REPORT / RECOMMENDATION

To: MAYOR AND CITY COUNCIL

Agenda Item #: IV. D.

From: Laura Adler, Water Resources Coordinator

Action ☒
Discussion ☐
Information ☐

Date: June 4, 2013

Subject: Engineering Services – Evaluation of FEMA Proposed Flood Hazard Determinations

Action Requested:
Authorize City Manager to approve attached proposal for Engineering Services.

Information / Background:
The Federal Emergency Management Agency (FEMA) has been revising the flood plain maps throughout Hennepin County since 2004. They issued a set of Preliminary Flood Insurance Rate Maps (FIRMs) and the accompanying Flood Insurance Study (FIS) for Hennepin County and started a 90 day review period on April 5, 2013. The proposed flood plain map was developed by FEMA and its contractors using hydrologic models and more accurate elevation information than was available when the maps were last revised in 2004.

Staff has reviewed the preliminary flood plain maps, provided notices to over 800 properties, and fielded calls from residents representing around 150 properties affected by the changes. There are three areas that may justify an appeal during the FEMA 90 day review. Two flood zones include major changes in the flood elevation: the Rolling Green Neighborhood and Nine Mile Village, another in the Morningside Neighborhood does not have an elevation assigned to it.

This request for purchase will provide technical review of the three areas to determine if an appeal is warranted, and if warranted, substantiation to support an appeal. Staff will work with technical experts at BARR Engineering Company (BARR) to determine if an appeal is warranted at each location. The cost for this request for purchase is a high side estimate assuming each site is determined to warrant an appeal, discussed below in greater detail in the detailed staff review.

Detailed Staff Review

Residents in the Rolling Green Neighborhood, Morningside Neighborhood and in Nine Mile Village have expressed concern about being newly included in the flood plain and have asked staff to look into these areas further to determine if an appeal to FEMA is warranted. The inclusion in the flood plain can have effects on flood insurance requirements, property values, and the feasibility to add-on or rebuild a home.

Staff asked BARR to put together a scope of services to review the flood plain in these three areas. The scope of services consisted of two parts: (1) a review of the existing information to determine if further investigation is warranted, and (2) a more thorough investigation of areas where it is warranted, along with possible preparation of appeal(s) to FEMA. BARR has a significant amount of background information, having worked on the city's Comprehensive Water Resources Management Plan (CWRMP), which included modeling of the storm sewer system throughout the city. They were also a part of a storm sewer project in the Rolling Green Neighborhood, worked on a previous change to the flood maps for Methodist Hospital, and serve as the Engineering Advisor for Nine Mile Creek Watershed District, who provided modeling of Nine Mile Creek to FEMA.

The goal of this evaluation is to ensure that FEMA's FIRMs are as accurate as possible. This may mean that some of these evaluations do not result in an appeal. In any case, we will have greater confidence in the accuracy of the flood risk assessment.

Morningside Area

This area has been identified by FEMA as a Zone A (or an approximate 100-year flood inundation area) with no base flood elevation determined (see Attachment 1). The extent of the 100-year flood plain area shown on the preliminary Flood Insurance Rate Map (FIRM) extends beyond the flood inundation area predicted in Edina's CWRMP, which is based on a 100-year flood elevation of 869 MSL. If the base flood elevation were determined to be 869 MSL, approximately 16 properties would be removed from the flood plain.

Part 1 of the evaluation of the Morningside Area includes investigating the origin of the flood inundation area on the FIRM and comparing it to the flood elevation in the CWRMP. The cost range for Part 1 is $1,000-$2,000. Part 2 of the evaluation of the Morningside Area includes further investigation if necessary, and if it is determined that an appeal should be made to FEMA, the documentation regarding the modeling and/or mapping and preparation of submittal materials for the appeal. The cost range for Part 2 is $1,000-$5,000.

Nine Mile Village

The 100-year flood plain shown on the preliminary FIRM in the Bredesen Park areas has expanded to include Nine Mile Village, which is located southeast of Bredesen Park and northwest of the intersection of Trunk Highway (TH) 62 and Tracy Avenue (see Attachment 2). This represents the potential for backwater from the North Fork of Nine Mile Creek overtop a high point in the ditch on the north side of TH 62 and flow eastward into the Nine Mile Village development. There are approximately 24 townhomes that are now included in the flood plain that were not previously. A portion of the site of The Waters development is also included within the new flood plain. However, the preliminary FIRM shows an aerial photo and elevations from before construction this site started, and may not accurately reflect the current elevations on the site.

