From:	Lenart, Brett
To:	DiLeo, Alexis
Subject:	FW: Ann Arbor Development Project
Date:	Tuesday, September 26, 2017 11:40:35 AM
Attachments:	7.25.17 1140 Broadway Project Floodplain Information.pdf 1140 Broadway - Technical Bulletin 10-01 compliance.pdf

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From: Shockey, Frank [mailto:Frank.Shockey@fema.dhs.gov]
Sent: Tuesday, September 26, 2017 11:31 AM
To: Delacourt, Derek <DDelacourt@a2gov.org>
Cc: Lenart, Brett <BLenart@a2gov.org>; Hancock, Jerry <JHancock@a2gov.org>; Cervelli, Donna (DEQ) <CERVELLID@michigan.gov>; Rosario, Mollie <Mollie.Rosario@fema.dhs.gov>
Subject: RE: Ann Arbor Development Project

Derek,

I just heard back from the Building Science experts at FEMA HQ in Washington this morning. The idea of a stormwater storage tank beneath a parking ramp structure is acceptable in concept and could be reasonably safe from flooding if the "engineered basement" guidance in FEMA's Technical Bulletin 10 is heeded. If this stormwater vault were a compensatory storage basin intended to fill with flood water in the base flood, this would be a different situation, but essentially it is a below-ground tank that stores rainwater from the site until it can be released into the sewer system. However, in particular since some of the finer details are clearly not yet worked out, given the general statements in the geotechnical engineer's letter, I have a few cautions to add about timing and about specific details that still need to be shown to the City in the future. In addition, some more specific guidance pertinent to this project from FEMA's Building Science helpline, is inside the quotation marks under #3 below:

1. Since I understand the developer, with the advice of consultants, is expected/expecting to try to limit the quantity of seepage from the contaminated soil on the site toward the adjoining and other nearby waterways, geotechnical analysis of the soil conditions between the stormwater detention "vault" location and the creek should be available prior to the commencement of any excavation, grading, and filling to provide a clearer estimate of the seepage rate at the margins of the vault site prior to any excavation or filling with offsite material.

2. The City should ensure that the investigations necessary to refine the design of the excavation, the selected fill material, and its placement, are carried out and documented, and that the excavation and filling are documented as having been completed in accord with the geotechnical engineer's recommendations, including any further refinements that may

prove to be necessary if unexpected conditions are discovered in the course of construction. These recommendations would of course anticipate the construction of the stormwater detention "vault" beneath the parking ramp structure. Calculations showing how the vault, including any waterproofing or unusual structural reinforcements, and parking ramp will meet the Technical Bulletin could be provided to the City by the developer and its consultant at that time. See the following point for further illumination from FEMA's Building Sciences contacts in Washington.

3. Specific guidance related to this project from FEMA's Building Science helpline is as follows (references are to the attachment, which was provided by the developer in late July 2017):

"This response is based on published FEMA Building Science guidance. Links to download all referenced FEMA publications are provided at the end of this email.

This response assumes that Building A will be removed from the special flood hazard area (SFHA) by the placement of fill. On sheet 11 of the plans, at the scale of the drawing, it appears the proposed SFHA boundary touches Building A. If the proposed SFHA touches Building A, then Building A would be "in the SFHA" and the entire building must comply with NFIP minimum requirements.

If the proposed SFHA does not touch Building A, then the question remains, what is needed to assure the building, attached parking garage, and stormwater detention vault are reasonably safe from flooding:

a. As shown on sheet 11, it should be verified that water rising to the proposed base flood elevation (BFE) would not have any paths to get into or under Building A. The outlet for the stormwater detention vaults will have a "Tideflex check valve" that prevents backflow from the rising stream into the vaults. Routine maintenance is critical to assure functionality.
b. Then the question is whether, under conditions of the base flood, the filled soils would become sufficiently saturated that it poses a risk to the below-grade portions of the building subject to that saturation.
c. The evaluation, similar to the "engineered basement option" method outlined in FEMA Technical Bulletin 10, Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding (2001), should consider soil type, compaction, stratification (in this case the boundary between placed soils and original soil). Although we don't know the hydrography, given the location and depth of flooding under base flood conditions (from the profile), it is likely to be short duration – that should be verified by the engineer as part of the evaluation. Duration is a factor because it influences the development of the phreatic surface, especially in well-compacted soils.
d. If the engineering analysis shows there will be no hydrostatic load associated with saturated soils under base flood conditions, and the conditions of the engineered basement approach are met, then the building is reasonably safe from flooding.

