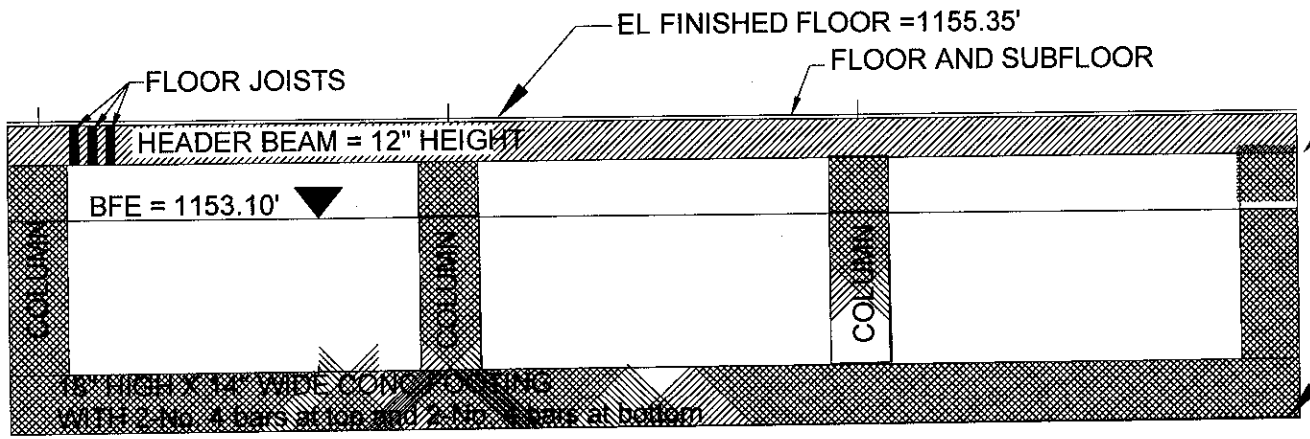
PROPOSED ELEVATED STRUCTURE
216 S LAHOMA AVENUE, NORMAN, OK
CONSTRUCTION DETAIL

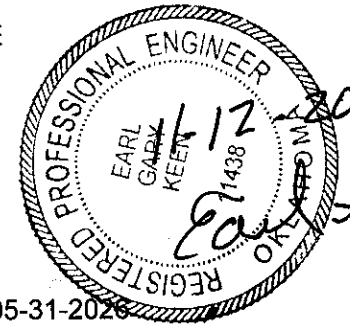


EL TOP COLUMN = 1154.35'.
COLUMN HEIGHT MAY BE VARIED TO SPECIFIED MIN. F.F. ELEVATION.

CONC. COLUMN: 15 TOTAL
18" X `8" WITH 6EA NO. 6 BARS

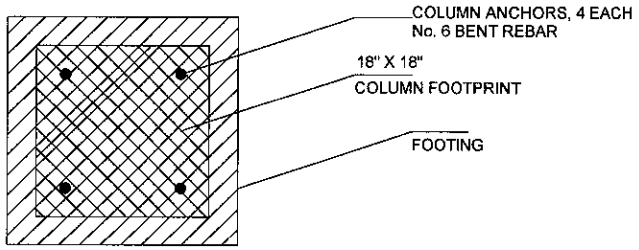
EL ADJACENT GRADE =1149.50'

NOTE: AREA BETWEEN COLUMNS TO REMAIN OPEN, PERMANENTLY. TO REDUCE IMPACT ON FLOODPLAIN. NO ENCLOSED AREA BELOW THE BFE; THEREFORE FLOOD VENTS ARE NOT REQUIRED.
NOTE: ALL ELEVATIONS ARE NGVD'88
NOTE: ONE ROW OF COLUMNS OF THREE ROWS. COLUMNS ARE SPACED 10.33 FT CENTER TO CENTER.

