Engineering
Architecture
Environmental

LABELLA Associates, P.C.

300 State Street, Suite 201, Rochester, NY 14614

Phone 585.454.6110
Fax 585.454.3066
www.labellapc.com

January 11, 2007

Mr. Marty Piecuch
Commissioner of Public Works
Town of Irondequoit
1280 Titus Avenue
Rochester, New York, 14617

Re: Cost Comparison Report for Drainage Improvements to Hoffman Rd. and Conifer Lane
Spring Valley Flood Control Project
LaBella Project No. 206090.07

Dear Mr. Piecuch:

The following report summarizes the comparison of probable material costs for drainage improvements to Hoffman Road and Conifer Lane coinciding with the 2- and 5-year design frequency storms.

IINTRODUCTION

Tributary ONT-112 traverses Spring Valley and flows under Hoffman Road and Conifer Lane via culverts. Both roadways are overtopped with floodwaters several times a year and the Town would like to reduce the frequency of roadway overtopping. The flooding problem at Hoffman Road and Conifer is the same. The valley floor in this area is very flat and both roadways are less than one foot higher than the normal water surface elevation of ONT-112 on a dry day. There is no appreciable difference in elevation between the overbank areas and the roadway. During rain events that exceed the primary banks of the stream, both roadways are overtopped for significant distances.

The proposed improvements to alleviate this flooding include raising both roadways and installing multiple culverts under the roadways in the overbank areas. Hydrologic and hydraulic analyses were performed in order to determine the height to which each roadway needed to be raised and the number of overbank culverts required for both the 2- and 5-year frequency design storms. An opinion of probable material costs was developed for both design frequencies.

HYDROLOGIC ANALYSIS

USGS regression equations summarized in "Regionalization of Flood Discharges for Rural, Unregulated Streams in New York, Excluding Long Island" were used to determine the peak design flows at both locations for the 2- and 5-year frequency design storms. Watershed areas for each culvert were delineated using the USGS map for the area. The watershed areas contributing to the Hoffman Road and Conifer Lane culverts were 515 acres and 526 acres respectively. The calculated design flows are shown in the following table.

Table 1. Design Flows

Location	2-Year Storm	5-Year Storm
Hoffman Road Culvert	66.3 cfs.	97.1 cfs.
Conifer Lane Culvert	67.5 cfs.	98.8 cfs.

HYDRAULIC ANALYSIS

A hydraulic analysis was performed at the Hoffman Road and Conifer Lane culverts for both the 2- and 5-year frequency design storms in order to determine an adequate roadway elevation and number of overbank culverts required for each frequency storm. The culvert analyses were performed using the FHWA's HY-8 culvert analysis program.

The first step in performing each analysis was determining the tailwater elevations at each culvert for the 2- and the 5-year frequency storms. The tailwater elevations were assumed based on discussions with Dalton Patterson and his observations and knowledge of past storm events. The tailwater on Hoffman was set at 276' and 276.5' for the 2- and 5-year design storms respectively. The elevation of 276' coincides with the edge of shoulder elevation at the low point on Hoffman. The tailwater on Conifer was set at 273.5' and 274' for the 2- and 5-year design storms respectively. The elevation of 273.5' coincides with the edge of shoulder elevation along the majority of Conifer Lane.

The next step in the analysis involved determining the capacity of each of the existing culverts at various proposed roadway (headwater) elevations. The existing culvert under Hoffman is a 43" x 27" arched CMP and the culvert under Conifer Lane is a 3' x 5' reinforced concrete box culvert. The analysis showed that neither existing culvert would be adequate by itself, therefore overbank culverts needed to be added. Various combinations of roadway (headwater) elevations and number of culverts were analyzed until the most feasible combinations were determined for each roadway, for both the 2- and 5-year frequency design storms.

