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**ENGINEERS'S REPORT
REGARDING
3124 MEADOW AVENUE
NORMAN, OK**

ADDENDUM TO PREVIOUS REPORT DATED JULY 28.2024

INTRODUCTION

Work consisting of constructing a new patio slab, fences along three sides of the yard, creating flower beds, planting various shrubs, and placing shrubs was done without getting the necessary floodplain permit from the City. This is unfortunate and it creates a situation where it is difficult to evaluate the effect that the work has on the floodplain. When a permit application is made prior to any construction, then the City staff, applicant and applicant's engineer have an opportunity to conduct an elevation survey of existing ground. Then the work can be before approval and again after completion to insure that the work complies with the applicable floodplain regulations. In cases where the pre-construction survey was not done, as in this case, it is impossible to get the precise elevation survey data that is needed. In this case, we have to rely on other information.

PRIOR APPLICATION

A floodplain permit application and engineer's report was submitted to the City of Norman in regard to the first application. That previous application was recommended for approval by staff. However, a neighbor that is the owners of Unit 3122, which is located within the same condo-type structure appeared at the FP committed meeting and objected to the work that was done and expressed concern that the work done in the yard of Unit 3124 might cause flooding of the interior of his unit. A former tenant of Unit 3124 also appeared at the FP meeting and made comments that reinforced the concern about potential flooding within the main structure.

After, hearing comments from these FP committee members expressed concern that the unpermitted work performed might be causing water to back-up in the yard of Unit 3122, and that this situation might cause stormwater to enter that unit. One member of the FP committee actually stated that his concern regarding this matter is more about the possible impact on Unit 3124 than on the impact on the floodplain. The FP committee ultimately voted overwhelmingly to deny the first application submitted for this project.

APPLICATION TWO AND REVISED RECOMMENDATIONS

Statements made by various committee members at that meeting are being used as guidance in preparing a new application and proposing corrective work that involves removing a lower portion of the two cross-fences (the portion located lower than the BFE). Also, the current proposal includes removing approximately nine shrubs and three flower beds. The metal edging located along the perimeter of the flower beds will also be removed. Sod was placed in this back yard, and I have not been able to establish that adequate soil was removed prior to placing this sod; therefore, it is possible that the placement of the sod has resulted in an increase in the elevation of the back yard. The contractor that build the fences and the concrete patio slab stated that after he completed the patio slab, he removed soil from a portion of the unpaved portion of the back yard of Unit 3124 and that he shaped the yard to cause the flows occurring south of the ridge will flow to the location of the gate in the back fence and onward across the golf course. Further, he stated that he graded this yard so that the soil adjacent to the patio slab was an estimated one-half inch lower than the top of the patio slab. In addition, this contractor stated that he finished his work at the point where the yard had been graded. He stated that he is not the contractor that placed sod and did the landscaping work—that work was done by somebody else. Consequently, I am recommending that the sod in the back yard be removed along with two inches of additional soil. Then new sod be placed. This will result in a lowering of the grassed area of the back yard by approximately two inches (which will also lower the top of the ridge by about two inches). This work will result in removing two inches of soil across an area of 520 square feet for a removal volume of approximately 3.2 cubic yards.

The contractor stated that he constructed the new patio slab by placing the top of the slab at existing grade elevation along the side of the slab adjacent to the property line. And, he sloped this pad downward toward the back fence and downward toward the property line of Unit 3126. The contractor further stated that the chamber located in the yard of Unit 3124 and containing a sump pump was not disturbed during the construction work. Originally the top of this chamber was flush with the soil and after the pad was constructed this chamber is flush with the top of the concrete slab. This information indicates that the top of the slab matches the original ground at this point. In addition, there is photographic evidence that the top of the original patio blocks and the top of the new patio slab are at approximately the same elevation at the location of a window on the back wall of the residence. This information. This information is consistent with statements made by the contractor and so is the survey data regarding this new patio slab. Consequently, I am recommending that this concrete slab remain and be included in the permit.