There are a number of technical issues involved in this investigation. There are two different storm water models for the area: the model from the city's CWRMP, which describes all of the land that does not drain directly to Nine Mile Creek (the "City" model), and the model of Nine Mile Creek, which describes flows within the creek and the lands that drain directly to it (the "Creek" model). These two models are used in conjunction to predict the real-world behavior of the storm water system.

One aspect of the two separate models is that the Creek model does not include the storage provided in the pond areas east of Nine Mile Village. The Creek model shows that the elevation of the creek rises to

857 MSL, which is an increase of 4 feet over the 2004 base flood elevation in the area. FEMA took that elevation and traced it along the ground elevations. In this case, that traced elevation appears to overtop the high point of the ditch adjacent to TH 62, which would allow the flood waters to spill into Nine Mile Village and the ponds to the east. However, since the amount of storage that would be provided after that spillover isn't included, the model may not accurately predict the flood elevation in that area.

The first step to this investigation will be to get a more accurate elevation survey of the area to determine if the high point in the TH 62 ditch is above or below 857 MSL. City staff will complete this survey. Part 1 of the evaluation of the Nine Mile Village area will include a review the elevation survey and a review of Nine Mile Creek and City storm water models. The cost range for Part 1 is $1,000-$1,500. Part 2 of the evaluation will include further investigation is necessary, and if it is determined that an appeal should be made to FEMA, the documentation regarding the modeling and/or mapping and preparation of submittal materials for the appeal. The cost range for Part 2 is $2,000-$5,000.

Rolling Green Area

There is some history to the flood plain in the Rolling Green area (see Attachment 3). In 2004, FIRMs were issued with the base flood elevation of 892 MSL. This elevation was the same as the elevation from 1980, and the reason for the reissuance was to provide flood plain information in a digital format. In 2005, FEMA began the process of revising the FIRMs in Hennepin County. Also in 2005, Minnehaha Creek Watershed District (MCWD) developed a hydrologic and hydraulic model (H&H model) of the watershed of Minnehaha Creek. The H&H model predicted a lower flood elevation in the Rolling Green area (approximately 888.5 MSL). The results from this model were included in the preliminary flood plain maps issued by FEMA as part of the county-wide map updates. In 2006, several municipalities expressed concerns about the significant reductions in flood elevation, and the MN DNR and FEMA agreed to work on resolving these concerns with the H&H model used.

In 2007, Methodist Hospital in St. Louis Park conducted a Letter of Map Revision (LOMR) which was necessary to accommodate the expansion of their facility adjacent to Minnehaha Creek. The modeling analysis for the LOMR used the MCWD H&H model as the base model, with some modifications conducted to more accurately model flows in the creek and meet MN DNR requirements. The outcome of the LOMR was a flood elevation of 889.5 in the Meadowbrook Golf Course and Rolling Green neighborhood. This was lower than the flood elevation from the 2004 maps, but higher than the elevation originally predicted by the MCWD H&H model. Since the 2007 LOMR, the MN DNR and FEMA have worked to improve the H&H model of Minnehaha Creek. The 100-year flood elevation included in the 2013 preliminary FIRM for this area is 891 MSL.

The Rolling Green Neighborhood has had a number of teardown and rebuilds in the past few years. This has been possible because the official flood elevation has been set at 889 MSL. Residents who see that the flood plain may increase to 891 MSL are concerned that their opportunity for sale or rebuild on their property will be significantly limited, affecting their property values. They are also questioning the change from the 2007 LOMR.

Part 1 of the evaluation of the Rolling Green area includes contacting the MN DNR and FEMA regarding the reason for the increase in flood elevation from the 2007 LOMR, reviewing the elevation data used to map the preliminary FIRM and comparison with the more current elevation data, and reviewing some specific projects that have occurred in the area that may affect flood levels. The cost range for Part 1 is $3,000-

$7,000. Part 2 of the evaluation includes, if warranted, further investigation into the model in the immediate area. It may include the preparation of documentation regarding the modeling and/or mapping for the submittal of an appeal. The cost range for Part 2 is $4,000-$10,000.