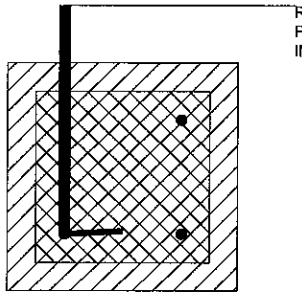


EARL GARY KEEN PE 11,438. EXP. 05-31-2026
PO BOX 891200, OKLAHOMA CITY,M OK 73189

PLAN VIEW COLUMN FOOTPRINT--TYPICAL

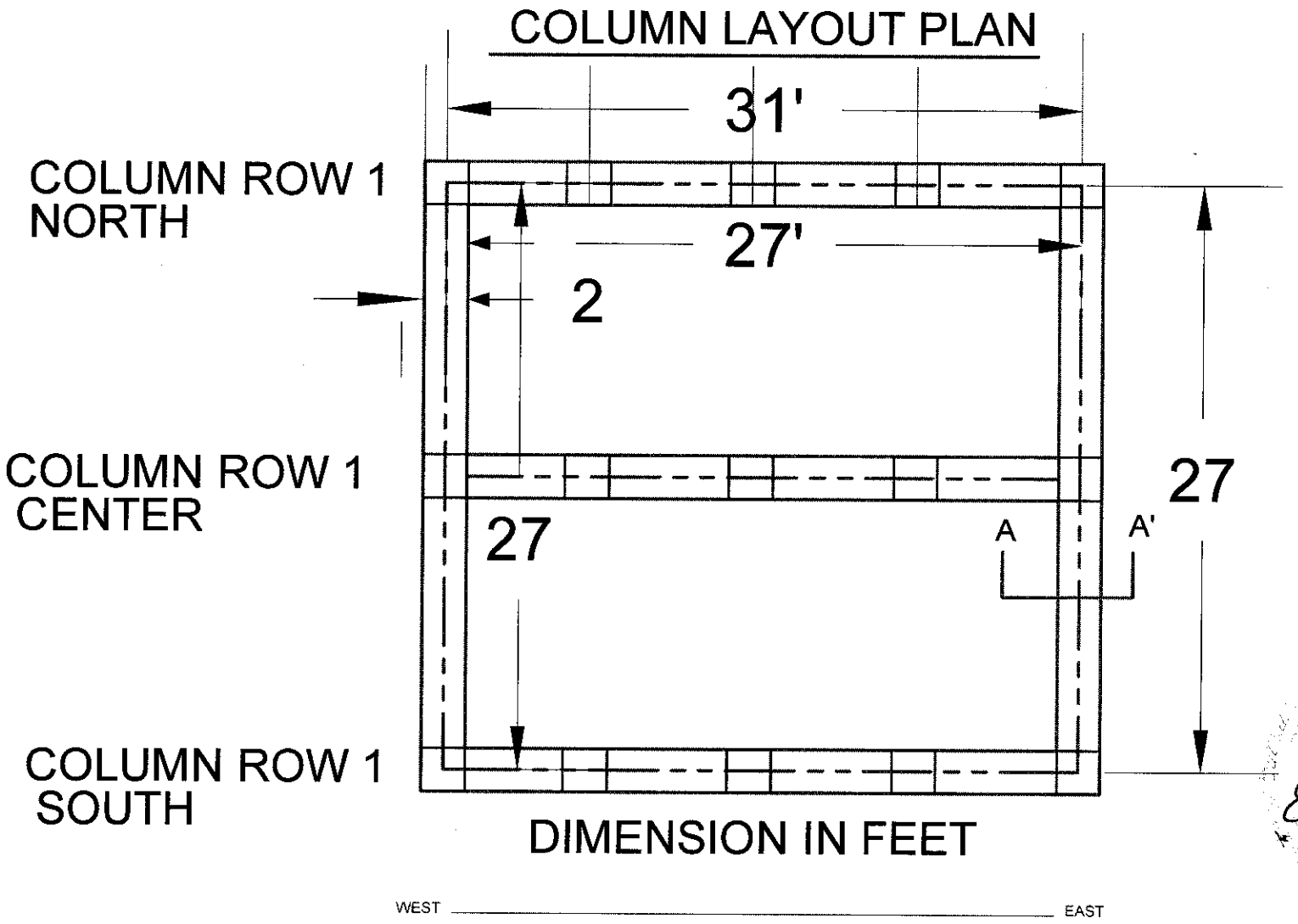


SECTION VIEW COLUMN FOOTPRINT--TYPICAL



4-EACH BENT REBAR ANCHORS SET IN FOOTING AND EXTENDING ONE FOOT FOOT ABOVE INTO COLUMN. NO. 6 REBAR.

