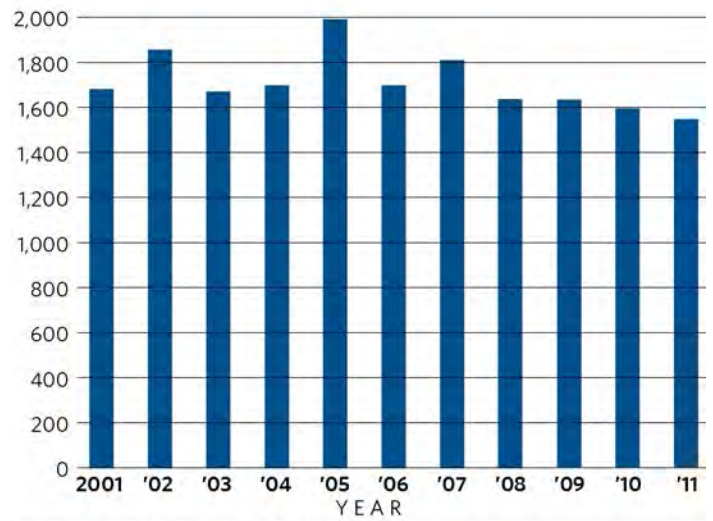
Sources: Village of Orland Park, 2012.

Residential Water Use

Residential consumption accounts for 76 percent of total use in Orland Park. There are 22,376 single family households and townhomes in Orland Park, and 3,157 apartments that collectively used 1.5 billion gallons of water in 2011, equivalent to annual use of 69,343 gallons per unit.⁸ While the overall average water use in Orland Park is less than the average usage in the northeastern Illinois region and in Cook County, the residential rates of water use are slightly higher than the regional averages. In 2005, the average residential per capita water use in Orland Park was 95 gallons, compared to an average residential water use in northeastern Illinois of 87 GPCD and a range between 70 and 80 GPCD for the highest frequency of water use among 300 municipalities in the region.⁹ The reason for this difference may be due to larger homes and lot areas for residences in Orland Park. Housing density may be another explanation for higher water use rates. Studies completed elsewhere in the nation have concluded that water demand tends to increase with lower development densities.¹⁰

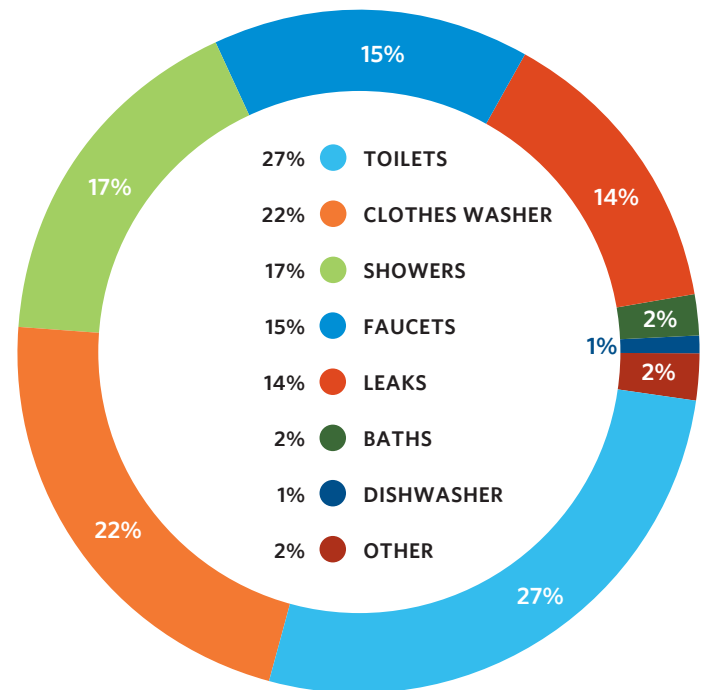
Analysis of residential water use between 2001 and 2011 shows spikes in consumption during 2002, 2005, and 2007 in which consumption exceeded 1.8 billion gallons of water. Incidentally, these years coincided with drought or dry spells as a result of shortfalls in precipitation. This positive correlation potentially reflects increased reliance on irrigation versus rainfall for landscaped areas. Therefore, it is important to address water conservation and efficiency measures for outdoor use in the residential sector as well as indoor uses. This is further supported through analysis of annual residential consumption which shows higher rates of usage during the months of August, September, and October.

Figure 3: Residential water use 2001- 11



Sources: Village of Orland Park, 2012; CMAP analysis, 2012.

Typical daily residential water use breakdown



Source: Mayers et. al. 1999. Residential End Uses of Water.

8. Water consumption data was provided by the Public Works Department of the Village of Orland Park.

9. Dziegielewski, Benedykt. 2009. Residential Water Use in Northeastern Illinois.

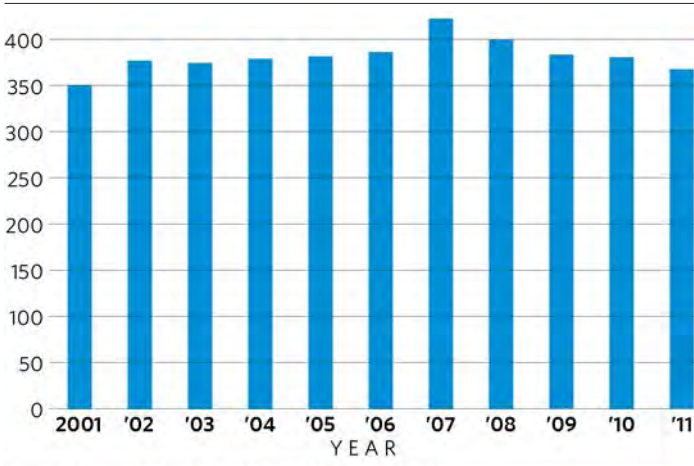
10. Gallo, D. 2007. Water Resource Impacts of Low and High Density Residential Developments: A Comparative Analysis. Center for Economic Development, California State University, Chico. Analysis from this study demonstrated that the annual water consumption in a 2-person household was 73,000 gallons at a 10 unit/acre development versus 116,800 gallons for the same size household at a three units/acre district.