It was concluded that the roadway elevation of Hoffman Road should be raised to 280'. This would involve raising the centerline of the roadway a range of 0 to 3.5 feet over a distance of approximately 885 feet, as shown on the attached Figure 1. Figure 1 also shows the amount of fill required at various locations along the roadway. Holding this roadway elevation constant at 280', it was determined that three (3) 18" SICPP overbank culverts would be required to convey the 2-year design storm and six (6) 18" SICPP overbank culverts would be required to convey the 5-year storm. An additional 18" SICPP culvert would be added at approximately Sta. H 1+645 in order to convey flow east of the intersection with Conifer Lane. This additional culvert would be added for both design storms alternatives.

The desired proposed roadway elevation on Conifer Lane was determined to be 277.5'. This would involve raising the centerline of the roadway a range of 0 to 4.2 feet over a distance of approximately 870 feet, as shown on the attached Figure 1. The proposed improvements would require some regrading of the driveways at the northern end of Conifer Lane. Figure 1 also shows the amount of fill required at various locations along the roadway. Holding this roadway elevation constant at 277.5', it was determined that four (4) 18" SICPP overbank culverts would be required to convey the 2-year design storm and eight (8) 18" SICPP overbank culverts would be required to convey the 5-year storm.

Figure 1 shows the approximate fill limits for the proposed improvements. The lateral fill limits were determined assuming 1 on 4 slopes from the edge of the proposed roadways to the existing ground. The proposed improvements would include a drainage swale parallel to the upstream side of both roadways in order to convey the overbank flow to the multiple culverts.

UTILITIES

Apparent buried utilities include gas and water. Gas utilities are owned and operated by Rochester Gas and Electric, while the water main is owned and operated by Sea Breeze and Vicinity Water District. The proposed fill will increase the utility's burial depth. Utility companies may claim maintenance will be significantly more difficult and that they have been adversely impacted by the Town's action. As a minimum, valve boxes would have to be adjusted and hydrants extended.

Several utility poles are located within the fill areas of Hoffman Road. The fill will reduce the height of wires. There are required minimums for some utilities, such as electrical line, and the utility may have to relocate poles or install longer poles and transfer wires.

Hoffman Road is a dedicated town highway and the Town can claim utilities are located within the right of way at the discretion of the Highway Superintendent. However, Conifer Road is a private drive and utilities are likely on an easement which may grant additional right to the utility company.

We recommend the Town conduct a utility coordination meeting soon after the decision to move forward on the project is made.

OPINION OF PROBABLE MATERIAL COSTS

It is anticipated that the Town's Highway Department would complete the work and purchase materials through the County's bid. Material Unit Costs for all materials, excluding the culverts, were obtained from the most recent County Bid, provided by the Town. The Material Unit Costs for the culverts were obtained from the New York State OGS Bid. The following roadway sections were assumed: Hoffman Road (6.5" of asphalt, 8" of subbase), Conifer Lane (4" of asphalt, 6" of subbase). Table 2 summarizes the opinion of probable costs for both the 2- and 5-year design frequency storms.

Table 2. Opinion of Probable Costs

Item	Unit Price	2-Year Storm		5-Year Storm	
		Hoffman Rd.	Conifer Lane	Hoffman Rd.	Conifer Lane
Fill (Embankment in Place)	$5 / CY	$12,920	$19,440	$12,920	$19,440
18" SICPP Culverts	$6 / FT	$1,392	$1,320	$2,436	$2,640
21" Steel End Sections	$100 / EA	$400	$400	$700	$800
Asphalt	$34 / TON	$23,902	$9,316	$23,902	$9,316
Subbase	$12 / CY	$5,244	$2,484	$5,244	$2,484
Extend Exist. CMP Culverts	$7 / FT	$420	$210	$420	$210
Extend Exist. Box Culvert	$320/ FT	$0	$9,600	$0	$9,600
Totals:		**$87,050**		**$90,120**	

As demonstrated in the above table, the estimated cost difference between designing for the 2- and 5-year frequency design storms is approximately $3,000. Based on the relatively small difference in cost between the two alternatives, LaBella recommends designing and constructing for the 5-year frequency design storm. With the Town's concurrence, we will be able to proceed with the final design. After reviewing the above information, please contact me to discuss.