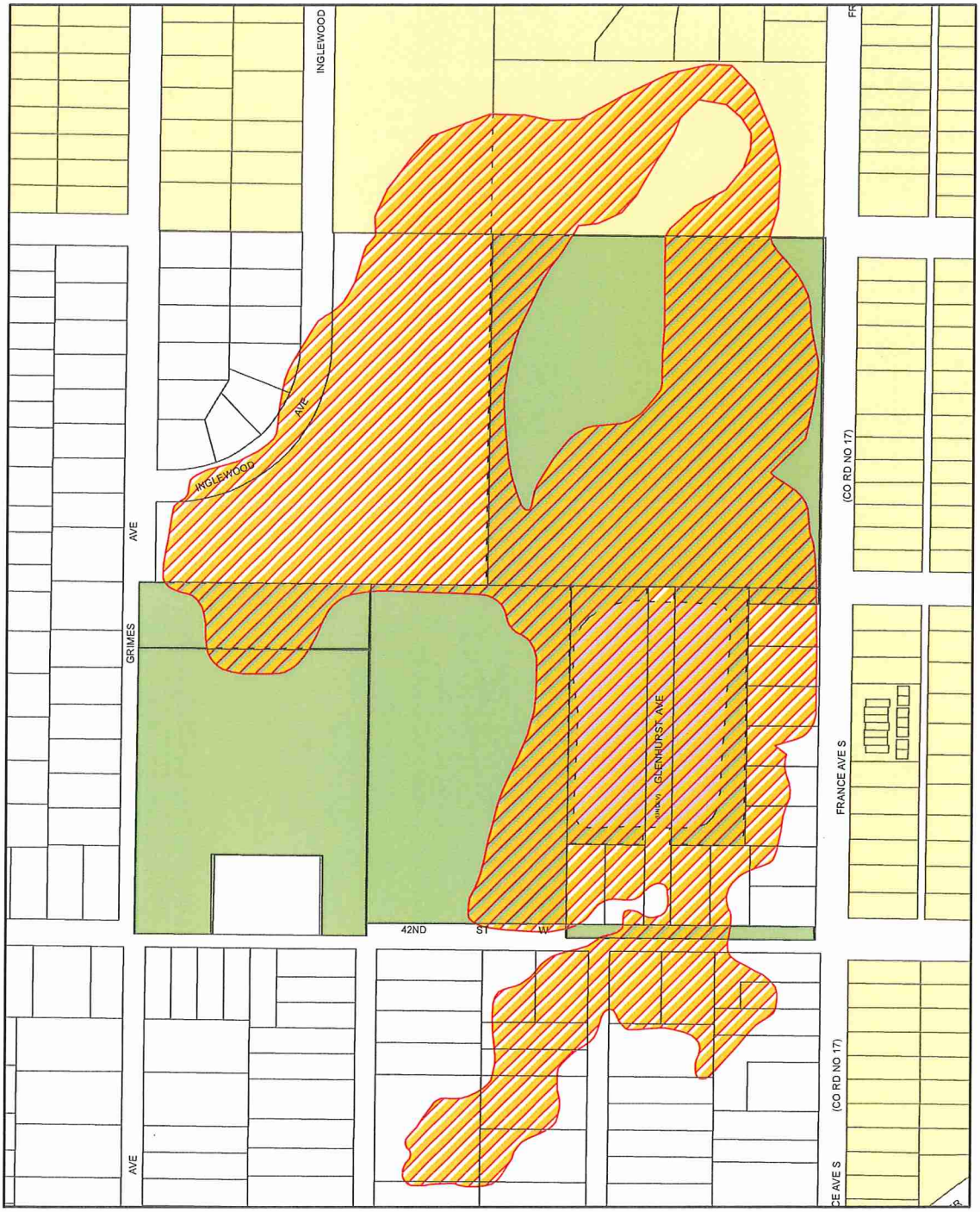
Attachments:

Maps:

1. Morningside Area
2. Nine Mile Village
3. Rolling Green Area

BARR Engineering Co. Proposal

Attachment 1
Morningside Area



Parcels

- Edina Parcels
- Surrounding Parcels
- City Owned Property

Proposed Flood Plain

- Proposed 100-year flood plain
- Proposed 500-year flood plain

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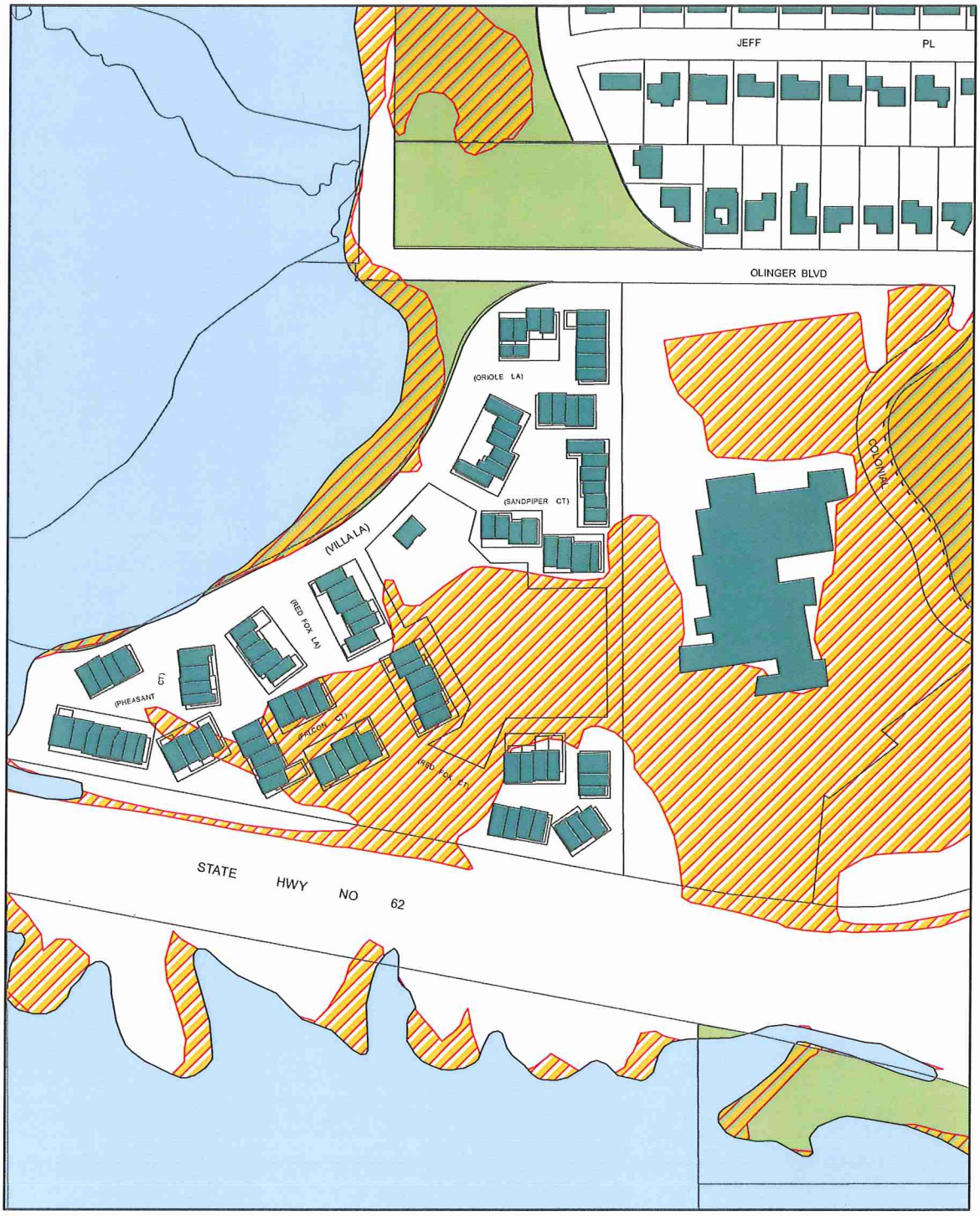
Attachment 2
Nine Mile Village