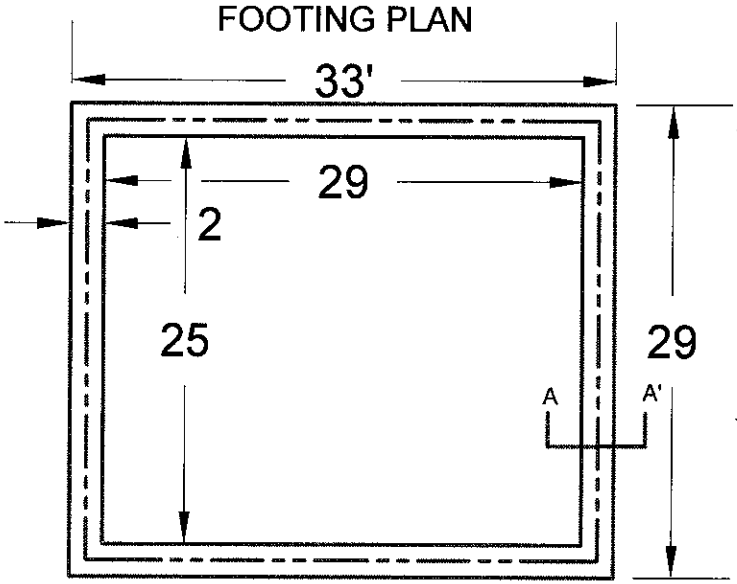
COLUMN LAYOUT PLAN



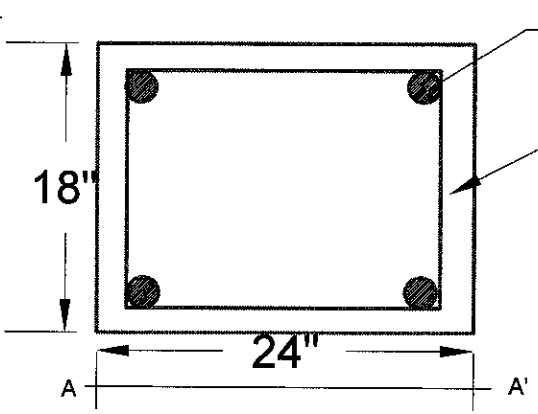
Earl Barry Ke
11-12-25

NOTE: COLUMNS SPACE IN EACH ROW AT 10.33' CENTER TO CENTER

FOOTING PLAN



FOOTING PLAN CROSS-SECTION



4 EA; NO6 REPAR; CONTINUOUS; OVERLAPS TO BE MIN. 12 DIAMETERS OF REBAR. PLACE REBAR 1-1/2" FROM EDGE.

CONCRETE: 4000 PSI COMP. STRENGTH DESIGN. PLACE TOP OF FOOTING AT GROUND LEVEL; FOOTING DEPTH TO BE TWO FEET MINIMUM.

PLACE BENT CONCRETE ANCHORS AT LOCATION OF COLUMNS. FOUR BENT ANCHORS AT EVERY COLUMN.

