APPENDIX G
Analysis of National Nonstructural Committee Assessment

1.0 Nonstructural Assessment

One way to reduce the risk of structural damage during a flood event is to consider nonstructural alternatives. The term nonstructural is expansive and ranges from buying out a structure to installing an upstream gage to track water levels. The nonstructural assessment conducted for this study relied on only nonstructural alternatives with a direct relationship with reducing flood damage to structures. These alternatives include sewer backup check valves, filling subfloor (basement or crawl space) areas, relocating utilities, floodproofing, elevating, or acquiring buildings. Each structure in the De Soto study area was individually evaluated and the least cost alternative was recommended with a few important assumptions that are detailed in the subsequent sections.

1.1 Structures in the Floodway

The City of De Soto is currently operating under the regulatory floodplain dated April 5, 2006, but this study was conducted using the preliminary FIRMs expected to be finalized in June of 2019. One of the many updates to the revised 2019 Flood Insurance Rate Map (FIRM) is the increase in the size of the regulatory floodway. The floodway is a special flood hazard zone within the floodplain that carries the deeper and faster moving water. Structures and other development within the floodway cause the water to slow and back up resulting in higher localized flood elevations. As a result, the National Flood Insurance Program (NFIP) requires communities to prohibit encroachments within the floodway:

> 44 CFR 60.3(d)(3): *In the regulatory floodway, communities must prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.*

The revised 2019 FIRM shows a floodway within De Soto that includes 138 structures. Some structures in this area experience depths of flooding exceeding eight feet above the first floor and velocities of up to five feet per second, which, when combined with deep flows, is able to collapse structural walls. While structures re-zoned within the floodway are grandfathered into the new system, any substantial improvement costing more than 50% of the structures value will require either elevation above the 1% Annual Chance Exceedance (ACE) event or relocation/acquisition. This study's nonstructural alternatives and recommendations for structures in the floodway are therefore limited to elevation or acquisition.

1.2 Available Mitigation Approaches

Non-structural floodproofing is an umbrella term that incorporates flood mitigation techniques that do not involve structural methods such as berms, levees, floodwalls, flood gates, etc. Instead, non-structural flood-proofing can be broken down into three major strategies:

1. Dry or Wet Floodproofing
2. Elevation
3. Structure Acquisition or Relocation

Dry floodproofing attempts to keep water away from the structure by creating a watertight seal with exterior barriers such as impervious sheeting, waterproof walls, watertight shields for doors and windows and drainage collection systems such as a sump pump. Dry floodproofing is best for slab foundation structures with flood depths three feet or less, which limits hydrostatic forces pushing on subfloor areas. If the structure has a subfloor area, it can be filled with sand or other material. This measure achieves flood risk reduction benefits, but is not recognized by the NFIP for any flood insurance premium rate reduction if applied to residential structures and cannot be used to bring any structure into compliance with a community's floodplain ordinance. Figure 1 shows a diagram that summarizes the features of dry floodproofing.

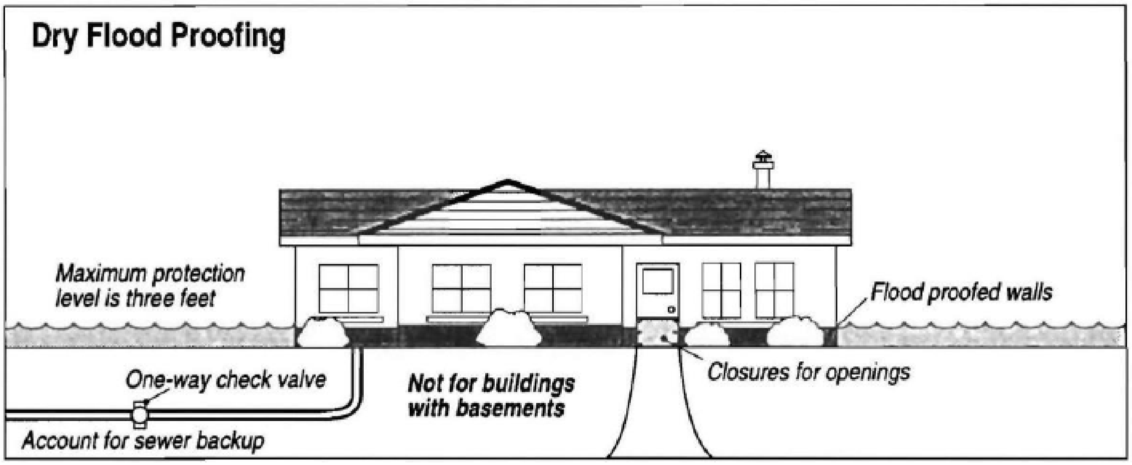

Figure 1. Nonstructural Dry Floodproofing Diagram

Wet floodproofing allows water to enter the structure by moving utilities, appliances, or other high value items to a higher elevation within the structure. The benefit of allowing water into a structure is to equalize or lessen the load on floors and walls from the effects of hydrostatic forces. While not typically recommended, a residential structure can be wet floodproofed by being constructed and finished with water resistant materials as shown in Figure 2. Wet floodproofing is best suited for warehouse structures given the open floor plans that can be retrofitted to elevate high value machinery and inventory. If the structure does have a subfloor area such as a basement, it is commonly recommended to fill the basement with sand or other material and relocate the lost square footage into a new addition above the base flood elevation. It is worth noting that wet floodproofing cannot be used to bring a residential structure into compliance with the community's floodplain management ordinance.

Figure 2. Nonstructural Wet Floodproofing Diagram

Elevating structures is more expensive than floodproofing but also provides more benefits by raising the structure above the base flood elevation. For this strategy, the structure is elevated from its existing foundation material onto a new foundation. Each foundation type has its own challenge to elevate with crawlspace foundations being easiest and slab foundations being the most challenging. Similar to other floodproofing alternatives, any utility from a basement would be lost as the only subfloor area allowed under NFIP regulations would be an enclosure with the appropriate amount of vents to allow for hydrostatic pressure equalization.

The analysis for this report assumes that subfloor areas such as basements are converted to enclosures and set on fill. For structures located in the floodway, elevating on fill is prohibited and piers or posts are utilized to limit floodway encroachment. Figure 3 shows a diagram that summarizes the features of elevation. The elevation mitigation approach assumes that each structure was elevated high enough to be greater than the base flood elevation.