11. Illinois State Water Survey, Prairie Research Institute. Drought Trends in Illinois. <http://www.isws.illinois.edu/atmos/statecli/climate-change/ildrought.htm>. Retrieved on March 11, 2012.

Commercial

The commercial sector was the second largest consumer of water in 2011, with a median annual usage rate of about 380 million gallons of water which was 17 percent of the total water use in Orland Park. The number of accounts billed for water use in this sector total 1,875 and includes manufacturing, construction, and retail, among others. As commercial activity increased in Orland Park between 2002-07¹³ a corresponding increase in water use occurred, however, the ordinance that provided for the Village’s first conservation water rate structure passed 2002 may have spurred additional conservation activities. Based upon this structure, higher rates per thousand gallons were charged between May 15th and October 15th of each year. In 2007, the Village further enhanced its conservation rate structure, charging higher rates for higher consumption year round as opposed to only during the summer months. The rates were structured in tiers; the lowest rate applied to usage between 0- 9,000 gallons, the next highest rate applied to usage between 9,001- 18,000 gallons, and the highest rate applied to usage above 18,000 gallons (see page 14, Existing Ordinances). This is notable because while water use dropped in this sector between 2007 and 2011, the number of billed units increased by 23 percent. Reduced water demand in more recent years may also be attributed to the prevailing economic conditions.

Figure 4: Commercial water use 2001-11



Sources: Village of Orland Park, 2012; CMAP analysis, 2012.

12. Comparison of 2002 Economic Census Data and 2007 water billing data from the Village of Orland Park.

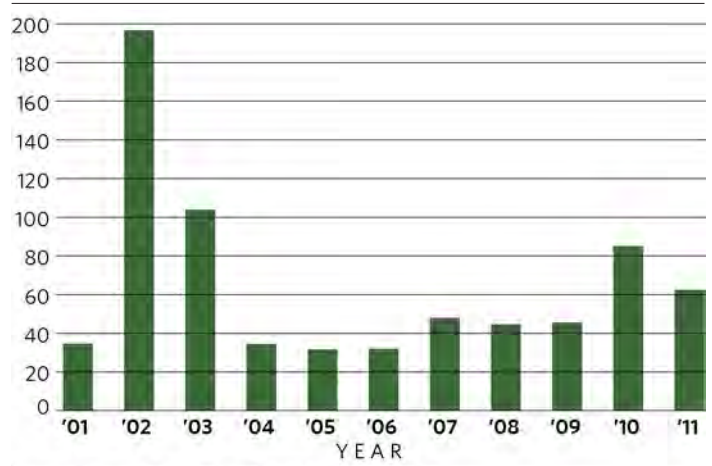
13. In 1992, the pool was 6.3 acres with only the zero-depth pool, aka 'Beach Pool.' The two pool additions in the early 2000's increased the size of the site to 13.1 acres corresponding to a total of 743,709 gallons of water (Activity Pool- T-pool: 239,500 gallons, Lazy River: 224,027 gallons, Beach Pool: 280,182 gallons)

Municipal

The municipal sector accounts for three percent of water use in Orland Park. The significance of further analysis of and recommendations for water conservation measures in this sector is due to the large average water usage per account as well as the opportunity posed by the leading role that the Village plays in sustainability practices. Recommendations implemented in this sector will reach a vast proportion of the population and will present an immense opportunity for public outreach and education.

The most notable change in water use in this sector were the spikes during 2002 and 2003 which corresponded with the significant expansion of the Centennial Park Aquatic Center¹³ and a leak in the “lazy river” during that time. The first pool structure was the zero-depth pool, built in 1992, which included a 280,182 gallon pool, then in 2000, a second 463,527 gallon pool and water slides encompassed in a ‘lazy river’ were added. The spikes in 2002 and 2003 were of great concern and were addressed during the off-season through a thorough inspection process seeking to identify all breaches in the structure. In 2010, additional leaks were detected in the plumbing systems associated with the aquatic center facility outside of the pools. Although immediate action was taken to correct those issues, significant water loss occurred prior to detection.¹⁴ The Village is now employing a check list that includes regular water meter reading for more immediate identification of possible malfunctions in the plumbing systems. In 2010 and 2011, the Township office facilities,¹⁵ built in the early to mid-1990’s, were added to the municipal sector which resulted in significant increases in water consumption in this sector.

Figure 5: Municipal water use 1998-2011



Sources: Village of Orland Park, 2012; CMAP analysis, 2012.

14. Information provided by the Steering Committee.

15. The Township building, which covers an area of 18,408 square feet, uses approximately 25,000 gallons of water per month according to billing records.

Figure 6: Centennial Park Aquatic Center



Source: <http://www.facebook.com/OrlandCPAC>.

Figure 7: Orland Township Building



Source: <http://orlandpark.patch.com/articles/orland-township-was-sole-area-taxing-body-to-keep-rate-steady-in-2010>.

