

# Memo

To: Dale Schepers, Director of Public Works  
Jennifer Prinz, PE  
Project Files

From: Jonathan J. Dykstra, CFM

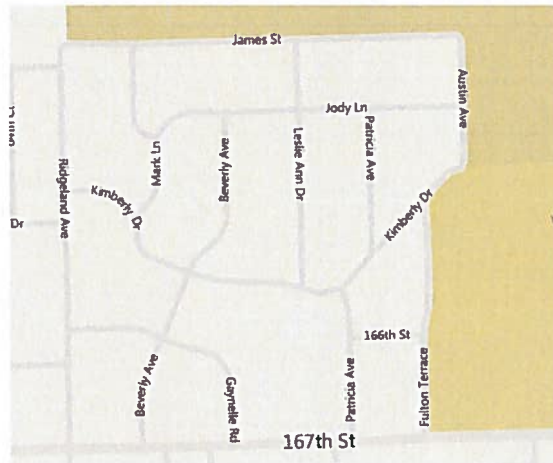


Date: October 12, 2011

RE: Kimberly Heights Subdivision – Tinley Park, IL  
Master Drainage  
REL Project #11-205

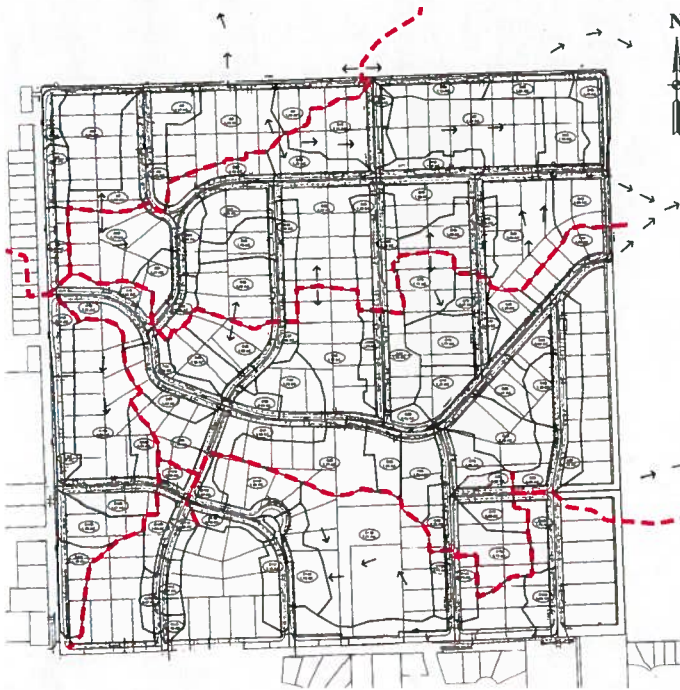
## EXECUTIVE SUMMARY

As requested, Robinson Engineering, Ltd. (REL) has completed a master drainage study for the Kimberly Heights Subdivision. The Kimberly Heights Subdivision is a residential neighborhood bordered by 167th Street on the south, Ridgeland Avenue on the west, and the Cook County Forest Preserve on the north and east as shown in the map to the right. Approximately two-thirds of the area has been annexed to the Village since 2000. As part of the annexation, the Village has taken over jurisdiction of the roadways and system of roadside ditches. At previously held public meetings, residents expressed that they want to maintain the current system of roads and roadside drainage ditches and do not want sidewalks and curbed streets.



Over time, many of the roadside ditches have been filled in by various landscaping, culvert enclosures or other such modifications that act as restrictions to stormwater conveyance. There have been several reported drainage complaints within the area as shown on Exhibit 1. The Village's response was to authorize a drainage investigation and development of a roadside ditch master plan.

To develop a master plan, REL performed the following tasks:



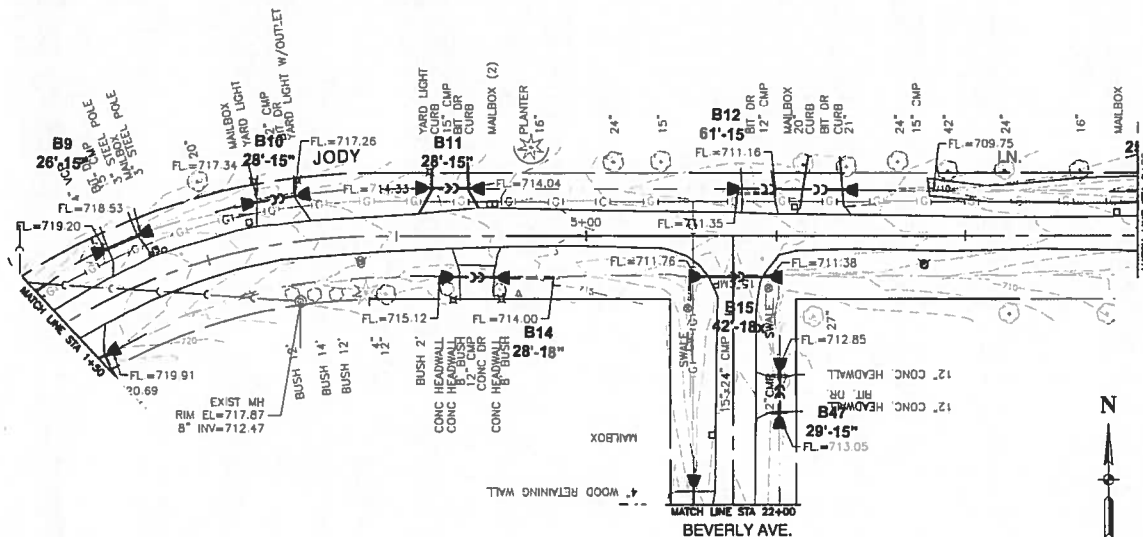
- Assembled data from previous work completed in the area
- Performed field topography of the remaining roadways
- Supplemented the topography with the County's aerial photography and 2' contour mapping
- Delineated major drainage divides and 93 drainage subareas as shown in the figure to the left
- Computed the drainage characteristics of area, runoff curve number and time of concentration for each of the 93 subareas

- Prepared a TR-20 hydrologic model of watersheds and determined the critical peak 10-year flowrates to be used for sizing proposed driveway and roadway culverts and ditch improvements
- Used the TR-20 results and CulvertMaster computer program to size 193 driveway and roadway culverts with a total pipe length of over 7,000 lineal feet
- Used the FlowMaster computer program to evaluate ditch grading and shaping improvements for nearly 22,000 lineal feet of roadside ditches
- Used AutoCAD to layout the proposed culverts and storm sewer structures
- Prepared an opinion of probable cost (cost estimate) for construction of the improvements



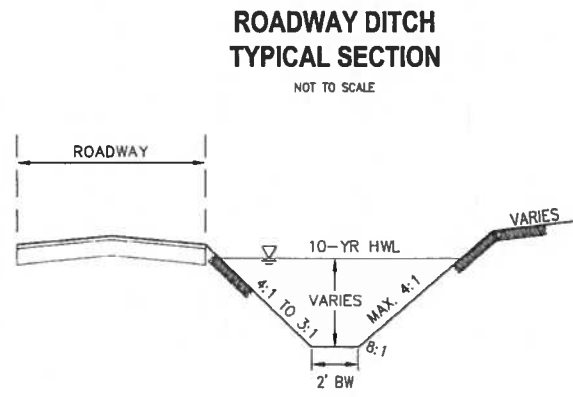
For the proposed replacement culverts, a typical minimum size of 15" diameter was used throughout which is consistent with the Village practice; however, in some cases 12" diameter pipes are called for due to cover limitations and minimal upstream tributary stormwater runoff (< 1.0 cubic feet per second (cfs)). In many cases, driveway and roadway culverts will need to be elliptical or arch-shaped pipes to accommodate limited cover situations. Reinforced concrete pipe (RCP) is assumed throughout for all culverts as opposed to the pipe material used for most of the existing culverts which is corrugated metal pipe (CMP). One proposed roadway outfall culvert will consist of

a 4' x 2' box culvert due to a critical peak 10-year flow that exceeds 36 cfs. Each proposed driveway or roadway culvert will have a flared end section at either end to facilitate flow transitions. A sample plan view (taken from Jody Lane) is shown below.



Because runoff naturally proceeds in a downhill direction, many culverts within the non-annexed portions of Kimberly Heights are also proposed to be replaced up to and including the ultimate outfall culvert. When upstream culverts are improved, the downstream culverts also need improving otherwise they will act as restriction points that may cause unnecessary ponding. A total of 193 culverts are proposed to be replaced, and in most cases upsized in capacity.