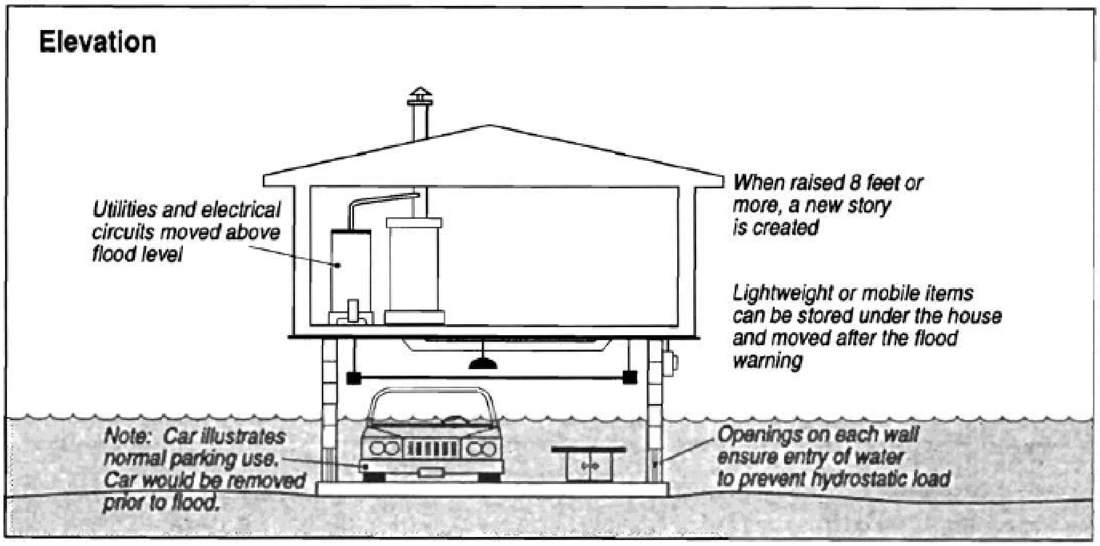

Figure 3. Nonstructural Elevation Diagram

Structure acquisition (buyout) and relocations are mitigation strategies that remove the hazard from the floodplain, which is the only nonstructural alternative that permanently reduces flood risk. Relocations involve uplifting a structure onto a transport vehicle and relocating it to an area outside of the floodplain. Acquisitions involve purchasing and demolishing the home or building and generally restrict the deed to open space in perpetuity. Acquisition is generally the most expensive mitigation approach as it requires compensating the homeowner the full market value of the structure. Relocations were not considered as part of any recommendations due to cost, but remain viable nonstructural alternatives.

1.3 Mitigation Cost Assumptions

Each mitigation approach will vary in cost based on a variety of assumptions. The cost of nonstructural mitigation has been studied by the U.S. Army Corps of Engineers (USACE) in previous reports, and the cost estimates from those reports will be utilized for De Soto to prioritize which mitigation approach minimizes costs based on the perceived benefits. The costs in this report are not site-specific to the De Soto study area and should therefore only be relied on for comparing approaches and evaluating cost-effectiveness.

Costs for structural elevation were taken from the 2017 Whittier Narrows Dam Safety Modification Study and vary by the amount of elevation as shown in Table 1. The costs assume a building has a slab on grade foundation and is priced per square foot of livable square feet. Slab on grade foundations are the most expensive foundation to elevate as they lack easy access to the floor joists that crawlspace and basement foundations provide. The structural elevation estimate for this report also assumes elevating on a 2:1 fill slope, meaning adequate space must be present on the parcel to accommodate the increase in the size of the footprint of the structure. In addition to elevating on fill, other foundation types include piers, posts, columns, and piles.

Table 1
Slab on Grade Elevation Costs (per sq/ft)

Height Raised (ft.)	Slab on Grade	
2	$	43
3	$	44
4	$	45
5	$	46
6	$	48
7	$	49
8	$	51
9	$	53
10	$	55

Costs for dry and wet floodproofing were taken from the 2016 Ste. Genevieve Draft General Reevaluation Report. Dry floodproofing is estimated to cost $23.32 per square foot for wood frame structures and $21.17 per square foot for brick structures. These estimates include the cost of the veneer wall and watertight doors. Costs for buildings with a shared "party wall" were reduced by 50% to account for a section of the building not requiring mitigation. A cost of $30 per square foot was determined to fill a basement or crawl space, which requires enough sand fill for an eight foot tall basement or three foot tall crawlspace. An additional $1,000 was added to each floodproofing estimate to account for installation of a sewer check valve.

For wet floodproofing, utilities will be relocated from a subfloor area to above the first floor elevation. The relocations considered for this report were electricity ($2.80 per square foot), plumbing ($4.40 per square foot), and HVAC ($6.70 per square foot). An additional $7,200 was added for commercial warehouses, which require the relocation of electrical outlets, meter, fuse box and HVAC compressor.

Acquisition costs are based on the property value of the structure and is sourced from the appraised property value from the Jefferson County Tax Assessors database. Associated costs associated with acquisition include the cost of demolition, real estate fees and transferring the deed. These costs include $45,000 for slab and crawlspace structures and $63,000 for structures with a basement, and are in addition to the appraised property value. Costs associated with compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA) were not included.

1.4 Mitigation Cost Estimation

A preliminary cost estimate was developed for each structure using the four available mitigation approaches discussed in Section 1.2 and based on the cost assumptions from Section 1.3. The costs identified in this report are not an engineering recommendation and should only be used for comparing mitigation approaches and evaluating cost-effectiveness. The cost estimates used in this report were developed based on the structures following foundation types:

1. *Basement*
    a. Acquisition – cost based on the market value of the building plus the cost associated with demolition, real estate fees and transferring the deed
    b. Elevation – cost based on filling the basement with eight feet of fill, elevating the building above the base flood elevation, and relocating all plumbing and HVAC
    c. Floodproofing – cost based on the flood elevation relative to the first floor:
        1. For structures with inundation less than the first floor elevation the cost is based on relocating all plumbing and HVAC and installing a sewer check valve
        2. For structures with inundation greater than the first floor elevation the cost is based on filling the basement with eight feet of fill, relocating all plumbing and HVAC, and installing a veneer wall, watertight doors and sewer check valve
2. *Crawlspace*
    a. Acquisition - cost based on the market value of the building plus the cost associated with demolition, real estate fees and transferring the deed
    b. Elevation – cost based on filling the crawlspace with 3 feet of fill, elevating the building above the base flood elevation and relocating all plumbing and HVAC
    c. Floodproofing – cost based on the flood elevation relative to the first floor:
        1. For structures with inundation less than the first floor elevation the cost is based on relocating all plumbing and HVAC and installing a sewer check valve
        2. For structures with inundation greater than the first floor elevation the cost is based on filling the crawlspace with three feet of fill, relocating all plumbing and HVAC, and installing a veneer wall, watertight doors and sewer check valve
3. *Slab*
    a. Acquisition - cost based on the market value of the building plus the cost associated with demolition, real estate fees, and transferring the deed
    b. Elevation – cost based on elevating the building above the base flood elevation and relocating all plumbing and HVAC
    c. Floodproofing – cost based on the flood elevation relative to the first floor:
        1. For structures with inundation less than the first floor elevation the cost is based on installing a sewer check valve
        2. For structures with inundation greater than the first floor elevation the cost is based on relocating all plumbing and HVAC, and installing a veneer wall, watertight doors and sewer check valve

