

CITY OF FALCON HEIGHTS
NORTHWEST AREA
STORM DRAINAGE STUDY UPDATE
SEPTEMBER 1988

I hereby certify that this Report was written by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of Minnesota.

Terry J. Maurer
Terry J. Maurer, P.E.
Reg. No. 15316

9/2/88
Date



CONSULTING ENGINEERS

Maier Stewart & Associates Inc.

September 1, 1988

File: 330-010.80

Ms. Jan Wiessner, Administrator
City of Falcon Heights
2077 Larpenteur Avenue West
Falcon Heights, MN 55113

RE: Northwest Area Storm Drainage Update

Dear Ms. Wiessner:

As requested, we have updated the City's 1974 Northwest Area Storm Drainage Study. The attached report summarizes our findings. In updating this report, we have followed the same methodology used in the original report.

If we can be of any further assistance on this matter, please call.

Sincerely,
MAIER STEWART & ASSOCIATES, INC.

Terry J. Maurer, P.E.

TJM/ms

INTRODUCTION

This update report of the 1974 Northwest Area Storm Drainage Study was authorized by the Falcon Heights City Council. It provides a review of the original report and a reanalysis of the conclusions of that report based on the storm drainage improvements accomplished since 1974.

The area of reanalysis is all property lying west of Fairview Avenue and north of Larpenteur Avenue, specifically the area at the north end of Lindig Avenue. The reanalysis utilized the same methodology used in the original report.

BACKGROUND

The 1974 Study developed a storm drainage system comprised of a network of pipes and ponds. The piping system sizing was based on a 5 year frequency rainfall event. That is, a rainstorm which has a statistical occurrence rate of once every five years. The method utilized for the system design was the rational method.

The original report developed two different plans for storm drainage in the Northwest Area. Plan A was based on the existing zoning in 1974 which had most of the City containing single family residences with a few multiple family residences along Larpenteur Avenue. Plan B was based on possible changes in the 1974 zoning which would have allowed higher density development in some areas plus possible development of portions of the University of Minnesota property.

Since 1974, development in the study area, west of Fairview and north of Larpenteur, has included the City Hall site, the Hewlett-Packard site, the

Stratford office complex and Falcon Woods No. 3. Tatum Street was also reconstructed including storm drainage improvements and storm sewer piping was extended south of Larpenteur Avenue on Gortner Avenue. This development most closely follows Plan B as presented in the original study. The original Plan B proposed improvements for the area west of Fairview and north of Larpenteur are shown on Exhibit 1. Exhibit 2 shows the storm drainage system in this area as it currently exists.

ANALYSIS

As can be seen from Exhibit 1, the original proposal was to drain the entire area to the corner of Fairview and Larpenteur. It was estimated that a 36 inch diameter storm sewer line would be required to handle the 5 year frequency storm runoff. Appendix B of the 1974 study estimated the flow at 68 cubic feet per second (CFS).

As the system was constructed, the concept has changed as shown by Exhibit 2. The outlet from the area is a storm sewer line down Gortner Avenue rather than the southeast corner of the district. This eliminates a small part of the drainage district at the south end of Tatum and along the west side of Fairview. Based on the original design criteria and this smaller area, it is estimated the peak 5 year discharge from the area is 51 CFS.

The other major change which is obvious from Exhibit 2 is the size of the outlet from the district. The storm sewer line down Gortner Avenue is 21 inches in diameter while the lines from the east and the west which connect to this discharge are 24 and 27 inches in diameter. A cursory review of City files revealed a draft agreement between the University of Minnesota

and the City of Falcon Heights which limited the Gortner Avenue line to 21 inches and a maximum flow of 16 CFS. The actual capacity of this 21 inch line considering maximum system surcharging is approximately 14 CFS.

This reduction of outlet capacity from the required 51 CFS to 14 CFS has a very limiting effect on the entire system. Rather than providing an overall system capacity for a 5 year frequency rainfall event, the outlet limits this to much less. All of the storm sewer facilities leading up to the Gortner Avenue line are adequately sized to convey the 5 year frequency storm.

CONCLUSION/RECOMMENDATIONS

The potential result of the limited outlet capacity would be backups throughout the system during higher frequency rainfall events. The intent would be to have the ponds in the system absorb the backups. Apparently, this is currently happening since there have been several rainfall events which have exceeded the storm sewer capacity since its construction with no reports of any damage.