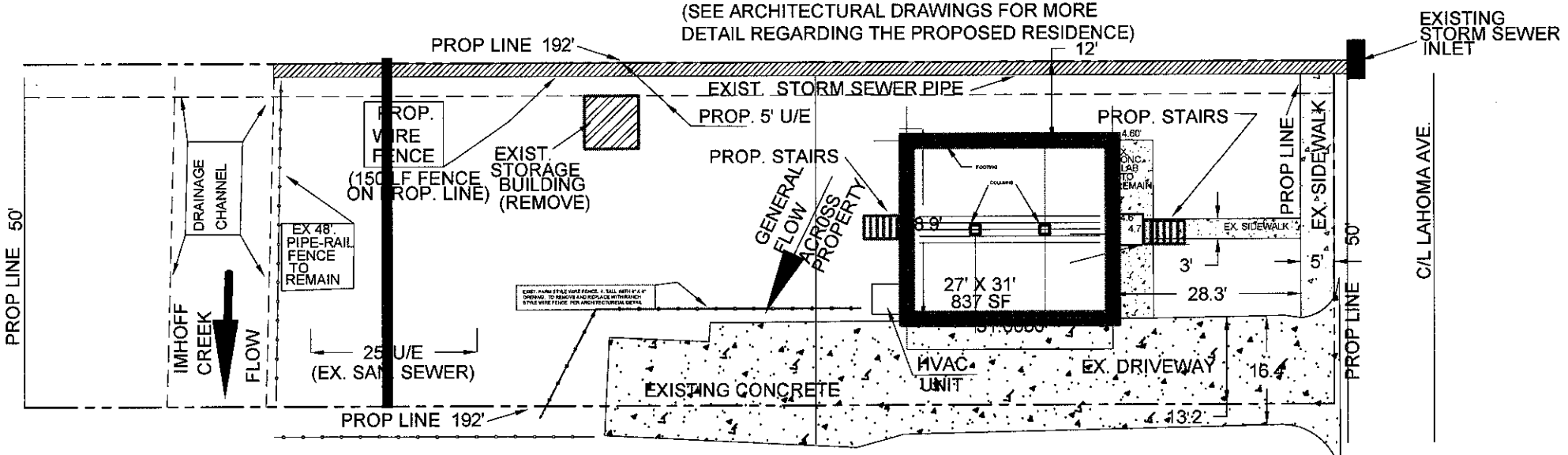
3/8" STIRRUP SPACED EVERY TWO FEET

Earl Keen
11-12-25

REGISTERED PROFESSIONAL ENGINEER
EARL
GARY
KEEN
11438
OKLAHOMA

SITE PLAN WITH
PROPOSED STRUCTURE
216 SOUTH LAHOMA AVE.
LOT 6, BLOCK 2, EAGLETON ADDITION
NORMAN, OK

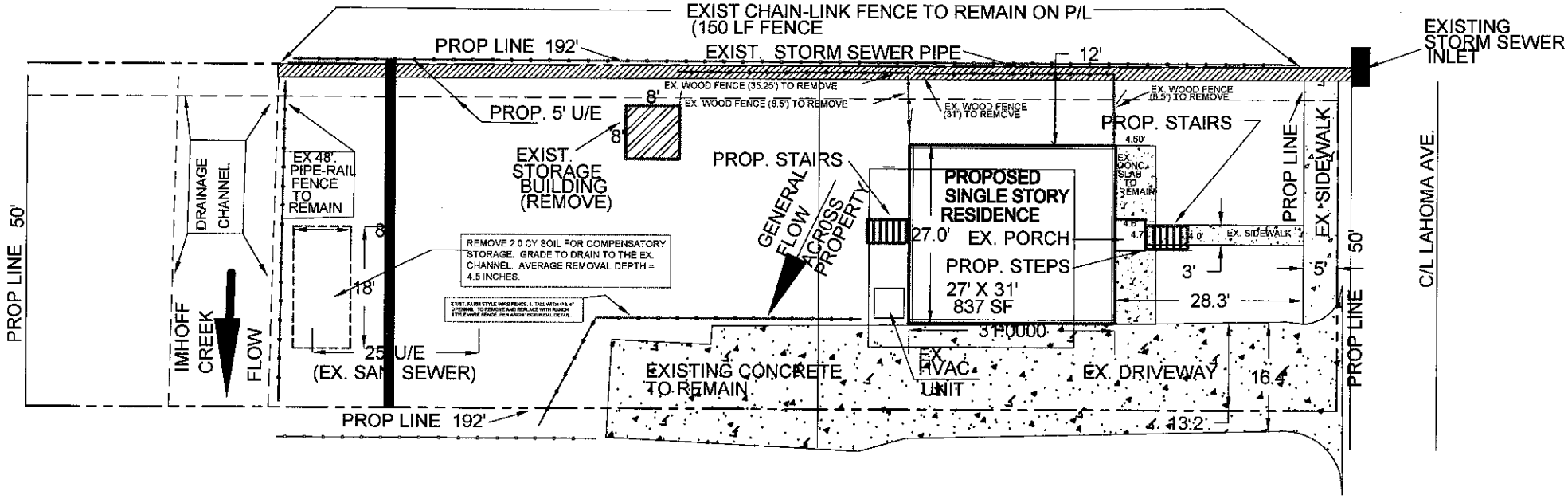
(SEE ARCHITECTURAL DRAWINGS FOR MORE DETAIL REGARDING THE PROPOSED RESIDENCE)



REGISTERED PROFESSIONAL ENGINEER
EARL GARY KEEN
11438
OKLAHOMA

4-25

SITE PLAN
PROPOSED CONDITIONS
216 SOUTH LAHOMA AVE.
LOT 6, BLOCK 2, EAGLETON ADDITION
NORMAN, OK



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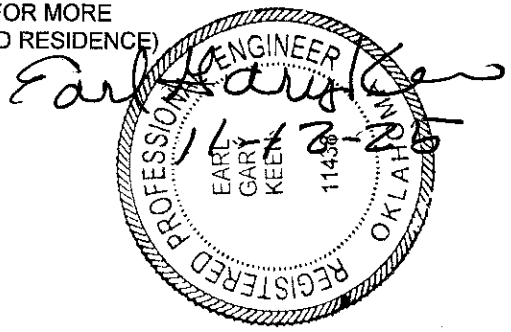
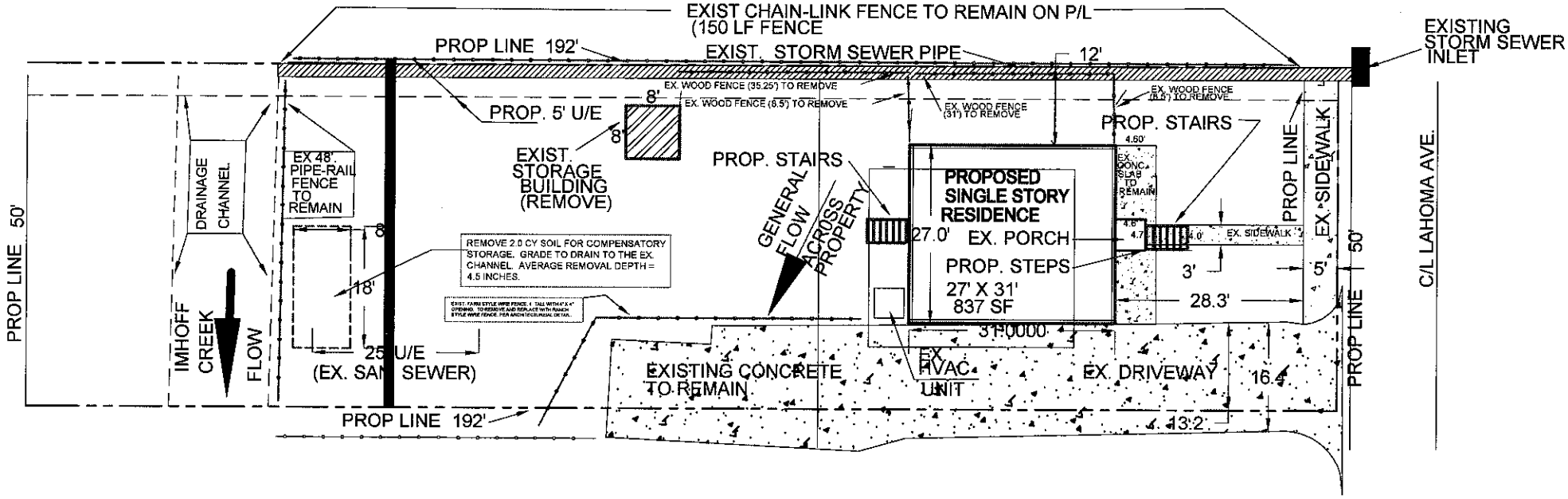
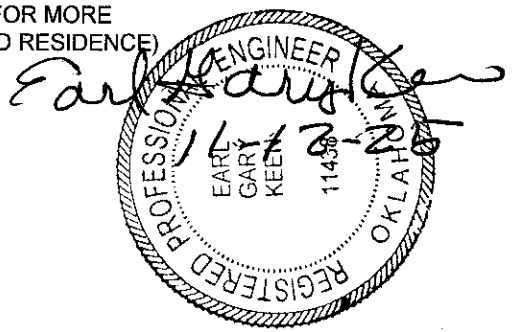