Nearly 22,000 lineal feet of existing ditches through the subdivision will need grading or shaping to some extent. In some instances (i.e., poorly draining stretches) significant grading will be necessary. Typically, many ditches will need to be lowered by approximately one foot to improve cover conditions at the culverts and to facilitate 10-year conveyance. In cases where existing ditches have been filled in by property owners, these will be restored to a 10-year design. The proposed typical ditch section to be used is shown in the illustration to the right. A 2-foot bottom width is proposed with typical 4:1 side slopes. In cases where 4:1 side slopes are not attainable, the street side slope can be steepened up to a maximum slope of 3:1. Alternatively, both sides could be steepened similarly to the same slope (e.g., 3.8:1 or 3.5:1). However, a side slope of 4:1 or flatter should be the typical goal to facilitate mowing and other maintenance.



The cost to construct the master plan culvert and ditch improvements for the Kimberly Heights Subdivision is estimated to be in the neighborhood of **\$1.5 million**.

# EXHIBIT 1

## LEGEND

-  Unincorporated parcel
-  Street with identified ditch grading issues
-  Recorded drainage complaint (not limited to culvert)



Estimate & Schedule of Prices

STATE	UNITS	REL JOB#	ESTIMATOR
IL	ENG	02-151	JSP

PRINT FORMS

OPTIONS

UP DN

DELETE

INSERT

Pre-Bid MODE

Post-Bid MODE

Final MODE

Click for ITEM LIST

CHANGE EST QUANT DECIMAL

County \_\_\_\_\_

MUNICIPALITY VILLAGE OF TINLEY PARK

Section \_\_\_\_\_

Project \_\_\_\_\_ Surface \_\_\_\_\_

Total Length \_\_\_\_\_ Type \_\_\_\_\_

Net Length \_\_\_\_\_ Width \_\_\_\_\_

Bridge or Culvert \_\_\_\_\_ Shoulder \_\_\_\_\_

Length \_\_\_\_\_ Type \_\_\_\_\_

Width \_\_\_\_\_ Width \_\_\_\_\_

Location & Description

KIMBERLY HEIGHTS SUBDIVISION

WATER MAIN EXTENSION PHASE III

Item No.	S.P. Req	Code Number	Items	Unit	Estimated Quantities	Estimated Unit Price	Estimated Cost
							\$1,655,500.00
1			8" DIWM CLASS 52 WITH POLYETHYLENE ENCASEMENT	LN FT	8710	60.00	522,600.00
2			8" x 8" TAPPING SLEEVE AND VALVE IN 48" VALVE VAULT	EACH	2	8000.00	16,000.00
4			FITTINGS	LBS	6500	5.00	32,500.00
5			HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE (WATEROUS OR APPROVED EQUAL)	EACH	30	4700.00	141,000.00
6			8" VALVE IN VALVE BOX	EACH	13	1800.00	23,400.00
7			8" VALVE IN 48" VALVE VAULT	EACH	5	2600.00	13,000.00
9			CONNECTION TO EXISTING WATER MAIN	EACH	4	200.00	800.00
10			16" PVC SLEEVE OPEN CUT	LN FT	200	45.00	9,000.00
11			20" STEEL SLEEVE, 3/8 INCH THICKNESS AUGURED	LN FT	160	200.00	32,000.00
12			WATER SERVICE INSTALLATION (LONG-AUGURED)	EACH	52	2150.00	111,800.00
13			WATER SERVICE INSTALLATION (SHORT)	EACH	30	700.00	21,000.00
14			12" CMP REMOVAL AND REPLACEMENT WITH 15" RCP WITH FLARED END SECTIONS	LN FT	940	40.00	37,600.00
24			GRADING AND SHAPING DITCHES	FOOT	6200	15.00	93,000.00
25			BITUMINOUS PAVEMENT REMOVAL AND REPLACEMENT	SQ YD	5000	41.00	205,000.00
26			COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	LN FT	20	20.00	400.00
27			CONCRETE DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	160	55.00	8,800.00
28			BITUMINOUS DRIVEWAY REMOVAL & REPLACEMENT	SQ YD	1600	35.00	56,000.00
30			PORTLAND CEMENT CONCRETE SIDEWALK 5" REMOVAL AND REPLACEMENT	SQ FT	150	8.00	1,200.00
31			TOPSOIL PLACEMENT (4") AND SODDING (SPECIAL)	SQ YD	13750	10.00	137,500.00
32			BUSH REMOVAL AND REPLACEMENT	EACH	6	150.00	900.00
33			TRENCH BACKFILL	LN FT	4000	48.00	192,000.00
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