Proposed Flood Plain

- Proposed 100-year flood plain
- Proposed 500-year flood plain

Parcels

- Existing 100-year flood plain
- Parcels
- City Owned Property

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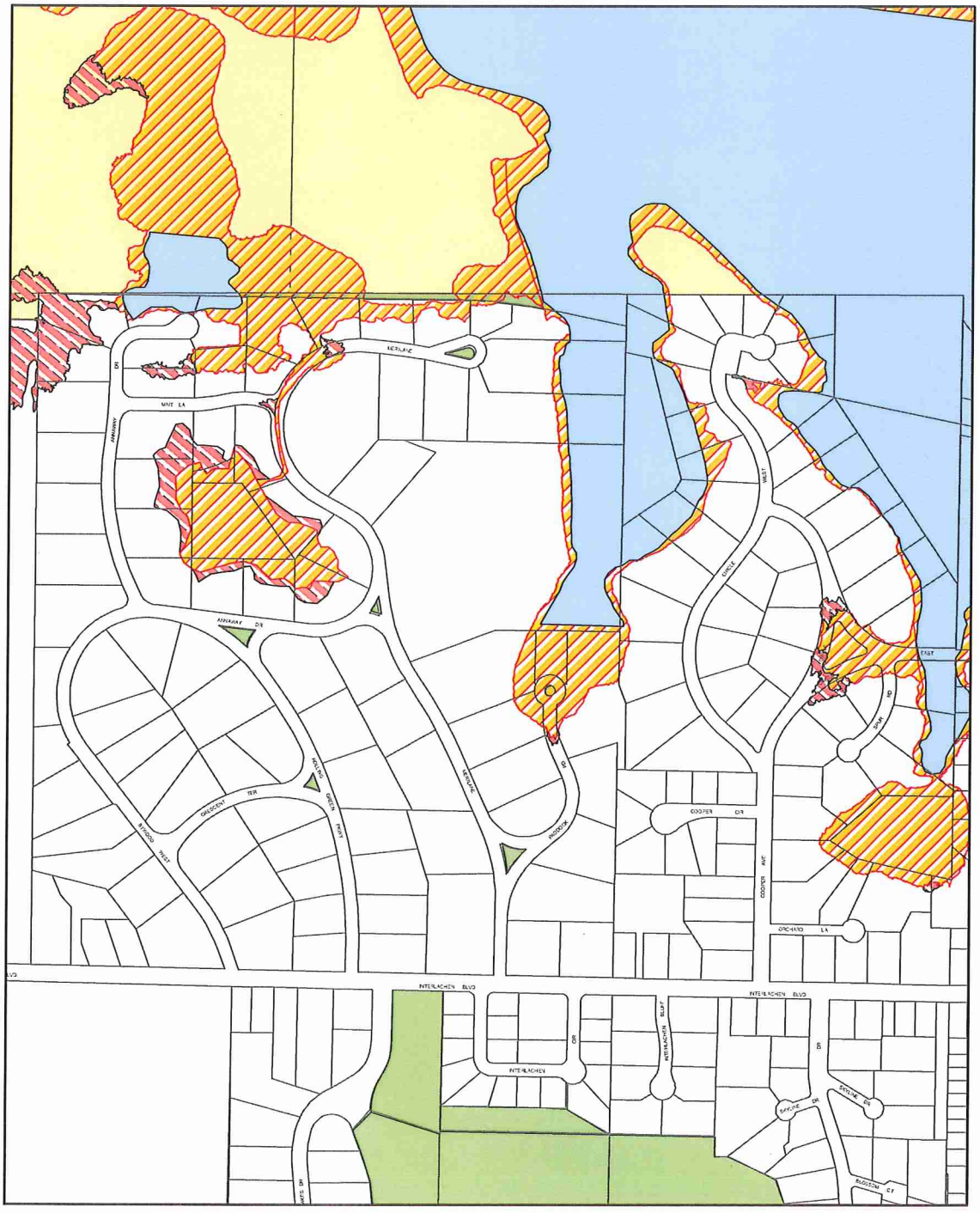
Attachment 3
Rolling Green Area



Parcels

- Edina Parcels
- Surrounding Parcels
- Existing 100-year flood plain (from 2007 LOMR)