SITE PLAN
PROPOSED CONDITIONS
216 SOUTH LAHOMA AVE.
LOT 6, BLOCK 2, EAGLETON ADDITION
NORMAN, OK



(SEE ARCHITECTURAL DRAWINGS FOR MORE DETAIL REGARDING THE PROPOSED RESIDENCE)



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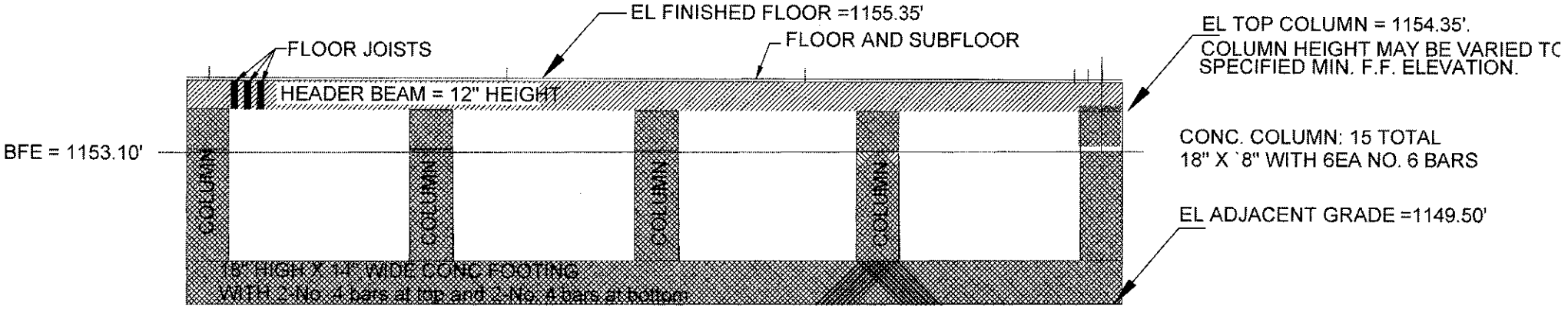

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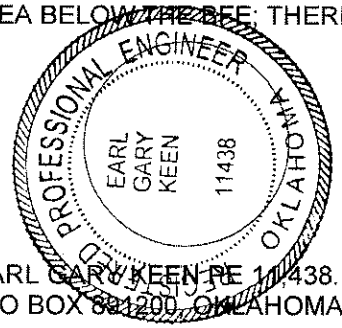

Earl Gary Keen
11-12-25

EARL GARY KEEN PE 11438. EXP. 05-31-2026
PO BOX 801200, OKLAHOMA CITY,M OK 73189

216 SOUTH LAHOMA AVENUE

DISCUSSION OF IMPACT ON THE FLOODPLAIN REULTING FROM PROPOSED REDEVELOPMENT OF THIS PROPERTY WITH SAID REDEVELOPMENT CONSISTING PRIMARILY OF REMOVAL OF THE EXISTING RESIDENTIAL STRUCTURE AND CONSTRUCTION OF A NEW STRUCTUE OF THE SAME TYPE AND USE AND CERTIFICATION STATEMENT PROVIDED BY BY AN OKLAHOMA LICENSED PROFESSIONAL ENGINEER REGARDING THE IMPACT THAT THE PROPOSED DEVELOPMENT WILL HAVE ON THE FLOODPL THAT EXISTS AT THIS SITE.