Existing Ordinances

Title 4 of the Orland Park Village Code contains three articles that pertain to water use conservation, summarized below. In the proposed Water Resources Chapter, these articles may be modified to include additional water conservation measures. This is further explored at the Recommendations section.

1. Anticipated water usage for development

Chapter 1, Additional Conditions 4-1-6(i). Under the provisions of this article, owners/developers are required to provide a study to the Village that describes anticipated water usage for a proposed development once fully complete. Village staff reviews the study to establish the availability of sufficient water capacity.

2. Pricing

Chapter 3, Water Charges and Rates 4-3-1-1(A). This article establishes the bi-monthly service charge per billing unit in the Village. Currently, the water rates are based on an increasing block structure based on three levels. Level 1 refers to usage less than 9,000 gallons, the next level ranges from 9,000 to less than 18,000 gallons, and Level 3 includes usage of 18,000 gallons and over. Rates increase across levels with Level 1 being the lowest and Level 3 being the highest.

3. Restrictions on outdoor water use

Chapter 8, 4-8-3. The Village permits lawn irrigation only between 7:00-11:00 AM and 7:00-11:00 PM year round. During the summer months — May 15 to September 15 — outdoor water use is allowed on an even/odd basis in which street addresses that have an even last digit are allowed outdoor water use during even numbered calendar days, and addresses that end in an odd digit are allowed outdoor watering on odd numbered calendar days. The restrictions include all manners of irrigation whether performed by manual hose or by automatic sprinkler systems. Certain uses such as golf course irrigation, construction or building renovation, and commercial car wash operations are not included in the above restrictions. Permits for exemptions from these restrictions are available for newly sodded lawns. The Orland Park Plumbing Code requires lawn sprinkling systems to be equipped with approved rain detection devices.

Landscape specifications are currently located in the Land Development Code under Section 6-305 Landscaping and Bufferyards. Landscape practices are critical to water conservation efforts since outdoor water use comprises a significant percentage of overall consumption.¹⁶

4. Landscape specifications

The Village encourages the selection of native landscaping materials where feasible and for the landscaping to provide natural habitat for birds and other animal life while preserving existing natural vegetation. A listing of recommended plantings is included in the landscape specifications. The Village also offers bonuses if the number of plantings exceeds the requirements by at least 25 percent, if use of native landscaping accounts for at least 75 percent of the required plantings, and for the installation of automatic garden sprinklers. A minimum topsoil depth of 6 inches is required for new residential subdivisions, commercial areas and parks.

5. Plumbing specifications

Title 5 Chapter 4, Village Code. The Village of Orland Park Plumbing Code follows the Illinois State Plumbing Code. Section 890.1140(d) states that any lawn sprinkler system connected to a potable water supply shall be equipped with a reduced pressure principle backflow preventer assembly. The amendment in Section 890.1140(d) requires that all lawn sprinkler systems be equipped with an approved rain detection device. The Permit requirements of Section 890.1940 state that all plumbing work, whether new construction or alteration, requires the issuance of a permit that may be included in the Village Building Permit. Such permits are issued only to licensed plumbers except in the case of a single family residence where a plumbing permit may be issued to the owner/occupant or lessee/occupant of said residence if said person(s) only employ a licensed plumber.

16. Approximately 30- 60% of residential water use is contributed to outdoor uses, mostly landscape irrigation. Vickers, Amy, 2001. Handbook of Water Use and Conservation.

Existing Programs

1. Rainwater harvesting

The Village has been active in publicizing rain barrel sales and making them available to residents. The Village also promotes the use of stormwater cisterns to collect and store runoff for irrigation and nonpotable uses in nonresidential sectors.

2. Cost-share program for rain detection devices

The Village requires that lawn sprinkling systems in new developments be equipped with approved rain detection devices at installation. To facilitate retrofit of existing systems, the Village has administered a cost-sharing program where participants were reimbursed 50 percent of the cost of installation, up to \$70, and were issued a no-cost installation permit.

3. Education/outreach

Through the Green Tent Challenge and the Residential Rewards programs¹⁷ the Village promotes various activities designed to improve home efficiencies and save money on utility bills. The programs currently award points for the installation of low flow toilets, faucet aerators, efficient showerheads, and landscaping with native plants, among other activities. Participants are entered into a drawing to win memberships in the Orland Park Sportsplex or Centennial Park Aquatic Center.

17. www.smartlivingop.com

WATER WHEEL

YOUR GUIDE TO HOME WATER CONSERVATION

WATER SAVING IDEAS

POTENTIAL WATER WASTER
WHAT YOU CAN DO

TOILET

Repair leaks

Add a few drops of food coloring to water in tank. If coloring appears in toilet without flushing, there is a leak. Also, listen for sound of running water or pump. Remodel with low consumption (1.5 gal./flush or less) toilets.

LEGEND

Don't leave water running



Fill sink and stopper or fill container with water

L = Large Amount
M = Medium Amount
S = Small, but significant amount.

OTHER WATER SAVING TECHNIQUES

WHY SAVE WATER?

- Clean drinking water is a vanishing resource
- Water saved is money saved
- Saving water reduces waste loads

WATER SAVED

M

HOW MUCH WATER ARE WE USING?

- Household faucet: 3-5 gal. min.
- Shower: 5-10 gal. min.
- Tub bath: 50 gal., if full
- Toilet flushing: 5-7 gals.
- Dishwasher: 15-25 gals.
- Washing Machine: 35 gals.
- Lawn watering: 35 gals. 1/3 acre
- Dripping faucet: 1,000 or more gallons/year.