Respectfully submitted,

LABELLA ASSOCIATES, PC

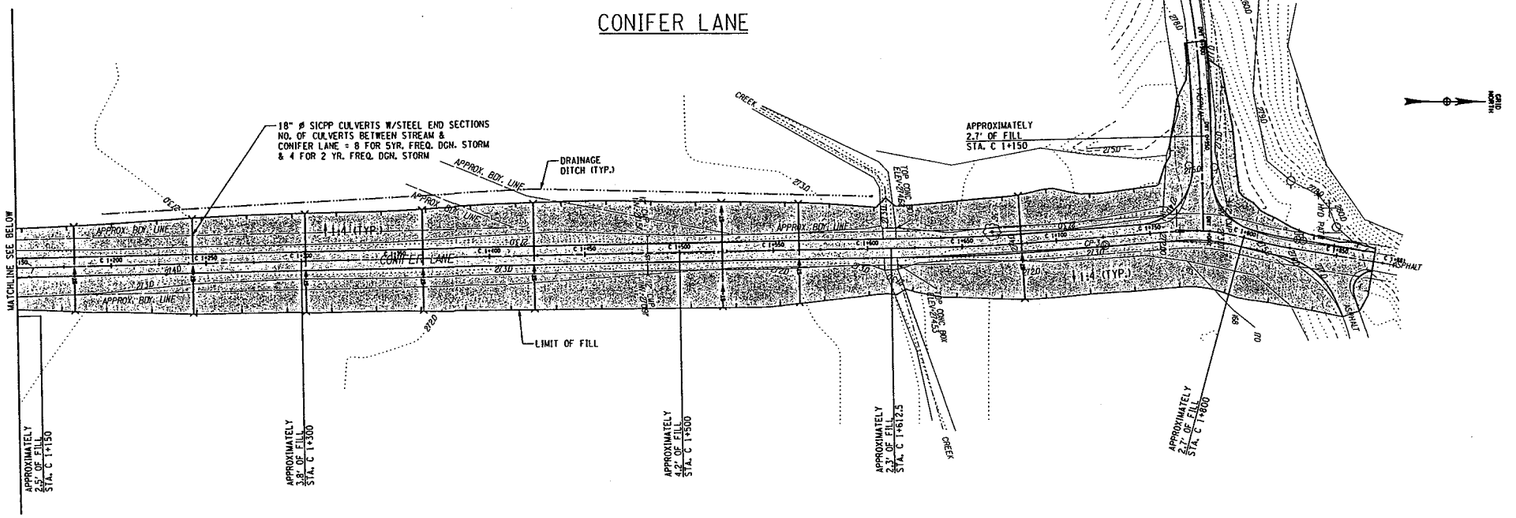
James W. Matzat/lk

James W. Matzat, PE
Project Engineer

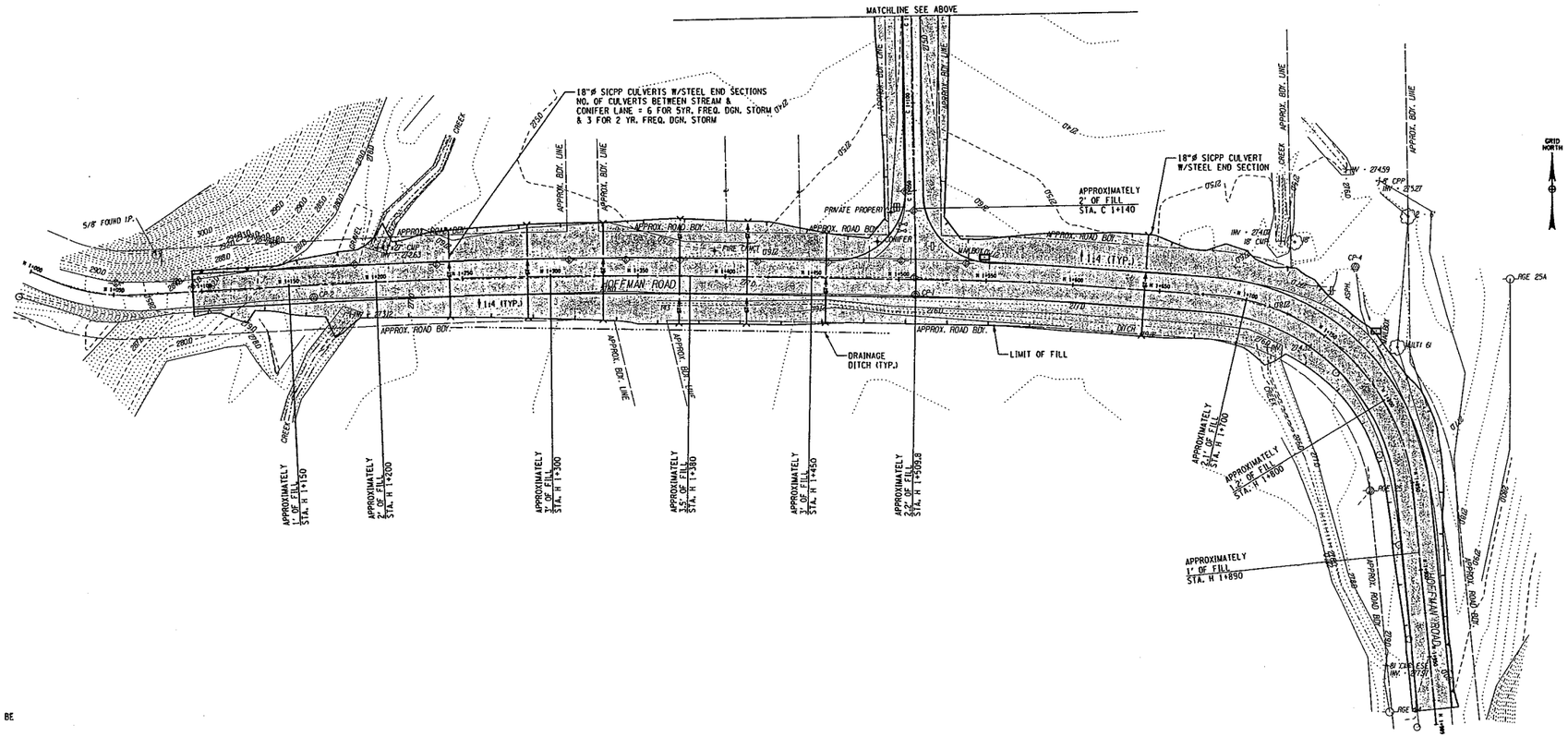
JWM/DWH/lk

Y:\IRONDEQUOIT TOWN\206090 - DPW\206090.07 - SPRING VALLEY FLOOD CONTROL\CLERICAL\WORD\RPT\R7A11DH1.DOC

CONIFER LANE



HOFFMAN ROAD



NOTES:

- ACUAL LOCATION OF CULVERTS WILL BE DETERMINED IN THE FINAL DESIGN.

NO.	REVISION	BY	DATE
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

LABELLA Associates, P.C.
300 STATE STREET
ROCHESTER, NY 14614
P: (585) 454-6110
F: (585) 454-3066
www.labellapc.com

PROJECT/CLIENT

SPRING VALLEY FLOOD CONTROL PROJECT

TOWN OF IRONDEQUOIT
DEPARTMENT OF PUBLIC WORKS
IRONDEQUOIT, NEW YORK

DRAWING TITLE

HOFFMAN ROAD AND CONIFER LANE CONCEPT

ISSUED FOR	SCALE:	1" = 40'
CONCEPT	DESIGNED BY:	DWH
	DRAWN BY:	CDN
DATE: 1/08/07	REVIEWED BY:	JMM

PROJECT/DRAWING NUMBER

206090.07

FIG.1