HISTORY

The lot on which the subject property is located in Lot 6, Block 2, Eagleton Addition, City of Norman, Cleveland County State of Oklahoma. This addition is one of the older additions in the City of Norman, being platted prior to the existing residence being constructed in 1930. In those early years, plats were created in a much different way that it is done today. In the early years of the city, devlopers and their engineers and surveyors created plats of proposed devlopment with little regard for existing terrain drainage ways or other existing features. In the early developments, the development platted esentially every square foot foof of the land that he/she owned, and the City approved such plats upon filing of same. Today, the City closely regulates new developments and the related plats. In the old days, plats were created that showed lots located in floodplains and even in floodways with the intention of all of these lots being developed. Today, the process of getting a plat approved in Norman requires careful analysis of existing drainage ways and the createion of drainage easement and in many cases, the improvement of existing drainage ways to insure that the development does not create drainage problems within the property being developed or other properties located within the community.

The existing residence located on the subject tract was constructed in 1930, and the City of Norman did not joint the Federal Flood Insurance Program until 1978 or perhaps a little later. FEMA recommended regulations were adoped by the City at the time of joining the Federal Flood Insurnace Program. Since joining the FIP, the City of Norman has been closely regulating development and re-development in the floodplain. But, in 1930, there were no FEMA sponsored regulatory guidelines. Consequently, many residences located within the City were constructed in floodprone area, with the results being occasional flooding of many of these structures and repeative flooding of some of these structues. The existing residence on the subject lot is one of the structures that has unfortunaely experience repeative flooding.

The City of Norman is experiencing a great demand for affordable housing, especially in locations near the campus. Consequently, many of the older existing homes have been purchased with the intent to repair, remodel. and/or replace these structures. They City has received and considered many applictions for floodplain permits to upgrade these older, existing homes in this same floodplain, and many of those applications have been approved.

A Floodplain permit application was previously submitted to elevation this existing structgure, and this application was approved by the City. This approved permit has now expired and the owner of the property now desires to remove the exising structure and replace it with a newly constructed residence.

The existing structure is located in the floodplain and in the floodway of Imhoff Creek, and the solid walls of this residence certainly creates an impediment to the flow of flood water down the valley. However, there are other improvements that provide and impediment to the flow of floodwate across this property and onward down the valley. First, there is a storage building that has dimension of approximately 8-feet by 8-feet. Second, there is a stockade fence that runs along the norh property line of this property that is approximately six feet high and xxx feet. The length of this fence that runs perpendicularly to the flow of floodwater across this property is xxx feet. The dimensions of the existing residence is 27-feet by 31-feet. All of these objectsprovide a restriction to the free flow of water across this property and down the valley.

There are some existing wire fences that have caputered some flotable items and need to cleaned. The current proposal is to keep the wire fences, but to clean and repair these fences. The owner intends to inspect these fences on a monthly basis and clean and maintain same as need to provide for the maximum free flow of stormwate through these existing chain-link type wire fences.

There is a rail type fence made of steel pipe placed horizontally that runs along the east bank of the lined drainage channel that runs across this property. This fence runs in a direction parallel to the flow of storm water across this property; therefore, this fence will have a small degree of restriction to the flow of water across this property and down the valley. For that reason and because this fence is existing and has existed for a long time, the proposal is to keep this fence in place. It will serve as a safety barrier to prevent a person from stumbling into the drainage channel.

There is another fence that exists in the vicinity of this property that should be mentioned. This fence is another pipe-rail fence and it runs from east to west across the valley, and it is located on the adjacent lot that abuts 216 Lahoma Avenue on the south side. This fence runs from the east property line westward across the valley to the east bank of the concree lined channel. This fence has a major impact on the floodplain as it will hinder the free flow of water across the property on which it is located and onward down the valley. Perhaps this existance of this fence has contributed to the previous flooding of the exising structure at 216 Lahoma Avenue because this fence will certainly ceate some back-water (increased waer depth) at 216 Lahoma Avenue during periods of severe flooding. This fence appears to be located on a lot addressed as 218 South Lahoma Avenue, and the Cleveland County accessor's webpage shown the owner of this lot to be the City of Norman. This, the City of Norman may be the owner of this fence, and the City might be willing to remove this fence in order to reduce the risks of flooding upstream of same.

CURRENT RESTRICTIONS TO FLOW ACROSS PROPERTY AT 216 S LAHOMA AVE.