WATER SAVING DEVICES

A number of inexpensive devices are now available that will enable you to save even more water and energy. For more information, contact your plumber or hardware store or your local government environmental office.



www.plumbingcouncil.com

Recommendations

Ordinance recommendations

Village staff is proposing the establishment of a separate Water Resources Chapter to be added to the Village Code. The chapter will be composed of two sections: stormwater management and water use conservation. The following sections present the recommended ordinance language to be added to the water use conservation section of the proposed Water Resources Chapter and Title 5 Chapter 4 of the Village Code- the Plumbing Code, with appropriate cross-referencing. The existing ordinance language can be modified to incorporate the recommended items where appropriate or cross referenced to the relevant location. Ordinance recommendations are intended to provide language that Village Staff can easily transfer to the new chapter; therefore, existing codes that pertain to water conservation are incorporated in the recommendations below and are noted. For ease of readability, ordinance language is indented. Commentary further clarifying ordinance language is also included in this section.

Indoor water use

1. Residential and Commercial

The following ordinance recommendations for indoor water use are intended for addition to the “Anticipated water usage for development” article currently located in Title 4 of the Village Code, Chapter 1, 4-1-6(i). By inserting the items below in this article, developers will be encouraged to seek water saving measures as they report anticipated water usage. Additionally, since developers and builders are accustomed to reviewing the Plumbing Code for specifications on fixtures and fittings, it is recommended that Title 4 of the Village Code cross-references the recommended ordinance language pertaining to indoor water use with the Plumbing Code. This way, information on higher efficiency plumbing fixtures and fittings will be readily available to a builder or property owner when applying for a plumbing and/or building permit.

The requirements below apply to residential and commercial buildings. Additional recommended ordinance language that applies solely to the commercial sector is included in the following section.

Plumbing fixtures and fixture fittings

Plumbing fixtures and fittings in all new and remodeled construction shall not exceed the following flow rates and must be WaterSense¹⁸ labeled products, if available, or shall at a minimum maintain alignment with the most current U.S. Environmental Protection Agency (U.S. EPA) WaterSense product specification standards, where applicable.

Toilets (water closets)

No toilet shall have a flush volume greater than 1.6 gallons per flush (gpf).

Gravity, Pressure Assist and Electro-Hydraulic Tank-type Toilets¹⁹

All gravity, pressure assist and electro-hydraulic tank type toilets shall have a maximum effective flush volume of not more than 1.28 gallons of water per flush in accordance with American Society of Mechanical Engineers (ASME) A112.19.2/ Canadian Standards Association (CSA) B45.1 or ASME A112.19.14 and shall comply with the EPA WaterSense Tank-Type High Efficiency Toilet Specification.

Note: The effective flush volume for dual flush toilets²⁰ is defined as the composite average flush volume of two reduced flushes and one full flush.

Flushometer-Valve Activated Toilets²¹

All flushometer-valve activated toilets shall have a maximum flush volume of not more than 1.6 gpf in accordance with ASME A112.19.2/CSA B45.1.

Faucets

No faucet shall have a flow volume greater than 2.2 gallons per minutes at 60 psi (pounds per square inch).

Lavatory Faucets

The maximum flow rate for lavatory faucets shall be 1.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/ CSAB125.1 and shall comply with the EPA WaterSense High Efficiency Lavatory Faucet Specification.

Kitchen Faucets

The maximum flow rate for kitchen faucets shall be 2.2 gallons per minute at 60 psi.

18. WaterSense is a program by the U.S. Environmental Protection Agency in which water-using products are tested and certified for efficiency by an independent third party. This certification insures that products are 20% more efficient than average products and that they perform as well or better than their less efficient counterparts. For more information on WaterSense labels visit: http://epa.gov/watersense/about_us/watersense_label.html.

19. Electro-Hydraulic Tank Type Toilets are toilet fixtures of siphonic or washdown design that uses a motor, pump, and controller to assist flushing action.

20. Dual flush toilets are high efficiency toilets designed with two flush volumes, a reduced flush (0.8 gpf) for liquid waste and a full flush (1.6-1.28 gpf) for solid waste.

21. Flushometer-Valve Activated Toilets are toilets that flush by valves that discharge a predetermined quantity of water to the fixture and are actuated by direct water pressure.

Showerheads (for the residential sector only)

The maximum flow rate for showerheads shall be 2.0 gallons per minute at 80 psi in accordance with ASME A112.18.1/CSA B125.1. The showerhead shall be supplied by an automatic compensating valve that complies with American Society of Safety Engineers (ASSE) 1016 or ASME A112.18.1/CSA B125.1 and specifically designed for the flow rate of the showerhead being used.

Dishwashers

Dishwashers shall comply with U.S. EPA ENERGY STAR²² Program Requirements.

Clothes Washers

Clothes washers shall comply with the U.S. EPA ENERGY STAR program requirements.

Potential water and energy savings from adopting various items in the recommended ordinances above are summarized in Table 2.

Table 2: Potential water and energy savings

WATER SAVINGS		
FIXTURE	POTENTIAL WATER SAVINGS (GALLONS) HOUSEHOLD/DAY	POTENTIAL WATER SAVINGS (GALLONS) HOUSEHOLD/YEAR
Toilet	32	11,500
Lavatory Faucet	15	5,500
Showerhead	7	2,400
Clothes Washer	12	4,500
ENERGY SAVINGS		
FIXTURE	ENERGY SAVINGS (kWh/HOUSEHOLD/DAY)	ENERGY SAVINGS (kWh/HOUSEHOLD/YEAR)
Lavatory Faucet	0.84	307
Showerhead	0.86	317
Clothes Washer	1.40	511

Source: CMAP 2010 Model Water Use Conservation Ordinance.