2.0 De Soto Flood Mitigation Results

Each floodprone structure within the De Soto 1% ACE floodplain was evaluated for its structural attributes, hydraulic conditions and estimated cost of nonstructural flood mitigation. All recommendations in this report are preliminary and are subject to a detailed field survey and site-specific cost estimate.

2.1 Flood Mitigation Recommendation Methodology

The 1% ACE flood event recommendations identify the cost and approach to mitigating all 229 structures that are expected to be damaged during the flood event. The following sub-sections describe the mitigation methodology for how each recommendation was derived.

1. Acquisition

The rationale for acquisition was based on identification of acquisition as the least cost mitigation approach. Some structures were also identified for acquisition where acquisition was not the least cost mitigation approach. In these situations, acquisition was selected if the structure met any of the following criteria:

1. Located in the floodway and the cost was lower than elevation
2. Total cost within 25% of other nonstructural measures

It was assumed that since acquisition completely removes the flood hazard into perpetuity, that the property owner and city would elect to acquire the structure rather than paying marginally more for a mitigation measure that does not fully remove the risk of damage, especially for more infrequent flooding larger than the 1% ACE event.

2. Floodproofing

The rationale for floodproofing was based on the structure's foundation, occupancy type and local flood characteristics. Wet floodproofing was applied to commercial and industrial structures characterized similarly to a warehouse style building that could allow water to flow in without having to be concerned with hydrostatic pressures. Dry floodproofing was applied to all non-warehouse style structures experiencing less than three feet of flooding relative to the first floor elevation. Floodproofing structures with depths of flooding below the first floor was the most cost-effective alternative as most flood related damages could be mitigated by filling the subfloor area and relocating utilities above the first floor. For structures with flooding greater than the first floor elevation, the cost-effectiveness decreased given the additional veneer and watertight doors required to mitigate flooding. Floodproofing is typically the most common and cost-effective alternative, but given the large floodway, floodproofing becomes non-viable for a significant portion of the inventory despite flood depths being lower than three feet.

3. Elevation

The rationale for elevating structures was based on local flood characteristics and the least cost mitigation approach. Elevating structures is an effective flood mitigation approach up to 10 feet of rise and assuming proper slope grading and fill compaction, is not subject to hydrostatic pressures. Elevating structures has a high upfront cost from filling in subfloor areas and lifting structures onto a new foundation. As a result, elevation is limited to structures with significant flood depths, typically at least three feet, given that floodproofing is more cost-effective for shallower flood events. Elevation for the City of De Soto represented the only feasible non-acquisition approach to avoiding flood damages in the floodway. As previously stated, the elevation to the structure would have to occur on piles, piers or other system that avoids encroaching the floodway and allows flood flows to bypass the structure.

2.2 1% ACE Flood Event Mitigation Recommendations

The list of nonstructural flood mitigation recommendations was compiled by the U.S. Army Corps of Engineers National Nonstructural Committee (NNC), which conducted an August 2018 site visit and surveyed ten structures with in the City of De Soto and Jefferson County. More information and the results of the site visit are located in Appendix D of the Floodplain Management Plan. The recommendations were informed by Appendix D, but in the case of the structures located within the revised regulatory floodway, the recommendations were changed to either acquisition or elevation.

Of the structures located within the 1% ACE floodplain in De Soto, 41% are recommended to be elevated, 31% to be acquired, 17% to be floodproofed, and the rest (11%) had inundation below the first floor, and therefore only required either a sewer check valve or relocation of utilities.

One structure of note is the De Soto Rural Fire Station at E. 201 Miller Street, which was visited and assessed by the National Nonstructural Committee during the site visit. The Fire Station is a first responder hub during emergencies and is also located in the 1% ACE (100-year) floodplain, and more importantly, the regulatory floodway on the 2019 revised FEMA maps. The original recommendation of the NNC was to wet floodproof and elevate utilities, which was based on the depth of flooding relative to the first floor elevation. While the first floor is approximately 4.8 feet below the base flood elevation (BFE), the NNC noted in Appendix D that the Fire Station had already elevated existing systems and utilities including a storage platform for equipment, etc.

Following communication between City Administration as well as the De Soto Rural Fire Station's Fire Chief, USACE St. Louis District Economists reviewed the assessment and recommendation. Upon further evaluation, it is the final recommendation of USACE that the De Soto Rural Fire Station be acquired and relocated to a location outside of the floodway. While the Fire Station has taken action to reduce the impacts of flooding on the structure and its contents, no other mitigation recommendation absent acquisition will prevent the Fire Station and its personnel from having its life safety mission put at risk. The Fire Station's location in the floodway and the fact that fire trucks must be deployed from a flooded structure to save others during a flood event creates a safety and social impact on the community. Therefore, it is **recommended** to acquire and relocate the De Soto Rural Fire Station.

The mitigation cost assumed in this Appendix is $332,000 using RS Means, which is a commercial reference book used by construction contractors and industry professionals to determine budget estimates for construction. The costs have been depreciated to reflect the value of rebuilding the structure to its current age and location. The costs do not reflect the actual cost of constructing a new fire station. The acquisition cost <u>for only this structure</u> also does not reflect land value since RS Means does not estimate land value. Further research would need to be performed in order to determine a new location, the cost of that land, and the cost of building a new facility.

A full list of nonstructural flood mitigation recommendations is located in the enclosure below (Enclosure 1). The list includes other attributes such as parcel identification, site address, flood elevation, structure value and mitigation cost.

ENCLOSURE 1
Nonstructural Mitigation Analysis Enclosure

Mitigation recommendations indicated with (*) designate a recommendation by the USACE Nonstructural Committee during the site visit.