Proposed Flood Plain

- Proposed 100-year flood plain
- Proposed 500-year flood plain

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BARR

Memorandum

To: Laura Adler, City of Edina
From: Janna Kieffer
Subject: Scope of Services: Evaluation of FEMA Proposed Flood Hazard Determinations
Date: May 24, 2013
c: Ross Bintner, City of Edina

The Federal Emergency Management Agency (FEMA) recently released proposed flood hazard determinations for the City of Edina for public review and comment. Per your request we have developed a scope of services to evaluate three proposed FEMA floodplain areas identified by the City that either differ from the effective (2004) FEMA Flood Insurance Rate Maps (FIRMs) or may not accurately represent the floodplain based on more recent modeling and/or mapping. The proposed floodplain in each of these areas identified by the City has the potential for substantial effects on Edina residents; therefore, in these areas the City would like to investigate the technical supporting information and if appropriate, submit an appeal to FEMA within the 90 day appeal period that ends July 4, 2013.

Detailed below is Barr's proposed scope of services and estimated costs to assist City staff with evaluation of these areas and submittal of an appeal, if necessary. The estimated costs for each task are presented as ranges due to the investigative nature of this scope of services and the difficulty in determining the level of effort for model revisions and appeal submittal preparation without a full understanding the extent of the issues with the modeling and/or mapping. Completion of the work tasks and tracking of associated costs will be completed in close coordination with City staff.

Task 1. Morningside Area

Background: This area has been identified by FEMA as a Zone A (or an approximate 100-yr flood inundation area) with no base flood elevation determined. The extent of the 100-year floodplain area shown on the preliminary Flood Insurance Rate Map (FIRM) extends beyond the flood inundation area predicted in Edina's Comprehensive Water Resources Management Plan (CWRMP), which is based on a100-year flood elevation of 869 MSL.

Subtask 1A. Preliminary evaluation of proposed FEMA determination

To evaluate whether the proposed FEMA floodplain determination should be appealed, Barr will complete the following:

- Determine whether or not a specific flood elevation was used to map the flood inundation area; if a specific elevation was used, determine the vertical datum of that elevation
- If the elevation used for the mapping is greater than the predicted flood elevation in the City's CWRMP, determine the reason for the higher elevation by identifying and reviewing the engineering information (which may or may not include modeling) used for the FEMA mapping and assessing its appropriateness in comparison with the City's detailed XP-SWMM model
- Identify the elevation data source used to map the zone identified on the preliminary FIRM
- Review the City's XP-SWMM model for the Morningside area
- Discuss with MN DNR and FEMA the likelihood of the flood inundation area being revised through appeal based on updated modeling and/or mapping

The results of the preliminary evaluation will be summarized and presented to City staff at a meeting to determine if further evaluation is necessary.

Subtask 1A. Estimated cost range: $1,000 - $2,000

Subtask 1B. Additional evaluation and preparation of relevant information for appeal submittal

If necessary, the modeling and/or mapping of the 100-year floodplain in the Morningside area will be further evaluated. If it is determined that the flood zone identified on the preliminary FIRM should be appealed, documentation regarding the modeling and/or mapping will be prepared. Note that the estimated cost below includes preparation of submittal information, but does not include time for addressing follow-up questions and/or discussion with MN DNR and FEMA, which would be additional cost.

Subtask 1B. Estimated cost range: $1,000 - $5,000

Task 2. Nine Mile Village

Background: The 100-year floodplain shown on the preliminary FIRM in the Bredesen Park area has expanded to include Nine Mile Village, which is located southeast of Bredesen Park and northwest of the intersection of Trunk Highway (TH) 62 and Tracy Avenue. The expanded floodplain shown on the

preliminary FIRM represents the potential for backwater from the North Fork of Nine Mile Creek to overtop a high point in the ditch on the north side of TH 62 and flow eastward into the Nine Mile Village development. The 100-year flood elevations identified in the City's CWRMP for waterbodies within the Nine Mile Village development are lower, as they do not reflect this potential for backwater from the creek.