2. Commercial Only**Urinals**

Urinals shall have a maximum flush volume of not more than 0.5 gpf (i.e. High Efficiency Urinals, HEUs) in accordance with ASME A112.19.2/CSA B45.1 or International Association for Plumbing and Mechanical Officials (IAPMO) Z124.9.

Public or Public Use Lavatory Faucets

Lavatory faucets installed in bathrooms of buildings or occupancies other than for residential or private use shall be self closing, metering faucets or manual faucets and must comply with the flow rates below. Private bathroom faucets in hotels and hospitals are an exception and shall have a maximum flow rate of 1.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/CSA B125.1.

Self-Closing²³ and Manual Faucets

The maximum flow rate shall be 0.5 gallons per minute at 60 psi in accordance with ASME A112.18.1/CSA B125.1.

Metering Faucets²⁴

Metering faucets shall deliver not more than 0.25 gallons of water per cycle.

Showerheads

The maximum flow rate for showerheads shall be 2.0 gallons per minute at 80 psi in accordance with ASME A112.18.1/CSA B125.1. The showerhead shall be supplied by an automatic compensating valve that complies with ASSE 1016 or ASME A112.18.1/CSA B125.1 and specifically designed for the flow rate of the showerhead being used. This does not apply to emergency safety showers and emergency eye wash stations.

Drinking Fountains

Drinking fountains shall be self closing.

Water Recycling System

All new and remodeled commercial car-wash and laundry facilities shall be equipped with a water recycling systems.

22. U.S. EPA ENERGY STAR is a national joint energy efficiency program of the U. S. Environmental Protection Agency and the U. S. Department of Energy. www.energystar.gov

23. A faucet that is designed to close itself as soon as the activating mechanism is released.

24. A faucet that dispenses water of a predetermined volume or for a predetermined period of time after actuation. The volume or cycle duration can be fixed or adjustable.

Pre-Rinse Spray Valves

In eating and drinking establishments, the maximum flow rate for a pre-rinse spray valve installed in a commercial/institutional kitchen to remove food waste from cookware and dishes prior to cleaning shall be 1.6 gallons per minute at 60 psi. Where pre-rinse spray valves with maximum flow rates of 1.3 gallons or less are installed, the minimum static pressure shall be 30 psi. Commercial/institutional kitchen pre-rinse spray valves shall be equipped with an integral automatic shut off. All new and existing establishments that serve food must install a pre-rinse spray valve in accordance with this section.

Ice Machines

For new and remodeled construction, ice machines shall be air cooled and shall comply with the U.S. EPA Program for Commercial Ice Machines.

Potential water savings from adopting various items in the recommended ordinances above are summarized in Table 3.

Table 3: Potential water savings

FIXTURE/ FITTING	EPAct 1992 STANDARD	ORDINANCE STANDARD	% REDUCTION W/ ORDINANCE
Toilet	1.6 gpf	1.28 gpf	20%
Urinal	1.0 gpf	0.5 gpf	50%
Faucets	2.2 gpm/60 psi	1.5 gpm/60 psi	32%
Showerheads	2.5 gpm/80 psi	2.0 gpm/80 psi	20%

Source: CMAP 2010 Model Water Use Conservation Ordinance.

Outdoor water use

Regulations of outdoor water use in Orland Park are presently located in two separate documents. Title 4 of the Village Code contains restriction on outdoor water use along with certain specifications on lawn sprinkling systems, while other landscaping specifications are in Section 6-305 of the Land Development Code. It is recommended that all language pertaining to outdoor water use be unified where appropriate under the new Water Resources Chapter or cross referenced to the relevant location such as Section 6-305 of the Land Development Code.

1. Residential only

Turf Area and Location

Residents are encouraged to limit the combined size of turf (plus other high water use plants) or other water features to no more than 40 percent of the total developed landscape area.

Planting

Residents are encouraged to use native plants²⁵ and/or low water use plants.²⁶

The 2009 WaterSense Single-Family New Home Specification calls for turf area to not exceed 40 percent of the landscaped area with an exemption for homes equal to or less than 1,000 square feet. The developed landscape area refers to all outdoor areas under irrigation and water features excluding hardscape areas. Some of the mechanisms that have been successfully used to encourage sustainable practices in new developments include bonuses in the form of expedited permitting processes or additional development credits, e.g. reduced setbacks and increased densities. The current Orland Park Landscape Specifications offer bonuses if use of native landscaping accounts of at least 75 percent of the required plantings. For technical expertise and consultation, the Village may wish to consider partnering with the Master Gardeners' program of the University of Illinois Extension to assist residents with proper planting and maintenance.²⁷ The Lawn to Lake Program is an additional resource for information, training, and outreach.

**Outdoor water use constitutes
30- 60% of residential demand.**

25. The Landscaping Ordinance in the Land Development Code contains language that encourages the use of native plantings by providing various development bonuses.

26. Low water use plants generally, once established, can survive on 2 irrigations per month during the summer months.

27. This pollution prevention campaign provides resources and training to those responsible for lawn and landscape care in the Southern Lake Michigan basin. Collaborating partners include CMAP, Illinois-Indiana Sea Grant (IISG), Lake Champlain Sea Grant, Northwestern Indiana Regional Planning Commission (NIRPC), Safer Pest Control Project (SPCP), and University of Illinois Extension. Visit www.cmap.illinois.gov/lawn-to-lake for more information.