XID	Parcel ID	Address	Appraised Value	First Floor Elevation	1% Flood Elevation	1% ACE Flood Depth	Floodway ID	Mitigation Recommendation	Mitigation Cost
203	24120223017002	210 RANKIN ST	$ 20,900	493.5	500.1	6.6	Yes	Acquisition	$ 66,000
220	24120223018004	E 209 3RD ST	$ 15,700	493.7	500.1	6.4	Yes	Elevate, fill subfloor area, relocate utilities	$ 37,000
218	2412022301800100	E 203 3RD ST	$ 17,300	493.9	500.0	6.1	Yes	Acquisition	$ 62,000
66	24120210005002	1221 DEWITT ST	$ 84,000	505.5	511.5	6.0	No	Elevate, relocate utilities	$ 90,000
206	24120223017005	204 E THIRD ST	$ 51,200	494.4	500.1	5.7	Yes	Acquisition	$ 96,000
221	24120223018005	E 211 3RD ST	$ 18,500	494.6	500.2	5.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 41,000
222	24120223018006	E 213 3RD ST	$ 20,400	494.7	500.2	5.6	Yes	Elevate, relocate utilities	$ 39,000
217	24120223018001	E 201 3RD ST	$ 18,900	494.3	499.9	5.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 53,000
106	24120212017001	E 120 ST LOUIS ST	$ 8,000	501.8	507.2	5.4	Yes	Acquisition	$ 53,000
76	2412021201000600	811 DEWITT ST	$ 46,300	501.1	506.5	5.4	Yes	Acquisition	$ 91,000
72	2412021200400200	E 721 MAIN ST	$ 39,200	500.6	505.7	5.1	Yes	Acquisition	$ 84,000
50	24120210004046	1515 VETERANS DR	$ 92,200	510.5	515.5	5.0	No	Elevate, relocate utilities	$ 67,000
223	24120223018007	E 219 3RD ST	$ 6,200	495.8	500.7	4.9	Yes	Acquisition	$ 51,000
49	24120210004045	1513 VETERANS DR	$ 79,000	510.3	515.3	4.9	No	Elevate, relocate utilities	$ 63,000
110	24120212017006	E 204 PLATTIN	$ 40,600	503.3	508.3	4.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 51,000
197	24120223016004	E 1 CLEMENT ST	$ 150,000	495.6	500.5	4.9	Yes	Acquisition	$ 195,000
202	24120223017001	E 200 3RD ST	$ 33,600	495.2	500.0	4.9	Yes	Elevate, relocate utilities	$ 39,000
166	24120223003003	E 104 2ND ST	$ 26,400	494.8	499.6	4.8	Yes	Acquisition	$ 89,000
207	24120223017006	E 206 3RD ST	$ 32,600	495.2	500.0	4.7	Yes	Elevate, fill subfloor area, relocate utilities	$ 58,000
284	24120223036001	E 201 MILLER ST	$ 320,000	499.4	504.1	4.7	Yes	Acquisition	$ 332,000
157	24120223002010	E 103 2ND ST	$ 58,000	494.8	499.4	4.7	Yes	Acquisition	$ 121,000
111	24120212017007	913 DEWITT ST	$ 30,000	504.5	509.1	4.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 54,000
52	24120210004048	1519 VETERANS DR	$ 87,500	511.2	515.8	4.6	No	Elevate, relocate utilities	$ 68,000
51	24120210004047	1517 VETERANS DR	$ 71,300	511.0	515.5	4.5	No	(*) Relocate utilities, fill crawl space, elevate	$ 85,000
48	24120210004044	1511 VETERANS DR	$ 79,000	510.6	515.1	4.4	No	Elevate, fill subfloor area, relocate utilities	$ 60,000
9	17703503001002	N 1800 MAIN ST	$ 128,600	481.3	485.5	4.2	No	(*) Relocate Utilities, wet floodproof	$ 34,000
288	24120223036005	E 609 MAIN ST	$ 56,100	500.5	504.7	4.2	Yes	Elevate, relocate utilities	$ 72,000
169	24120223003008	E 107 MAIN ST	$ 75,600	495.8	500.0	4.2	No	Elevate, relocate utilities	$ 42,000