Subtask 2A. Preliminary evaluation of proposed FEMA determination

To determine whether the proposed FEMA determination should be appealed, Barr will evaluate the following:

- Review of the XP-SWMM model and resulting 100-year flood elevations of the North Fork of Nine Mile Creek upstream of TH 62 used by FEMA
- Review of the digital elevation data (and vertical datum) used to model and map the floodplain shown on the preliminary FIRM
- Review of field survey results to assess potential for backwater into the Nine Mile Village development (field survey to be conducted by City staff)

The results of the preliminary evaluation will be summarized and presented to City staff in a meeting to determine if further evaluation is necessary.

Subtask 2A. Estimated cost range: $1,000 - $1,500

Subtask 2B. Additional evaluation and preparation of relevant information for appeal submittal

If review of the modeling and available digital elevation data indicates a potential for backwater to flow eastward to the Nine Mile Village development, the model of the Nine Mile Village development will be revised accordingly and 100-year flood elevations for waterbodies within the Nine Mile Village development will be re-evaluated. If it is determined that the flood zone identified on the preliminary FIRM should be revised, documentation regarding the modeling and/or mapping will be prepared. Note that the estimated cost below includes preparation of submittal information, but does not include time for addressing follow-up questions and/or discussion with MN DNR and FEMA, which would potentially be at additional cost.

Subtask 2B. Estimated cost range: $2,000 - $5,000

Task 3. Rolling Green area

Background: The 100-year floodplain identified on the preliminary FIRM for the Rolling Green neighborhood extends beyond the previously established floodplain in several areas. The historic 100-year flood elevation for this area is 892, as identified in the effective Hennepin County Flood Insurance Study dated 2004. In 2005, the Minnehaha Creek Watershed District (MCWD) developed a hydrologic and hydraulic model of the watershed tributary to Minnehaha Creek, which predicted a lower flood elevation in the Rolling Green area (approximately 888.5). The results from this model were included in the preliminary floodplain maps issued by FEMA as part of the county-wide map updates. In 2006, several municipalities expressed concerns about the significant reductions in flood elevations, and the MN DNR and FEMA agreed to work on resolving these concerns with the hydrologic and hydraulic model used.

In 2007, the Park Nicollet Hospital in St. Louis Park conducted a Letter of Map Revision (LOMR) which was necessary to accommodate expansion of their facility adjacent to Minnehaha Creek. The modeling analysis for the LOMR used the MCWD hydrologic and hydraulic model as the base model, with some model modifications conducted to more accurately model flows in the creek and meet MN DNR requirements. The outcome of the LOMR was an increased 100-year flood elevation (approximately 889.5) in the Meadowbrook golf course and Rolling Green neighborhood. Since the 2007 LOMR, the MN DNR worked with FEMA to improve the hydrologic and hydraulic model of Minnehaha Creek. The 100-year flood elevation included in the preliminary FIRM for this area is now 891.

Subtask 3A. Preliminary evaluation of proposed FEMA determination

To understand the reason for the differences in 100-year flood elevations from the revised hydrologic and hydraulic model and determine whether the proposed FEMA determination should be appealed, Barr will conduct the following tasks:

- Preparation of a timeline documenting revisions to the FEMA 100-year floodplain elevation and associated modeling efforts in the Rolling Green area
- Verification that the proposed 100-year elevation (891) reflects the results from the most recent MCWD hydrologic and hydraulic model and discussion with MN DNR and FEMA regarding the reason for the increase in flood elevation (from 2007 LOMR)
- Review of the digital elevation data used to map the floodplain shown on the preliminary FIRM and comparison with more current digital elevation data (Mn DNR LiDAR, 2011)

- Review of FEMA's revised XP-SWMM model and comparison with the model used for the 2007 Park Nicollet LOMR to understand the differences in the 100-year flood elevations and evaluate the need for City appeal

The results of the preliminary evaluation will be summarized and presented to City staff in a meeting to determine if further evaluation is necessary.

Subtask 3A. Estimated cost range: $3,000 - $7,000

Subtask 3B. Additional evaluation and preparation of relevant information for appeal submittal

If deemed necessary, the modeling and/or mapping of the 100-year floodplain in the Rolling Green area will be revised and documentation regarding the modeling and/or mapping will be prepared. Note that the estimated cost below includes preparation of submittal information, but does not include time for addressing follow-up questions and/or discussions with MN DNR and FEMA, which would potentially be additional cost.

Subtask 3B. Estimated cost range: $4,000 - $10,000