2. Residential and Commercial

Soil Depth

Areas planted with turf grass shall have a minimum of six inches of topsoil depth.²⁸ The soil shall be blended with compost in a ratio of soil to compost appropriate to the local soil characteristics. The compost shall be incorporated in the top two inches of the native soil.

Mulching

All exposed soil shall be covered with a two- to three-inch layer of mulching material.²⁹

Landscape Irrigation Equipment

Any new system installed within residential areas must be equipped with rain³⁰ sensing devices that shut off the systems and that are approved as to number and type by the Director of Public Works/Planning. Use of weather-based systems or systems that utilize evapotranspiration irrigation controllers³¹ is allowed.

- Sprinkler heads must not spray onto or over any hardscape areas, including streets, sidewalks, driveways, decks, patios and buildings.
- Strips of land less than six feet in width shall be irrigated by drip irrigation systems or micro irrigation systems.
- Check valves of a specified breakaway pressure rating must be installed at irrigation heads as needed to prevent low head drainage and puddling.

Sources of landscape water waste include:

- Poor irrigation scheduling
- Inefficient irrigation systems and practices
- Fixed notions about what constitutes attractive and functional landscapes

In its leadership role in sustainable practices, the Village of Orland Park should work with the communities of the Oak Lawn water supply system to promote more efficient landscape irrigation scheduling. Below are recommended schedules for landscape irrigation. It is important to note that while the allowable irrigation days have been reduced, irrigation periods have been extended as compared to the existing restrictions in the Village Code.

Landscape Irrigation Days

At even numbered addresses, landscape irrigation may occur only on Wednesdays and Saturdays. Odd numbered addresses may irrigate only on Thursdays and Sundays.

Landscape Irrigation Schedules

Between the months of April through October, landscape irrigation shall not occur between 10:00 A.M. and 6:00 P.M.

Due to the amount of rain that falls in this region, irrigating landscapes bi-weekly should be sufficient for healthy lawns. Studies have shown that odd/even irrigation schedules may increase water usage because homeowners assume they should water every other day, even if they did not water that often before.³² Typical lawns will stay healthy with one inch of water (rainfall and/or irrigation) every five to seven days.

Variations

The following are conditions that allow variances from the above regulations:

- The Village of Orland Park may waive the above requirements if presented with compelling evidence that the site is not suitable for the recommended plantings.
- The requirement for turf and high water use plants, does not apply where the developed landscape areas are less than 1,000 square feet.
- Irrigation using a micro-spray, micro-jet, drip, bubbler system, soaker hose, hand-held hose equipped with an automatic shut-off nozzle is allowed anytime and on any day.³³
- The use of water for irrigation from a recycled water system is allowed with no constraints on irrigation schedules. Recycled system components shall be identified as non-potable water sources.
- The use of discharge water from a water-to-air air-conditioning unit or other water-dependent cooling system is not limited under the requirements of this ordinance.

28. The six-inch requirement is currently included in Section 6-305 of the Land Development Code, Landscaping and Bufferyards.

29. Mulching material refers to a permeable arrangement of organic and/or inorganic materials that help retain soil moisture, suppress weeds, and allow free movement of oxygen into and out of the soil.

30. The Village Code includes rain sensor specifications for lawn sprinkling systems.

31. Evapotranspiration refers to water loss from the soil from evaporation and from plant intake through transpiration. Evapotranspiration data is generally obtained from local weather data that can be programmed into the irrigation system.

32. Approximately 30- 60 percent of residential water use is contributed to outdoor uses, mostly landscape irrigation. Vickers, Amy, 2001. Handbook of Water Use and Conservation.

33. The Village Code currently restricts irrigation using the above-mentioned systems.

3. Commercial Only

Planting

Developers are encouraged to limit turf planting and high water use plants to no more than 50 percent of the landscaped area. Strips of land less than 15 feet in width and planting beds shall be irrigated by low flow or spray irrigation using low angle spray nozzles.

Landscape Irrigation Equipment

In addition to the above requirements under Residential and Commercial, applicants for a development permit are required to submit a water use plan that addresses the measures taken to minimize evaporation loss of water from landscaped areas, utilization of low water using plants, and use of non-potable water for irrigation.

Reporting

New dedicated landscape accounts holders are encouraged to provide a report on an annual basis to the local unit of government on facility water conservation practices. Such report will provide a detailed description of water conservation technologies, irrigation schedules and their connection to weather and soil conditions, plant type, and topography, as well as aggregate water usage versus predetermined water budget. Accounts that demonstrate a reduction in water consumption may be eligible for incentives and rewards.

The Village of Orland Park may wish to provide a questionnaire or a survey to the above mentioned accounts for ease of reporting. When difficult to implement, this requirement may be added to existing review procedures e.g. Landscape Plan Review, as part of permit requirements and approvals or incorporated in the business license renewal process, where applicable. In this case, instead of regular reporting, the enforcing agency may require to view the conditions stated above from applicants seeking permits or approvals and may ask for site inspection as part of the occupancy requirements.

Variations

The following are conditions that allow variations from the above regulations:

- Areas with existing native vegetation that remain undisturbed, areas around the trunk of existing trees, shrub beds, and wildscapes shall be exempt from the soil depth requirement.
- Detention and water quality ponds may not be counted towards the above landscape area requirements.
- Accounts that demonstrate capacity to provide 50 percent of irrigation from recycled water via rainharvesting, e.g. rain barrels or cisterns, are waived from the reporting requirement.

Program recommendations



Image courtesy of the Alliance for Water Efficiency.

Program recommendations are intended for activities for the Village to undertake to promote awareness of water use and increased adoption of conservation measures.