210	2412022301700800	E 208 THIRD ST	$ 40,700	496.0	500.2	4.2	Yes	Elevate, fill subfloor area, relocate utilities	$ 49,000
225	24120223019005	E 301 MAIN ST	$ 43,500	496.5	500.6	4.1	Yes	Acquisition	$ 89,000
108	24120212017003	905 DEWITT ST	$ 54,700	504.6	508.7	4.1	Yes	Elevate, fill subfloor area, relocate utilities	$ 73,000
74	24120212010002	803 DEWITT ST	$ 43,700	502.0	506.1	4.1	Yes	Elevate, fill subfloor area, relocate utilities	$ 44,000
196	24120223016003	E 204 2ND ST	$ 51,500	496.1	500.1	4.1	Yes	Elevate, relocate utilities	$ 36,000
219	24120223018003	E 2 3RD ST	$ 6,600	496.2	500.2	4.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 37,000
155	24120223002008	213 ROBERTS ST	$ 28,100	495.7	499.7	4.0	Yes	Elevate, relocate utilities	$ 46,000
10	17703503001003	N 1700 MAIN ST	$ 150,400	481.8	485.8	4.0	Yes	Acquisition	$ 195,000
167	24120223003004	E 108 2ND ST	$ 27,100	495.7	499.7	4.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 39,000
214	24120223017012	E 300 CLEMENT ST	$ 45,000	496.5	500.4	4.0	Yes	Acquisition	$ 90,000
289	24120223036006	616 ROLLINS ST	$ 42,100	500.7	504.6	3.9	Yes	Elevate, relocate utilities	$ 47,000
53	24120210004049	1521 VETERANS DR	$ 85,100	511.9	515.8	3.9	No	Elevate, relocate utilities	$ 64,000
213	24120223017011	E 212 3RD ST	$ 34,700	496.4	500.3	3.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 53,000
104	24120212016007	S 918 MAIN ST	$ 369,700	505.1	509.0	3.9	No	Acquisition	$ 415,000
230	24120223019009	E 112 PRATT ST	$ 51,000	497.1	500.9	3.8	Yes	Elevate, relocate utilities	$ 70,000
58	24120210004055	1512 LINDENWOOD DR	$ 90,100	511.7	515.3	3.7	No	Elevate, fill subfloor area, relocate utilities	$ 80,000
109	24120212017004	907 DEWITT ST	$ 44,200	505.4	509.0	3.7	Yes	Elevate, fill subfloor area, relocate utilities	$ 63,000
165	24120223002017	E 127 2ND ST	$ 41,300	496.4	500.0	3.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 52,000
286	24120223036003	E 605 MAIN ST	$ 65,400	500.6	504.2	3.6	Yes	Elevate, relocate utilities	$ 20,000
54	24120210004050	1523 VETERANS DR	$ 112,900	512.3	515.9	3.6	No	Elevate, relocate utilities	$ 73,000
226	24120223019006	E 309 MAIN ST	$ 54,300	497.1	500.7	3.5	Yes	Acquisition	$ 99,000
69	24120210005005	1220 DEWITT ST	$ 71,700	508.0	511.6	3.5	No	Elevate, fill subfloor area, relocate utilities	$ 72,000
209	24120223017008	E 210 3RD ST	$ 57,000	496.8	500.3	3.5	Yes	Elevate, fill subfloor area, relocate utilities	$ 47,000
189	24120223015005	S 308 MAIN ST	$ 47,100	497.3	500.8	3.5	No	Acquisition	$ 92,000
228	2412022301900700	E 300 MAIN ST	$ 24,800	497.4	500.8	3.4	Yes	Acquisition	$ 70,000
45	24120210004041	1505 VETERENS DR	$ 60,300	511.1	514.5	3.4	No	Elevate, fill subfloor area, relocate utilities	$ 51,000
185	24120223015001	S 300 MAIN ST	$ 78,000	497.6	501.0	3.4	No	Acquisition	$ 123,000
161	24120223002013	E 111 2ND ST	$ 29,400	496.4	499.8	3.4	Yes	Acquisition	$ 74,000
231	24120223019010	E 116 PRATT ST	$ 18,700	497.3	500.7	3.4	Yes	Elevate, relocate utilities	$ 43,000
164	24120223002016	E 123 2ND ST	$ 40,700	496.7	500.0	3.3	Yes	Elevate, fill subfloor area, relocate utilities	$ 55,000
112	24120212017008	917 DEWITT ST	$ 56,100	505.8	509.1	3.3	Yes	Elevate, fill subfloor area, relocate utilities	$ 28,000
335	24120212028003-16	1009 DEWITT ST	$ 15,800	505.7	509.0	3.3	Yes	Acquisition	$ 61,000
47	24120210004043	1509 VETERANS DR	$ 97,800	511.7	515.0	3.3	No	Elevate, fill subfloor area, relocate utilities	$ 85,000
44	24120210004040	1503 VETERANS DR	$ 63,800	511.1	514.4	3.3	No	Elevate, fill subfloor area, relocate utilities	$ 60,000
227	24120223019007		$ 32,000	497.5	500.7	3.3	Yes	Acquisition	$ 77,000
256	24120223022005	S 406 MAIN ST	$ 53,500	498.1	501.4	3.3	No	Acquisition	$ 99,000

181	24120223014005	S 210 MAIN ST	$ 65,700	497.4	500.6	3.2	No	Acquisition	$ 111,000
187	24120223015003	S 304 MAIN ST	$ 54,700	497.5	500.7	3.2	No	Acquisition	$ 100,000
239	24120223021003	E 132 KELLEY ST	$ 26,800	498.5	501.7	3.2	Yes	Acquisition	$ 72,000
77	2412021201000700	815 DEWITT ST	$ 57,200	503.4	506.6	3.2	No	Elevate, fill subfloor area, relocate utilities	$ 76,000
276	24120223031007	E 521 MAIN ST	$ 59,400	499.6	502.8	3.2	Yes	Elevate, relocate utilities	$ 46,000
292	24120223036009	E 621 MAIN ST	$ 66,000	501.9	505.0	3.1	Yes	Elevate, relocate utilities	$ 56,000
180	24120223014003	S 204 MAIN ST	$ 61,800	497.2	500.3	3.1	No	Elevate, relocate utilities	$ 153,000
191	24120223015007	S 312 MAIN ST	$ 77,500	497.8	500.9	3.1	No	Acquisition	$ 123,000
183	24120223014012	S 212 MAIN ST	$ 932,200	497.5	500.6	3.1	No	Elevate, relocate utilities	$ 508,000
291	24120223036008	E 617 MAIN ST	$ 43,700	501.8	504.9	3.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 74,000
237	24120223021001	E 131 PRATT ST	$ 32,300	498.0	501.0	3.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 35,000
99	24120212016001	S 900 MAIN ST	$ 51,800	505.9	509.0	3.0	No	Wet floodproof	$ 36,000
101	24120212016004	S 904 MAIN ST	$ 39,300	506.1	509.1	3.0	No	Wet floodproof	$ 36,000
71	2412021200400200	E 713 MAIN ST	$ 27,900	502.4	505.4	3.0	Yes	Acquisition	$ 73,000
250	24120223021018	E 413 MAIN ST	$ 36,600	498.2	501.2	3.0	Yes	Acquisition	$ 82,000
156	24120223002009	E 101 2ND ST	$ 50,600	496.5	499.5	3.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 29,000
188	24120223015004	S 306 MAIN ST	$ 39,300	497.8	500.7	3.0	No	Elevate, relocate utilities	$ 117,000
334	24120212028003-17	1009 DEWITT ST	$ 15,800	506.1	509.0	2.9	Yes	Acquisition	$ 61,000
154	24120223002007	E 100 3RD ST	$ 26,800	496.6	499.6	2.9	Yes	Elevate, relocate utilities	$ 33,000
192	24120223015008	S 318 MAIN ST	$ 54,600	497.9	500.8	2.9	No	Dry floodproof	$ 26,000
229	24120223019008		$ 165,800	498.0	500.9	2.9	Yes	Acquisition	$ 211,000
285	24120223036002	E 601 MAIN ST	$ 59,900	501.2	504.0	2.8	Yes	Acquisition	$ 105,000
159	2412022300201100	E 106 3RD ST	$ 42,300	496.7	499.6	2.8	Yes	Elevate, relocate utilities	$ 49,000
168	24120223003005	E 110 2ND ST	$ 22,800	497.0	499.8	2.8	Yes	Elevate, fill subfloor area, relocate utilities	$ 40,000
245	24120223021012		$ 10,000	498.2	501.0	2.8	Yes	Elevate, relocate utilities	$ 39,000
287	24120223036004	E 607 MAIN ST	$ 34,600	501.8	504.6	2.7	Yes	Elevate, fill subfloor area, relocate utilities	$ 39,000
46	24120210004042	1507 VETERANS DR	$ 92,900	511.9	514.6	2.7	No	(*) Relocate utilities, fill basement, elevate	$ 74,000
205	24120223017004	E 207 2ND ST	$ 31,300	497.5	500.2	2.7	Yes	Elevate, fill subfloor area, relocate utilities	$ 56,000
333	24120212028003-19	1009 DEWITT ST	$ 15,800	506.2	508.9	2.7	Yes	Acquisition	$ 61,000
170	24120223003009	E 111 MAIN ST	$ 36,500	497.3	499.9	2.7	No	Fill subfloor area, dry floodproof	$ 49,000
179	24120223014001	S 200 MAIN ST	$ 55,000	497.7	500.3	2.6	No	Dry floodproof	$ 161,000
194	24120223016001	E 202 2ND ST	$ 50,600	497.5	500.1	2.6	Yes	Acquisition	$ 96,000
193	24120223015009	S 324 MAIN ST	$ 235,000	498.3	500.9	2.6	No	Dry floodproof	$ 223,000
332	24120212028003-18	1009 DEWITT ST	$ 15,800	506.2	508.8	2.6	Yes	Acquisition	$ 61,000
257	2412022302200500	S 412 MAIN ST	$ 71,300	498.6	501.2	2.6	No	Dry floodproof	$ 35,000
331	24120212028003-08	1009 DEWITT ST	$ 15,800	506.1	508.7	2.6	Yes	Acquisition	$ 61,000
162	24120223002014	E 119 2ND ST	$ 55,300	497.4	499.9	2.5	Yes	Elevate, fill subfloor area, relocate utilities	$ 45,000
330	24120212028003-01	1009 DEWITT ST	$ 15,800	505.9	508.4	2.5	Yes	Acquisition	$ 61,000