As mentioned above three restriction to southward flow across the property at 216 S Lahoma Ave exist at or near the north property line of that lot. On the ease is the historic residence, which has dimension of 27-feet by 31-feet. The wall having a length of 27 feet is located at the est end of this line of restrictive objects and the east-west length of the restriction is 27 feet. This wall is constructed of brick and has no openings to allow the passage of water through this wall. At the west end of this line of line of restrictions is a storage building that has dimension of approximately 8-feet by 8-feet. The restriction associated with this building is a solid wall eight feet in length. Between the residence and the storage building is a stockade fence that has a length of 35.25 feet. This stockade fence incorporates vertical 1 x 6 planks that are 5.5 inches in width and it is assembled with crackes between the planks, and the cracks between the planks is approximaely ½ inch in width. Therefore, it is concluded that it is reasonable to consider this fence to be of a solid construction and that the stormwater that could flow through the cracks in the fence is neglible. Accodingly is is concluded that

The existing structure is located in the floodplain and in the floodway of Imhoff Creek, and the solid walls of this residence certainly creates an impediment to the flow of flood water down the valley. However, there are other improvements that provide and impediment to the flow of floodwate across this property and onward down the valley. First, there is a storage building that has dimension of approximately 8-feet by 8-feet. Second, there is a stockade fence that runs along the norh property line of this property that is approximately six feet high and xxx feet. The length of this fence that runs perpendicularly to the flow of floodwater across this property is xxx feet. The dimensions of the existing residence is 27-feet by 31-feet. All of these objectsprovide a restriction to the free flow of water across this property and down the valley.

There are some existing wire fences that have caputered some flotable items and need to cleaned. The current proposal is to keep the wire fences, but to clean and repair these fences. The owner intends to inspect these fences on a monthly basis and clean and maintain same as need to provide for the maximum free flow of stormwate through these existing chain-link type wire fences.

There is a rail type fence made of steel pipe placed horizontally that runs along the east bank of the lined drainage channel that runs across this property. This fence runs in a direction parallel to the flow of storm water across this property; therefore, this fence will have a small degree of restriction to the flow of water across this property and down the valley. For that reason and because this fence is existing and has existed for a long time, the proposal is to keep this fence in place. It will serve as a safety barrier to prevent a person from stumbling into the drainage channel.

There is another fence that exists in the vicinity of this property that should be mentioned. This fence is another pipe-rail fence and it runs from east to west across the valley, and it is located on the adjacent lot that abuts 216 Lahoma Avenue on the south side. This fence runs from the east property line westward across the valley to the east bank of the concree lined channel. This fence has a major impact on the floodplain as it will hinder the free flow of water across the property on which it is located and onward down the valley. Perhaps this existance of this fence has contributed to the previous flooding of the exising structure at 216 Lahoma Avenue because this fence will certainly ceate some back-water (increased waer depth) at 216 Lahoma Avenue during periods of severe flooding. This fence appears to be located on a lot addressed as 218 South Lahoma Avenue, and the Cleveland County accessor's webpage shown the owner of this lot to be the City of Norman. This, the City of Norman may be the owner of this fence, and the City might be willing to remove this fence in order to reduce the risks of flooding upstream of same.

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the width of this restrictive line of objects, consisiting of residence, wall of storage building and stockade fence is _70.25 feet.

PROPOSED MODIFICATIONS

The proposal included in the current application for a floodplain permit includes:

1) Removing the current residence in its entirety and constructing a new residence that has the same living area as the original residence. The new residence will be constructed on piers that will have a top elevation designed to place the proposed finished floor of the new structure a minimum of two feet above the 100-year base flood elevation to comply with applicable regulations regarding minimum finished floor elevations. Only the width of the piers will be in contact with flowing flood waters and there will be fifteen piers. The width of each pier will be 1.5 feet; therefore, the total width of the restriction caused by the piers will be 22.5 feet.
2) The above-mentioned storage building will be removed completely and it will not be replaced.
3) The above-mentioned stockade fence will be removed in its entirety and it will not be replaced . Removal of this stockade fence will remove35.25 feet of the restrictive line of objects discussed in the preceding section.
4) The existing chain-link fence will be cleaned and repaired and this fence work will not change the flow of floodwater across the subject property.
5) The pipe-rail fence that exists along the east bank of the lined drainage channel will not be modified and will remain as it is, and this will not change the flow of flood water across the subject property.
6) The additional paved parking are proposed in a previous submittal of this application will not be constructed and is hereby withdrawn from the application. This change will not impact the flow of water across the subject property.
7) The wire fencing that is located in the vicinity of the north line of the concrete paved driveway will be repaired and cleaned as needed. This fence work will not change the flow of storm water across the subject property.