1. Education and outreach

Public awareness is critical to the success of water conservation programs and is a first step for the Village to undertake prior to enacting ordinances or announcing new programs. In addition to learning the benefits of water conservation, the potential for participation by community members increases with the realization that individual actions may have significant impacts at various levels. Education and outreach may take many forms such as print, radio and TV media, direct mail, special events, informational websites and electronic newsletters, bill inserts, brochures and guidebooks, videos/DVDs, flyers, public recognition awards, etc. Since Orland Park has various existing programs, integrating new efforts into current ones is a logical and efficient route to promote public awareness.

A. Residential Rewards Program

This existing program provides a great opportunity for encouraging increased conservation while promoting awareness of water use practices. Linking program activities to water-related events such as Fix a Leak Week (March 11- 19)³⁴, World Water Day (March 22)³⁵, or National Drinking Water Week (May 6- 12)³⁶ may result in increased responsiveness and participation in the program. The Village should consider adopting a similar program for businesses and partnering with the Orland Park Area Chamber of Commerce to recognize businesses that adopt water conservation measures. Recognition may include plaques that can be displayed in prominent places in business facades and announcements through the local media outlets.

Project WET
(Water Education for Teachers)
provides resources for schools
and teachers such as water
testing kits and workbooks
for classrooms.
www.projectwet.org

B. School Programs

School Environmental Clubs can be an ideal medium for education and outreach to Orland Park households. By involving students in leak detection audits³⁷ at school buildings and planting school grounds (where appropriate) with native and low water using vegetation, knowledge about water conserving practices can be transferred from the classroom to the home and shared with family members, neighbors, and the community at large. These efforts can build on the success of the energy efficiency programs administered by the Department of Recreation in partnership with schools in Orland Park, e.g. the Take One Small Step (TOSS) program.

C. WaterSense Partnership

By becoming a WaterSense Partner, the Village will have access to free outreach and educational materials to disseminate to residents and businesses. Participation entails the completion of a registration form and a one-page form describing annual promotional activities e.g. communicating water conservation messages to the community, participating in Fix a Leak Week, and requiring EPA WaterSense-labeled products in rebates. Twenty municipalities and counties in northeastern Illinois have become EPA WaterSense Partners as of February 2012.³⁸

D. Bill inserts

An outreach tool for maintaining communications between water suppliers and customers, bill inserts may include messages ranging from general conservation tips to specific actions being taken by the supplier to enhance water conservation and stewardship. Where bills are mailed to customers, inserts may present a cost-effective communication method as costs range from \$0.02 to \$0.10 per insert. For electronic billing, bill insert messages can be included in confirmation emails. CMAP offers a Bill Insert Program where water suppliers can customize pre-designed water conservation messages for insertion in newsletter or in utility bills.³⁹

34. http://epa.gov/watersense/our_water/fix_a_leak.html

35. <http://www.unwater.org/worldwaterday/>

36. <http://water.epa.gov/drink/drinkingwaterweek/index.cfm>

37. Leak detection audits can be as simple as reporting leaky faucets, toilets and showerheads or can involve the analysis of annual water billing records.

38. <http://www.cmap.illinois.gov/watersense-partnerships>

39. <http://www.cmap.illinois.gov/water-2050/bill-inserts>

2. Incentives

For the largest users of water, specifically in the commercial sector, the Village may consider incentive payments for reductions in water use. For example, the Village may offer a cash amount equivalent to \$1.25/10,000 gallons of water conserved over two years to a business or industry. Such an amount may be in the form of a credit in the water bill. Other incentives include rebates for purchase of water-efficient fixtures or the distribution of residential water conservation kits to encourage more efficient water use in homes. Such kits may include shower timers, high efficiency showerheads, faucet aerators, leak detection dye tablets for indoor water use; or rain gauges, moisture sensors, automatic sprinkler timers, and water hose nozzles for outdoor use. The Village may choose to target the top 25 users of water, identified by the billing records, with the above incentives.

3. Audits

Municipal facilities, schools, and commercial accounts have the highest demand for water per account (Table 1). Regular audits for these sectors may detect inefficiencies and outline opportunities for increased conservation. Establishing key water conservation players in these sectors who will regularly communicate with Village officials to track usage and explore ways to attain reductions is a first and important step towards significant potential savings. Sustainability managers or science and environmental teachers who can establish conservation programs and be the liaisons with Village staff can monitor the success of audit programs. The Village may wish to prequalify consultants to conduct audits and propose water conservation measures. Rebates or incentives may then be offered based on adoption of the audit recommendations. Additionally, by providing estimates of payback periods, participants will obtain an understanding of returns on water conservation investments. The Village can then publicize these efforts, thus achieving increased education while recognizing participants and the sustainability initiatives being practiced.

4. Sustainable landscaping

Various environmental issues such as air and water pollution, stormwater management, and water availability are addressed in sustainable landscaping. A sustainable landscape is one that contains water-wise or low water using plants with deep roots, does not involve the use of harmful pesticides and fertilizers- rather uses organic matter such as compost for soil stabilization, and utilizes permeable paving for reduction of stormwater run-off and increased infiltration of water into the ground, among other practices. As mentioned elsewhere in the report, the Village may wish to consider a partnership with University of Illinois Master Gardeners' program in which volunteers provide training and technical assistance in environmentally-friendly horticultural practices. The Lawn to Lake program, which is a partnership between CMAP, University of Illinois, the Illinois-Indiana Sea Grant, and others, provides resources and training to those responsible for lawn and landscape care.⁴⁰

Through the Sustainable Backyards Program, the City of Chicago provides 50% rebates, up to \$60, for the local purchase of native plants.