293	24120223036010	E 111 STONE ST	$ 44,500	502.5	504.9	2.4	Yes	Elevate, relocate utilities	$ 59,000
251	24120223022001	S 400 MAIN ST	$ 100,000	498.6	501.0	2.4	No	Dry floodproof	$ 99,000
75	24120212010003	807 DEWITT ST	$ 55,100	503.8	506.2	2.4	Yes	Elevate, fill subfloor area, relocate utilities	$ 63,000
320	24120212028003-11	1009 DEWITT ST	$ 15,800	506.3	508.7	2.4	Yes	Acquisition	$ 61,000
208	24120223017007	E 211 2ND ST	$ 43,300	497.7	500.1	2.4	Yes	(*) Relocate utilities, fill subfloor area, elevate	$ 58,000
267	24120223030001	S 500 MAIN ST	$ 80,000	499.0	501.4	2.4	No	Acquisition	$ 125,000
260	24120223022008	S 418 MAIN ST	$ 71,500	498.6	500.9	2.3	No	Dry floodproof	$ 46,000
319	24120212028003-05	1009 DEWITT ST	$ 15,800	506.5	508.8	2.3	Yes	Acquisition	$ 61,000
68	24120210005004	1222 DEWITT ST	$ 75,200	509.3	511.6	2.3	No	Fill subfloor area, dry floodproof	$ 53,000
326	24120212028003-07	1009 DEWITT ST	$ 15,800	506.5	508.8	2.3	Yes	Acquisition	$ 61,000
328	24120212028003-14	1009 DEWITT ST	$ 15,800	506.2	508.4	2.2	Yes	Acquisition	$ 61,000
263	24120223022010	S 426 MAIN ST	$ 54,200	498.9	501.1	2.2	No	Dry floodproof	$ 23,000
238	24120223021002	E 129 PRATT ST	$ 31,800	498.9	501.1	2.2	Yes	Elevate, fill subfloor area, relocate utilities	$ 35,000
290	24120223036007	E 615 MAIN ST	$ 7,400	502.4	504.6	2.2	Yes	Acquisition	$ 52,000
261	2412022302200800	S 420 MAIN ST	$ 25,700	499.3	501.5	2.2	No	Dry floodproof	$ 22,000
107	24120212017002	903 DEWITT ST	$ 60,000	505.4	507.6	2.2	Yes	Elevate, fill subfloor area, relocate utilities	$ 46,000
259	24120223022007	S 414 MAIN ST	$ 79,100	499.0	501.1	2.2	No	Dry floodproof	$ 38,000
264	24120223022011	W 104 KELLEY ST	$ 40,400	499.2	501.4	2.2	No	Dry floodproof	$ 19,000
177	24120223004012	S 122 MAIN ST	$ 68,100	498.3	500.5	2.2	No	Dry floodproof	$ 58,000
232	24120223019011	E 118 PRATT ST	$ 34,400	498.8	501.0	2.2	Yes	Elevate, fill subfloor area, relocate utilities	$ 29,000
324	24120212028003-13	1009 DEWITT ST	$ 15,800	506.4	508.5	2.2	Yes	Acquisition	$ 61,000
274	2412022303100200	E 517 MAIN ST	$ 29,900	499.9	502.0	2.2	Yes	Acquisition	$ 75,000
325	24120212028003-04	1009 DEWITT ST	$ 15,800	506.5	508.7	2.2	Yes	Acquisition	$ 61,000
201	24120223016009	E 225 MAIN ST	$ 69,100	498.4	500.4	2.0	Yes	Acquisition	$ 114,000
269	24120223030005	S 510 MAIN ST	$ 34,500	499.7	501.7	2.0	No	Wet floodproof	$ 32,000
160	24120223002012	E 105 2ND ST	$ 53,100	497.6	499.6	2.0	Yes	Acquisition	$ 98,000
163	24120223002015	E 121 SECOND ST	$ 26,800	498.1	500.0	1.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 30,000
178	24120223004013	S 126 MAIN ST	$ 77,600	498.2	500.1	1.9	No	Dry floodproof	$ 75,000
41	24120210004037	1487 VETERANS DR	$ 51,500	511.5	513.4	1.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 45,000
199	24120223016007	E 215 MAIN ST	$ 43,000	498.5	500.5	1.9	Yes	Acquisition	$ 88,000
277	24120223031008	522 ROLLINS ST	$ 40,700	501.0	502.9	1.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 46,000
298	2412022303700400	S 610 MAIN ST	$ 102,200	502.7	504.6	1.9	No	Dry floodproof	$ 158,000
105	24120212016008		$ 23,600	507.0	508.9	1.9	No	Wet floodproof	$ 45,000
322	24120212028003-09	1009 DEWITT ST	$ 15,800	506.4	508.3	1.9	Yes	Acquisition	$ 61,000
323	24120212028003-15	1009 DEWITT ST	$ 15,800	506.5	508.3	1.9	Yes	Acquisition	$ 61,000
294	24120223036011	618 ROLLINS ST	$ 33,000	503.0	504.9	1.9	Yes	Elevate, relocate utilities	$ 57,000
211	24120223017009	E 213 2ND ST	$ 41,400	498.5	500.3	1.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 56,000