During the meeting, testimony from concerned residents stated that the brick wall that surrounds the public sanitary sewer manhole located in this yard near the back fence was recently constructed. The same comment was made about the bricks located adjacent to the back fence that create a flower bed. These bricks and mortar appear to be aged so I originally concluded that these bricks have existed for a long time. Since the first meeting regarding this property, I discussed the unpermitted work separately with the owners of Units 3122, 3124, 3126 and the contractor that did the wok on the yards of Unit 3124 and Unit 3126. The owners of Units 3124 and 3126 and the contractor all stated that these brick have been in place for a long time. During my discussing with the owner of Unit 3122, he stated that the work in question probably did not include adding any additional bricks. So, it seems that the bricks around the manhole and the back flower bed have been there for a long time and can remain. And, it seems that it will be okay to place some flowers, roses, or shrubs, etc. inside the back bricked flower bed.

DETAILED ELEVATION SURVEY OF UNITS 3122, 3124 AND 3126

After the first permit application being denied, the owner of 3124 requested that I prepare a new application and that I include doing all of the things that the City will require for approval. That is exactly my current objective. Incidentally, at about the same time, the owner of Unit 3126 asked me to prepare a floodplain permit application for that was done on her yard. I am submitting a separate application for that Unit.

I hired a Oklahoma License Professional Surveyor (PLS) to make a detailed elevation survey of the back yards of Units 3122, 3124 and 3126 and adjacent area on the golf course property. I have prepared a detailed site plan showing the results of this survey.

A summary of this survey indicated that the yard of Unit 3126 flows partially toward the southerly fence and partially toward the back fence and onto the golf course. Most of the runoff from local rainfall will flow southward and pass under the southern fence. Some of the local rainfall will go westerly under the back fence and onto the golf course. Flow from an elevated river floodplain during flooding conditions will from generally from the north-west to the south-east and will pass under the southern fence and onto the parking lot of the gold course property.

Regarding Unit 3124 flows from local rainfall will be divided by a ridge that runs across the back part of the yard, between the sanitary sewer manhole and the center of the new patio slab. This ridge does not extend onto the new patio slab. The grass-covered part of this yard that is located west of this ridge actually flows toward and onto the yard of Unit 3122 and then turn toward the golf course and exists the yard of Unit 3122 at the center of the back yard fence, which is the low point on the yard of Unit 3122.

The grassed portion of the yard of Unit 3124 located south of the ridge will flow toward the yard of Unit 3126, but will turn westerly at a point close to the southerly fence of Unit 3124, then the flow will go to the back gate of Unit 3124 and go onto the golf course. The contractor stated that the yard of Unit 3124 was intentionally sloped to carry the drainage to the back gate. Excavated soil was removed from the stie.

Survey data shows that the new patio slab is sloped to drain from the NE corner of the slab toward the SW corner of the slab. Therefor the flow from this slab will be westerly and easterly. Some of this flow from this patio will go north of the ridge and some will go south of the ridge. The floodwater from local rainfall going north of the ridge will flow onto the lawn of Unit 3122 along the property line and exist the yard of the lawn of Unit 3122 onto the golf course property. The flow going south of the ridge will flow toward the property line of Unit 3124 and then go westward to the gate in the back yard of Unit 3124 and then continue onward across the golf course. In my opinion the flow onto Unit 3122 is similar to the historic flow that existed before the construction in Unit 3124.

Incidentally, there is a underground drainage system in the yard of Unit 3124 that consists of area inlets, a sump pump and underground piping. This system collects rainwater on the patio of Unit 3126 and transports this rainwater along the back property line to the parking lot on the golf course property. The construction date of this drainage system is unknown but I was told that this system was installed by the HOA a long time ago to help prevent stormwater seepage into Unit 3124. Since the completion of the recent work on the yard of Unit 3124, this system may be unnecessary. This system will not impact the flow of water in the overall floodplain.

Major floodplain flow that will result from major flooding of the river will be generally from the northwest to the southeast and this flow is predicted to follow a path from the yard of Unit 3124 directly onto the yard of Unit 3126.

DRAINAGE ON THE YARD OF UNIT 3122

The owners of Unit 3122 are understandably concerned about the potential of flooding of their residence. My surveyor made an elevation survey of their yard and patio area, I am appreciative that the owner granted approval for this survey. Also, I observed the drainage on this yard during a period of moderate rainfall.