5. Conservation pricing

Orland Park has an increasing block rate pricing structure in the water billing process that charges higher rates for increased water use according to a block system that specifies water usage (see Existing Ordinances). The Village should consider adding value to this program by insuring that the rate structure reflects current water usage patterns. Demand may be controlled by increasing the unit price in the highest blocks while basic needs for low volume users would still be met at the same low rate. Research shows that pricing might be less-costly for governmental entities to implement than restrictions.⁴¹ From an economic perspective, monitoring, enforcing and maintaining restrictions is more expensive for a utility than monitoring water metering systems to implement conservation pricing. In addition, conservation pricing allows a utility to maintain revenue while still reducing water use.

40. <http://www.cmap.illinois.gov/lawn-to-lake>

6. Water billing

The bi-monthly water bill from the Village of Orland Park contains a chart depicting information on water usage for the past 12 months for the unit billed. This is important information as it affords the end user the ability to compare their current use with that of last year. Including information on how water use from that account compares to a conserving household, or other similarly-situated households, will allow the user to gain a keener perspective on how additional conservation can impact his or her current water use. In the message portion of the bill, information on water conserving practices and Village programs on the topic will empower community members with the knowledge to control water usage. Such messages can be delivered via email confirmation of payments with electronic billing.

7. Targeted programs for highest users of water

In conjunction with audits or separately, the Village should seek the largest reductions in water use that may be achieved from conservation programs that target the largest consumers. Below are recommended measures for the accounts identified through analysis of water use data and Steering Committee input:

A. Centennial Park Aquatic Center

- I. Weekly leak detection during operation (May-September) via tracking of water use records.
- II. Plumbing retrofits- showerheads, faucet aerators, toilet retrofits.
- III. Sustainable landscaping, use of interpretive signs.
- IV. Educational signs on water conservation in bathrooms, shower stalls, and select areas around pools.

An athletic facility in Massachusetts achieved total water savings of 328,000 gallons and \$3,300 in costs in one year by retrofitting showerheads at an initial cost of \$300.

B. Village recreation facilities such as the Sportsplex

- I. Quarterly leak detection via tracking of water use records.
- II. Plumbing retrofits- showerheads, faucet aerators, toilet retrofits.
- III. Sustainable landscaping, use of interpretive signs.
- IV. Educational signs on water conservation in bathrooms and shower stalls.

C. Municipal parks including parkways and landscaped medians

- I. Sustainable landscaping, use of interpretive signs.
- II. Efficient irrigation systems and scheduling.

D. School District

- I. Sustainable landscaping, use of interpretive signs.
- II. Plumbing retrofits.
- III. Educational signs on water conservation in bathrooms, shower stalls, and select areas around pools where available.

E. Commercial gyms

- I. Plumbing retrofits.
- II. Educational signs on water conservation in bathrooms and shower stalls.

8. Investigate full cost pricing

The Village conducts regular cost/rate studies to evaluate costs of water supply versus rates charged. This is an important initiative that enables the Village to take measures to insure that pricing reflects costs of service, thus providing for revenue stability. With rates that reflect costs, users become more aware of consumption and potentially will exercise increased conservation while utilities may be able to defer to the future the need to expand infrastructure to meet increasing demand. The Village should continue pursuing this pricing balance through the rate studies and insure that recommendations from the studies are incorporated in the water billing when and where appropriate.

41. Mansur, E. and Olmstead, S. 2011. The value of scarce water: measuring the inefficiency of government regulations and Comparing price and non-price approaches to water conservation, 2009.

Implementation

The success of the above recommendations hinges on continuous monitoring and follow-up. The Village is in a good position to track the success of water conservation programs due to the excellent water use records kept by the various departments. The Smart Living Taskforce is the ideal body to oversee the implementation of these programs and monitor accomplishments. Perhaps the most direct method to measure implementation progress is to track numbers of participation in the various recommended programs. For example, participants in the Residential Rewards program can be surveyed to estimate levels of activity accomplished in water conservation. The number of businesses and schools that conduct an audit and implement water conservation initiatives can be tracked to evaluate the success of this program.

It is important for the Village to provide information on costs for programs that promote retrofit of plumbing fixtures and fittings. Table 4 lists costs for various items.

Table 4: Sample costs in 2012 dollars

FIXTURE/FITTING	RETAIL COSTS	INSTALLATION COSTS
Toilet	\$75-\$600	\$150-\$500
Showerhead	\$4-\$8	\$0
Faucet aerator	\$.5 - \$3	\$0
Faucet replacement	\$50-\$250	N/A

Source: Ron Grabski, Green Construction Consultant, Plumbing Contractors Association of Chicago and Cook County, CMAP staff.

Regarding enforcement, the Village may consider implementing the steps below which are adapted from the Albuquerque Bernalillo County Water Authority program:

- Most water waste cases begin with a complaint from the public.
- Water waste is observed and documented by inspection staff.
- A notice-of-violation is sent by certified mail to the water billing address within fifteen days of the water waste observation. The notice informs the customer that a fee for the water waste will be assessed on the next water bill.
- A customer may contact the inspector who signed the notice to ask questions or arrange to view the videotape.
- A customer who has received a notice-of-violation may contest the fee assessment by filing a written request for a hearing with the Village Manager or his/her designee.
- The Village must receive the request within seven days of the notice-of-violation.
- If the fee assessment is not contested or if the fee assessment is upheld by the Village Manager, the fee is included on the next water bill. Water waste fees must be paid like any other charges on the water bill.



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