329	24120212028003-12	1009 DEWITT ST	$ 15,800	506.6	508.4	1.8	Yes	Acquisition	$ 61,000
275	24120223031003	510 ROLLINS ST	$ 33,300	500.0	501.8	1.8	Yes	Elevate, fill subfloor area, relocate utilities	$ 50,000
270	24120223030009	S 512 MAIN ST	$ 75,000	500.1	501.9	1.8	No	Acquisition	$ 120,000
176	24120223004008	S 120 MAIN ST	$ 42,300	498.4	500.1	1.8	No	Dry floodproof	$ 21,000
247	24120223021015	E 411 MAIN ST	$ 26,000	499.5	501.2	1.7	Yes	Elevate, fill subfloor area, relocate utilities	$ 30,000
243	24120223021008	E 118 KELLEY ST	$ 27,500	499.7	501.4	1.7	Yes	Elevate, relocate utilities	$ 42,000
321	24120212028003-10	1009 DEWITT ST	$ 15,800	506.7	508.4	1.7	Yes	Acquisition	$ 61,000
73	24120212004003		$ 87,300	504.1	505.8	1.7	Yes	Acquisition	$ 132,000
113	24120212028003	1009 DEWITT ST	$ 225,800	507.6	509.2	1.7	Yes	Acquisition	$ 271,000
327	24120212028003-02	1009 DEWITT ST	$ 15,800	506.7	508.3	1.7	Yes	Acquisition	$ 61,000
198	24120223016005	E 213 MAIN ST	$ 33,000	498.7	500.3	1.6	Yes	Elevate, relocate utilities	$ 52,000
78	24120212011001	S 800 MAIN ST	$ 136,400	505.1	506.6	1.5	No	Wet floodproof	$ 97,000
297	24120223037004	S 608 MAIN ST	$ 81,000	503.1	504.5	1.5	No	Dry floodproof	$ 18,000
215	24120223017013	E 217 2ND ST	$ 36,100	499.0	500.5	1.4	Yes	Elevate, fill subfloor area, relocate utilities	$ 46,000
302	24120224022005	415 DENO ST	$ 56,200	503.2	504.6	1.4	Yes	Elevate, relocate utilities	$ 45,000
204	24120223017003	E 201 2ND ST	$ 43,000	498.7	500.1	1.4	Yes	Acquisition	$ 88,000
272	24120223031001	E 109 KELLEY ST	$ 91,300	500.0	501.3	1.4	Yes	Acquisition	$ 136,000
200	24120223016008	E 217 MAIN ST	$ 42,800	499.0	500.4	1.3	Yes	Acquisition	$ 88,000
42	24120210004038	1495 VETERANS DR	$ 60,600	512.6	513.9	1.3	No	Fill subfloor area, dry floodproof	$ 40,000
174	24120223004007	S 118 MAIN ST	$ 130,200	498.7	500.0	1.3	No	Wet floodproof	$ 47,000
158	24120223002011	E 110 THIRD ST	$ 53,900	498.4	499.6	1.3	Yes	Acquisition	$ 99,000
70	24120211008002	E 705 STONE ST	$ 66,500	524.3	525.5	1.2	No	Dry floodproof	$ 77,000
282	24120223032005	519A ROLLINS ST	$ 57,200	501.1	502.2	1.2	Yes	Acquisition	$ 102,000
242	24120223021007	E 120 KELLEY ST	$ 20,600	500.2	501.4	1.1	Yes	Acquisition	$ 66,000
11	17703503001004	N 1600 MAIN ST	$ 73,900	485.0	486.1	1.1	Yes	Acquisition	$ 119,000
65	24120210004108	1437 VETERANS DR	$ 58,100	510.3	511.4	1.1	Yes	Elevate, fill subfloor area, relocate utilities	$ 71,000
279	24120223032002	503 ROLLINS ST	$ 46,200	500.3	501.5	1.1	Yes	Elevate, fill subfloor area, relocate utilities	$ 28,000
98	24120212015011	S 920 2ND ST	$ 46,300	508.4	509.5	1.1	Yes	Elevate, relocate utilities	$ 31,000
235	24120223019014	E 128 PRATT ST	$ 50,300	499.8	500.9	1.1	Yes	Acquisition	$ 95,000
278	24120223032001	511 ROLLINS ST	$ 58,400	500.7	501.7	1.1	Yes	Elevate, fill subfloor area, relocate utilities	$ 29,000
100	24120212016003	S 905 SECOND ST	$ 92,500	508.2	509.2	1.1	No	Dry floodproof	$ 36,000
216	24120223017014	E 206 CLEMENT ST	$ 43,800	499.6	500.6	1.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 60,000
67	24120210005003	1224 DEWITT ST	$ 100,000	510.7	511.6	1.0	Yes	(*) Relocate utilities, fill subfloor area, elevate	$ 99,000
175	2412022300400700	S 106 MAIN ST	$ 48,800	499.1	500.1	0.9	No	Dry floodproof	$ 56,000
318	24120212028003-06	1009 DEWITT ST	$ 15,800	508.0	508.9	0.9	No	Acquisition	$ 61,000
186	24120223015002	W 113 CLEMENT ST	$ 79,900	499.8	500.7	0.9	No	Wet floodproof	$ 30,000
246	24120223021014	E 409 MAIN ST	$ 34,700	500.3	501.2	0.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 30,000
248	24120223021016	E 108 KELLEY ST	$ 18,000	500.5	501.3	0.9	Yes	Elevate, fill subfloor area, relocate utilities	$ 34,000