The patio door threshold on this unit is only slightly higher than the adjacent patio slab (only about one and one-half inches difference.) The patio slab is lowest at the NW corner. I observed this patio slab as the rainfall began, and I watched for a considerable length of time. I observed the water falling on this patio slab to flow to the NW corner, where it began ponding due to adjacent vegetation that was higher than the slab. The roof gutters were overflowing at this time due to some kind of restriction in the system and the overflow was falling directly on the patio slab. This water from the gutter was greater than the water that was falling directly on the patio slab. As I watched, the depth of the ponding water increased, and as that happened, the edge of the pool of water moved toward the southerly end of the patio. This puddle was about four inches (horizontally) away from the north fence of Unit 3124 when the rainfall decreased to a sprinkle. Incidentally, there is a piece of landscape edging along the side of the patio slab that is adjacent to the property line with Unit 3124, and this edging will block flow onto or off this side of this patio slab. This edging ends at the corner of the patio slab. Also, there is landscaping mulch and some plants behind the landscape edging.

I did observe that water from the patio slab was flowing (more like seeping through the grass) and traveling toward the low spot at the back yard fence and then onto the golf course. At first, it was difficult to observe the movement of the clear water through the green lawn grass, but this flow was clearly observed when I turned the water red.

I did observe that the lawn grass is slightly higher than the patio slab along the edge of the slab and this grass is restricting the flow of stormwater from this patio. Stormwater will flow more rapidly toward the back fence and there will be less ponding on the patio slab if the ground adjacent to the patio is lower. And, there will be less risks of flooding of the interior of the unit. Perhaps the sod can be peeled back, soil removed, and then the sod replaced to reduce ponding on the patio. The survey shots indicated that there is a continuous downward slope from this patio slab to the back fence and onto the golf course, which is consistent with the observed water flow. Repairing the roof gutter system will be helpful, also.

Much of the stormwater from local rainfall that might flow from the yard of Unit 3122 onto Unit 3124 will turn toward the NW corner of the yard of the yard of Unit 3124 and return to the yard of Unit 3122 and then flow onto the golf course, as indicated by the elevation survey. Please refer to the site plan that contains spot elevations and contours of this area.

During a 1% chance flow of the river (and perhaps a smaller flow) the flow in the floodplain will certainly flow across all of the three yards discussed herein. Flow as a result of river flooding will be in a direction parallel to the back fence; therefore the fence will have a negligible impact on this floodplain.

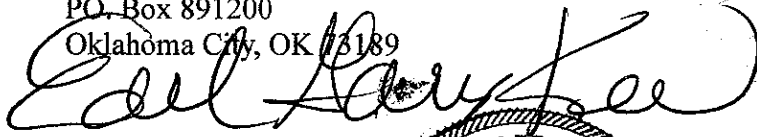
SUMMARY OF PROPOSED CORRECTIVE WORK (back yard—Unit 3124).

1. Cut off bottom part of the two cross-fences at the elevation of the BFE. Place wire mesh across opening below the fence (optional). (Include these cross fences in the permit.)
2. Cut off gate in rear fence at the bottom of the lower cross plank. Please wire mesh across the opening below the gate (optional). (Include in the permit.)
3. Remove nine shrubs, bushes, and hedge plants.
4. Remove all metal flower bed edging (three areas).
5. Remove several rose bushes planted near the sanitary sewer manhole.
6. Remove sod in the grassed area of the yard; remove two inches of additional soil; place new sod. Take photos as this work is performed to document progress. (Include this work in the permit).
7. Include the new concrete patio slab in the permit.
8. The bricks around the sanitary sewer manhole and adjacent to the back yard fence can remain. (Include in the permit.)

LIST OF EXHIBITS SUBMITTED WITH THIS APPLICATION

1. The first application that was submitted for consideration and rejected is available for staff review.
2. Exhibits submitted with the original application:
(Photos of the yard of unit 3124)
3. Updated mailing list and radius map.
4. Revised engineer's certification statement
5. Photographs of Unit 3122 for reference

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