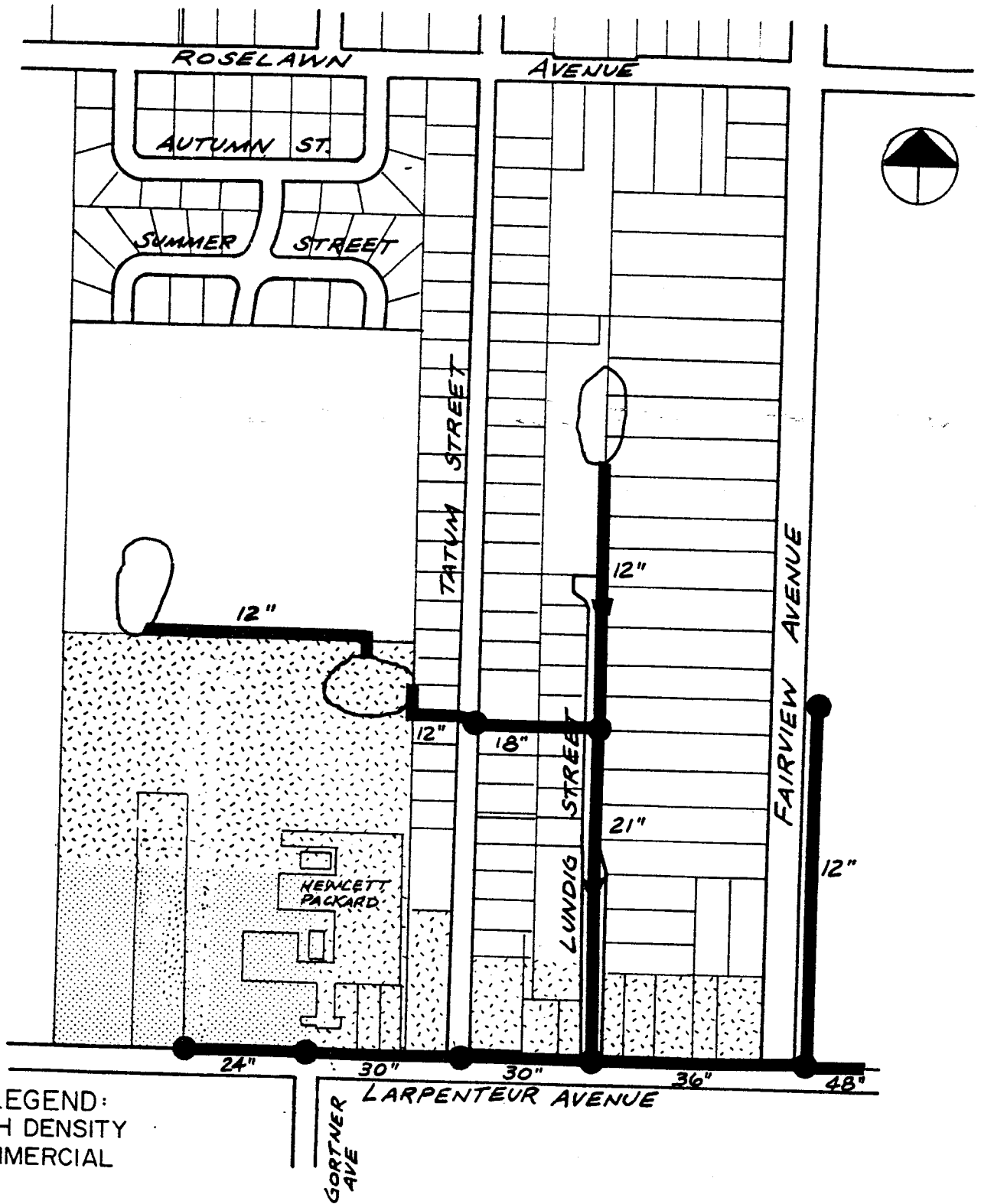
However, when storm sewer is extended from Tatum Street to the north Lindig area, another pond is proposed. This pond will likely be the lowest point on the system in terms of backups. Great care will be required in sizing that pond and analyzing the potential effects on the surrounding area given various rainfall events. Based on this analysis, a minimum building elevation can be set for the area which will preclude flooding from a given rainfall event.

In conclusion, it appears the "no build" designation can be removed from the

north Lindig area if storm sewer is extended and a ponding area constructed. It will require work beyond the scope of this report to analyze the pond sizing and the minimum building elevation. It is not clear whether or not the minimum building elevation will require substantial filling of the area to allow building.

In the interim, it would be possible to develop the lots at the north end of the existing Lindig Street pavement without extension of storm sewer system to the area. It appears there are at least two lots on the east side of Lindig that could be served by the existing sanitary sewer and water system. These lots are directly across from developed lots and south of the proposed pond location for this area as presented in the 1974 report. Development of these will cause a small increase in runoff in the area, but should not cause any significant problems. It is not recommended, however, that development occur north of the existing sanitary sewer and water facilities without an overall plan for utilities including storm sewer for the entire area.