CONCLUSION

The existomg restrictions (or blockage to flow) across this property consists of a storage building, a stockade fence, and the wall of the existing residence. The storage building will be removed, the stockade fence will be removed and the existing residence will be removed and a new residence will be constructed with the new residence being supported by twelve piers. Accordingly, the current restricted or blocked width of flow is 70.25 feet, as shown by the attached exhibit. The width of the restriction per the proposed plan is 22.5 feet. Accodingly, under the proposal, the width of the restrictive objects or the flow blockage will be just (100 x 22.5 / 70.25) = 32.0 percent of the width of the restrictive objects or the flow blockage that exists under the existing conditions. For these reasons, it is concluded that any qualified, competent and reasonable engineer should rationalize that the proposed modifications for the subject property will not increase the elevation of the floodplain nor the elevation of the floodway on any of the adjacent properties or on any other properties within this community. Basic hydraulics indicates that removing objects that restrict the free flow of water down a drainageway should result in a decrease in the elevation of the flowing water—not an increase. The proposed construction improvements on this property will promote the flow of water across this property for the reasons discussed above, and that change will be a positive measure in terms of managing the floodplain and floodway at this location.

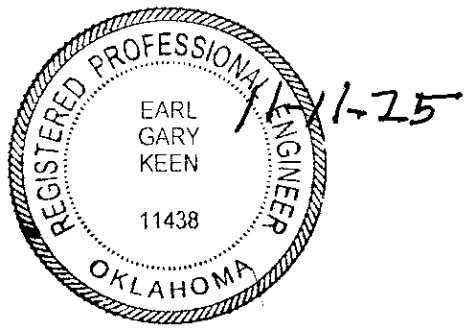
COMPENSATORY STORAGE FOR THE VOLUME OF THE TWO STAIRS THAT WILL BED CONSTRUCTED FOR ACCESS TO THE PROPPOSED STRUCTURE at 216 S Lahoma Ave.

Two stairways are proposed for access to the proposed stuctue at 216 S Lahoma Avenue. These stairs will have some volume and the lower portion of these stairs will be located in the flood plain that exist at the site. The stairs construction will be metal because the steel construction will have less volume than stairs constructed of either masonry or wood, the alternative materials. In addition, stairs will have a more open profile because there will be open space between the steps, and that open space will allow for the flow of storm water through the stairs during periods of flooding.

The devlopment proposal include removing some soil from the back yard of the subject property to compensate for the volume of the floodplain that will be occupied by the two stairs.

The depth of the floodwater below the BFE at the location of the stairs is 3.8 feet, measured in a vertical direction. However, the stairs will be sloped to accommodate the steps having a tread width of 11 inches and a rise of 8 inches for each step. Consequently, the lenth of the step runners located below the BFE during a 100-year storm is 3.8 x 11/7 = 5.23 feet. The width of the steps is four feet; therefore, the volume of the stairs located below the BFE is 5.23 x 4 = 20.92 sq. ft. Note that this computation is based on the space between the steps to be closed, but that space will remain open. For that reseon, this computation errors slightly on the high side—for a conservative analysis. For the two stairs, the total volume will be(2 x 20.92=) 41.84 cubic feet or (41.84/ 27) = 1.55 cubic yards. Accordingly, the volume of soil to be removed from the back yard is specified to be 2.0 cubic yards = 54 cu ft. The area from which this soil is to be removed is eight-feet by 18-feet, and the average depth of soil to be removed is 4.5 inches. The calculation for the volume of soil to be removed is computed: Depth = 4.5 inches =4.5/12= 0.375 feet. The area to be excavated is 8 feet x 18 feet = 144 sq feet, and the volume is 0.375 feet x 144 sq. ft = 54 cubic feet = 54/ 27 = 2.0 cubic yards. Accordingly the soil to be removed from the 8 foot by 18 foot area is an average depth of 4.5 inches for a total volume of 2 cubic yards. This soil shall be rmoved from the site for disposal. This soil can not be placed in the this flood plain or any other floodplain located in the City of Norman. Removal of this soil will provide the compensatory storage to offset the construction of the two stairs that are to be located in the floodplain and floodway.

Some excavation will be reqired for construction of the footing for the proposed residence. All excavated soil will be removed from this site and this excavated soil can not be placed in this flood plain or any other flood plain located in the City of Norman.



11-25

ENGINEER'S CERTIFICATION

I Earl Gary Keen, PE, an engineer licensed to practice professional engineering in the State of Oklahoma, do hereby state that I am an engineer experienced in drainage engineering and flood plain analysis and that I am in good standing with the State of Oklahom Board of Licensure for Professional Engineers and Surveyors. Furthermore, I state that I have made a thorough and careful analysis of the floodplain and floodway associated with Imhoff Creek that exists on the property known as 216 S Lahoma Avenue, Norman, Oklahoma. Furthermore, I state that I am familiar with an application submitted by Glenn Burnett to the City of Norman for a Floodplain Permit; said Floodplain Permit being required by City of Norman regulaitons prior to issuance of a building permit for conducting construction activities in a floodplain located within the City of Norman. Furthermore, I hereby state that it is my professional opinion that the work proposed in the modified permit application, as summarized in the attached document will not result in any increase in the flood elevations at any location in the community during the occurrence of the base flood as a result of the proposed work at this location.

Earl Gary Keen
PE 11,438, EXP. 5-31-2026

11-11-25