244	24120223021009	E 116 KELLEY ST	$ 25,700	500.5	501.3	0.8	Yes	Elevate, relocate utilities	$ 42,000
233	24120223019012	E 122 PRATT ST	$ 90,300	500.0	500.8	0.8	Yes	Acquisition	$ 135,000
12	1770350301300100	N 1522 MAIN ST	$ 51,500	485.5	486.3	0.8	Yes	Elevate, relocate utilities	$ 64,000
14	17703503034001	206 VALLEY PL	$ 136,900	490.7	491.5	0.7	No	Dry floodproof	$ 136,000
116	24120212028007	1119 DEWITT ST	$ 52,900	510.2	511.0	0.7	No	Fill subfloor area, dry floodproof	$ 44,000
234	24120223019013	E 126 PRATT ST	$ 27,100	500.2	500.9	0.7	Yes	Acquisition	$ 72,000
212	24120223017010	E 215 2ND ST	$ 34,200	499.5	500.1	0.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 46,000
241	24120223021005	E 125 PRATT ST	$ 50,900	500.4	501.0	0.6	Yes	Elevate, fill subfloor area, relocate utilities	$ 34,000
172	24120223003012	E 115 MAIN ST	$ 36,400	499.6	500.1	0.5	No	Fill subfloor area, dry floodproof	$ 27,000
273	24120223031002	E 517 MAIN ST	$ 18,200	501.3	501.7	0.4	Yes	Acquisition	$ 63,000
43	24120210004039	1499 VETERANS DR	$ 63,500	513.3	513.7	0.4	No	Fill subfloor area, dry floodproof	$ 40,000
114	24120212028004	1017 DEWITT ST	$ 46,700	508.6	509.1	0.4	No	Fill subfloor area, dry floodproof	$ 45,000
336	24120212028003-03	1009 DEWITT ST	$ 42,900	508.6	509.0	0.4	No	Dry floodproof	$ 46,000
280	24120223032003	505 ROLLINS ST	$ 45,800	500.9	501.3	0.4	Yes	Elevate, relocate utilities	$ 23,000
304	24120224022007	421 DENO ST	$ 52,900	504.4	504.8	0.4	Yes	Elevate, relocate utilities	$ 55,000
6	17703500000039	4250 STATE RT	$ 89,900	481.1	481.4	0.3	Yes	Acquisition	$ 135,000
258	24120223022006		$ 35,900	501.0	501.3	0.3	No	Dry floodproof	$ 56,000
171	24120223003011	E 126 2ND ST	$ 32,700	499.7	499.9	0.3	Yes	Elevate, relocate utilities	$ 48,000
240	24120223021004	E 126 KELLEY ST	$ 38,000	501.2	501.4	0.2	Yes	Elevate, fill subfloor area, relocate utilities	$ 58,000
30	24120210004020	267 MAPLE ST	$ 39,400	512.2	512.3	0.1	No	Fill subfloor area, dry floodproof	$ 30,000
296	24120223037003	S 604 MAIN ST	$ 69,100	504.0	504.0	0.1	No	Dry floodproof	$ 12,000
173	24120223004001		$ 143,300	500.1	500.2	0.1	No	Wet floodproof	$ 71,000
249	24120223021017	E 106 KELLEY ST	$ 23,700	501.4	501.4	0.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 37,000
148	24120223001009	N 100 MAIN ST	$ 117,300	500.0	500.0	0.0	No	Dry floodproof	$ 47,000
281	24120223032004	509 ROLLINS ST	$ 43,400	501.5	501.5	0.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 33,000
28	24120210004011	1449 VETERANS DR	$ 109,000	511.6	511.6	0.0	No	Fill subfloor area, dry floodproof	$ 32,000
253	2412022302200200	W 111 PRATT ST	$ 54,200	501.1	501.1	0.0	No	Sewer check valve	$ 1,000
40	24120210004036	1491 VETERANS DR	$ 88,500	513.5	513.5	0.0	Yes	Elevate, fill subfloor area, relocate utilities	$ 91,000
16	17703503034005	N 1008 2ND ST	$ 54,500	491.6	491.4	-0.1	No	Relocate utilities	$ 18,000
295	24120223037001	S 600 MAIN ST	$ 72,100	504.0	503.7	-0.2	No	Sewer check valve	$ 1,000
27	24120210003011	4399 FLUCOM RD	$ 11,100	525.9	525.6	-0.3	Yes	Acquisition	$ 56,000
195	24120223016002	E 207 MAIN ST	$ 243,600	500.7	500.3	-0.4	No	Relocate utilities	$ 76,000
19	17802700000049	12521 STATE RT	$ 875,900	524.2	523.7	-0.4	Yes	Sewer check valve	$ 1,000
34	24120210004027	1483 VETERANS DR	$ 55,300	513.6	513.2	-0.5	No	Relocate utilities	$ 20,000
184	24120223014013	W 112 CLEMENT ST	$ 61,400	501.2	500.7	-0.5	No	Sewer check valve	$ 1,000
305	24220310000002	1075 AMVETS DR	$ 180,000	555.0	554.4	-0.6	No	Sewer check valve	$ 1,000
89	24120212014008	S 921 4TH ST	$ 40,500	515.0	514.4	-0.6	Yes	Relocate utilities	$ 13,000
145	24120223001007	N 112 MAIN ST	$ 90,500	500.3	499.6	-0.7	No	Sewer check valve	$ 1,000

311	24220311007005		$ 15,900	527.3	526.6	-0.7	No	Sewer check valve	$ 1,000
88	24120212014007	S 920 3RD ST	$ 49,100	512.7	511.9	-0.8	No	Sewer check valve	$ 1,000
315	24220311008013	503 CEDAR ST	$ 46,900	518.9	518.0	-0.9	No	Relocate utilities	$ 19,000
84	24120212011007	S 823 2ND ST	$ 101,000	510.0	509.0	-1.0	No	Sewer check valve	$ 1,000
29	24120210004019	1467 VETERANS DR	$ 66,600	513.6	512.3	-1.4	No	Relocate utilities	$ 25,000
21	24111102001016	1651 VETERANS DR	$ 120,000	520.7	519.3	-1.4	No	Sewer check valve	$ 1,000
15	17703503034003	N 1017 3RD ST	$ 53,100	493.5	492.1	-1.4	No	Relocate utilities	$ 15,000
97	24120212015010	S 914 SECOND ST	$ 56,400	510.9	509.5	-1.5	No	Sewer check valve	$ 1,000
96	24120212015009	S 915 3RD ST	$ 51,000	512.1	510.4	-1.7	Yes	Sewer check valve	$ 1,000
103	24120212016006	S 913 2ND ST	$ 56,900	511.1	509.3	-1.9	No	Sewer check valve	$ 1,000
314	2422031100800800	S 922 4TH ST	$ 37,100	516.9	515.1	-1.9	Yes	Sewer check valve	$ 1,000
17	17703503034006	N 1004 2ND ST	$ 43,200	493.7	491.5	-2.2	No	Relocate utilities	$ 11,000
94	24120212015006	S 904 2ND ST	$ 36,500	512.6	509.6	-3.0	No	Sewer check valve	$ 1,000
117	24120212029001	S 1000 MAIN ST	$ 56,000	515.5	508.4	-7.1	No	Relocate utilities	$ 16,000
								Total Cost of Recommended Mitigation Activities	**$ 14,944,000**