Development should be limited to existing services available
until future studies → H₂O, Sewers ()
waiver no longer necessary for



LAND USE LEGEND:
 HIGH DENSITY
 COMMERCIAL

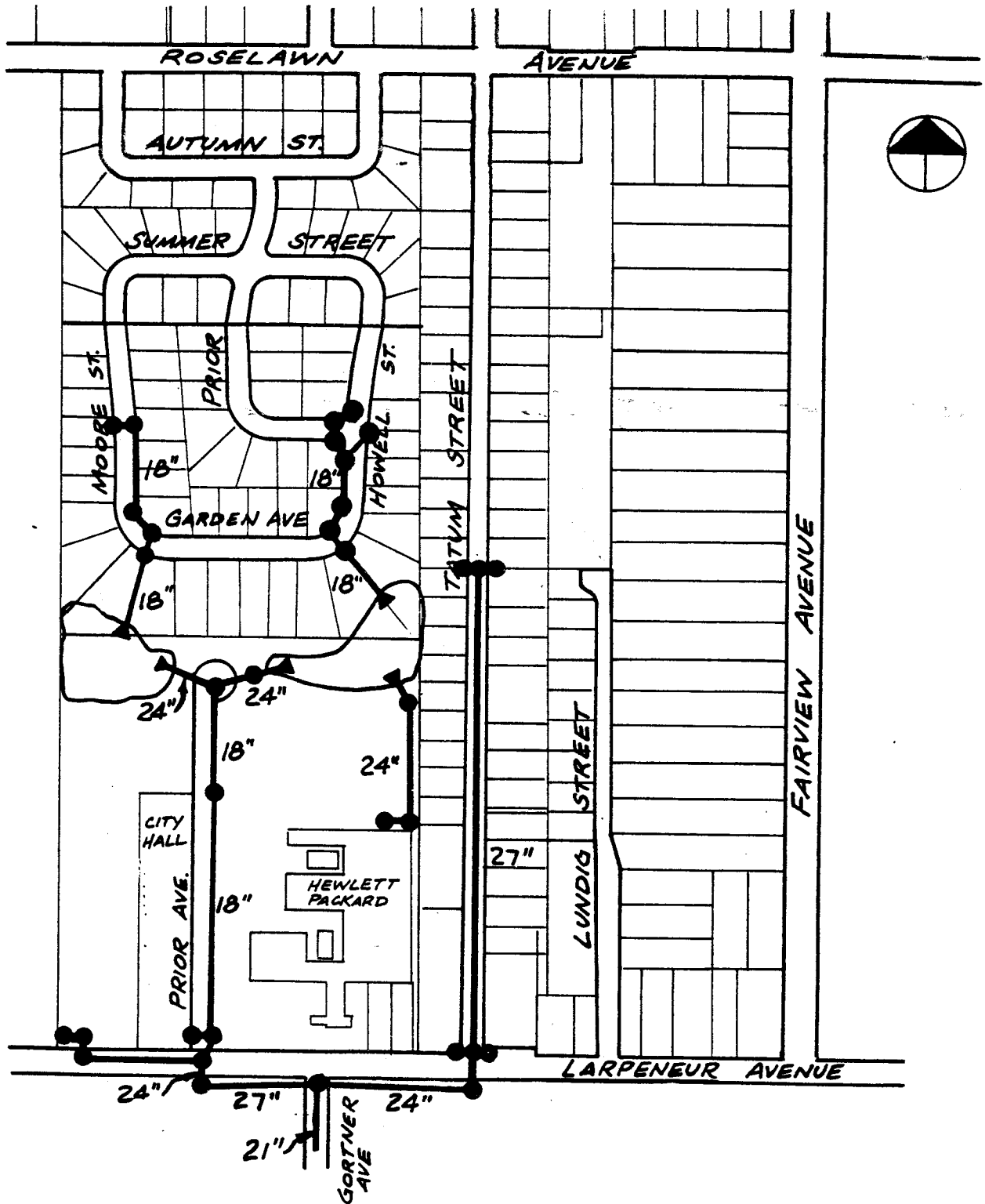


Maier Stewart & Associates Inc.

EXHIBIT 1.
 PROPOSED SYSTEM
 (PLAN B)
 1974 N.W. AREA STORM
 DRAINAGE STUDY



CITY OF
FALCON HEIGHTS
 2077 W. LARPEL TEUR AVENUE • FALCON HEIGHTS, MN 55113-5584



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EXHIBIT 2

EXISTING DRAINAGE FACILITIES



CITY OF **FALCON HEIGHTS**

2077 W. LARPENEUR AVENUE • FALCON HEIGHTS, MN 55113-5504