FEMA Building Science has many publications for homeowners, design professionals, and builders that illustrate important concepts and best practices in accordance with building

codes and standards for constructing and retrofitting stronger, safer buildings. The publications are downloadable for free on FEMA's Web site and are organized by hazard: http://www.fema.gov/building-science-publications. The publications relevant to your inquiry are linked below:

- Technical Bulletin 10, Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding (2001), https://www.fema.gov/media-library/assets/documents/3522, discusses building techniques, including the use of fill, that can be used to ensure structures are reasonably safe from flooding.

Free hard copies of FEMA Building Science's current publications may also be ordered by calling the FEMA Publication Warehouse at 1-800-480-2520, Monday through Friday between 8:00 AM and 5:00 PM (EST), by fax at 1-240-699-0525, or by emailing your request to FEMA-Publications-Warehouse@fema.dhs.gov. Please provide the title, publication number, and quantity of each publication, along with your name, address, zip code, and daytime telephone number.

If you have additional questions pertaining to FEMA Building Science publications, please feel free to contact us again at FEMA-Buildingsciencehelp@fema.dhs.gov."

4. I must emphasize the initial point in the BSHelpline response: following the fill placement, all proposed buildings on the site need to be unambiguously on land that is at (or better, above) the BFE or a LOMR-F will not be available. The upward-right hatching on sheet 11 does suggest that the SFHA would "touch" the wall of the elevated building foundation of the residential building. As we have discussed, it is possible to construct a nonresidential building such as the parking ramp with a floor below BFE and below grade on all sides if it is dry-floodproofed, and of course it is also possible to construct a residential building in the SFHA that is properly elevated to/above the BFE, but we all recognize the developer wishes to obtain a LOMR-F so that lenders will not be required by law to require flood insurance for loans secured by the buildings or by condominium units that might be within the buildings in the future. Where the stakes are so high, it may be wise for the developer to obtain a Conditional Letter of Map Revision based on Fill (CLOMR-F) to get FEMA's comment as to whether the proposed location and extent of fill and the proposed building footprint locations will allow for the buildings (or an area of land described by metes and bounds) to be removed from the SFHA, if built as proposed. A CLOMR-F does not comment prospectively on the matter of whether the filled site and/or buildings will be "reasonably safe from flooding," the determination of which remains the local government's responsibility.

5. The City should ensure that by the time of the completion of the filling activities that enable the developer to initiate the MT-1 LOMR-F process, a binding condition of some sort (such as a zoning condition or development agreement stipulation) has been effectuated to enable to City to continue to apply the flood-related provisions of the Michigan Building Code to the site and thereby ensure that the stormwater detention vault and all other structures to be constructed in filled and/or excavated areas of the site will be reasonably safe from flooding

in accordance with the recommendations of the geotechnical and other specialist engineers involved in the project. The Community Acknowledgment Form Part A of the MT-1 application should not be signed in the absence of a binding condition/commitment that will allow the City to require this after the LOMR-F has been issued. If the developer chooses to apply for a CLOMR-F in advance of the site preparations, the City would be called on to sign the Community Acknowledgment Form Part A at that time as well.

6. Following completion of building foundations the as-built condition should be memorialized by a brief report(s) or letter(s) certified by the relevant engineers indicating that the fill and the building foundations have been built in accordance with the plans, are in place, and fully functioning. The City should maintain records of documentation of all steps of this process in perpetuity.

As you know, determining whether a site that has been filled, graded, and/or excavated that is in or near the SFHA, and buildings built on that site, are "reasonably safe from flooding" is fundamentally the responsibility of the local jurisdiction that regulates floodplain development. Requiring the developer and its consultants to certify such conditions is one way that the City can call upon the developer to share in that responsibility in the event of any future problems.

Please let me know if you have any further questions.

Frank Shockey
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From: Delacourt, Derek [mailto:DDelacourt@a2gov.org]
Sent: Thursday, September 21, 2017 10:08 AM
To: Shockey, Frank <Frank.Shockey@fema.dhs.gov>
Subject: Ann Arbor Development Project

Frank,

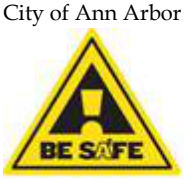
I'm forwarding this to you in preparation for a potential conference call per our discussion. Please send a few dates and times that will be convenient for you and I can set something up. I will also send over our Building Officials interpretation when I have it.

Thank you again,

Derek

Derek L. Delacourt,

Community Services Administrator
City of Ann Arbor ~ 301 E. Huron St. ~ Ann Arbor, Michigan 48104 ~ 734-794-6000, ext 43902



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