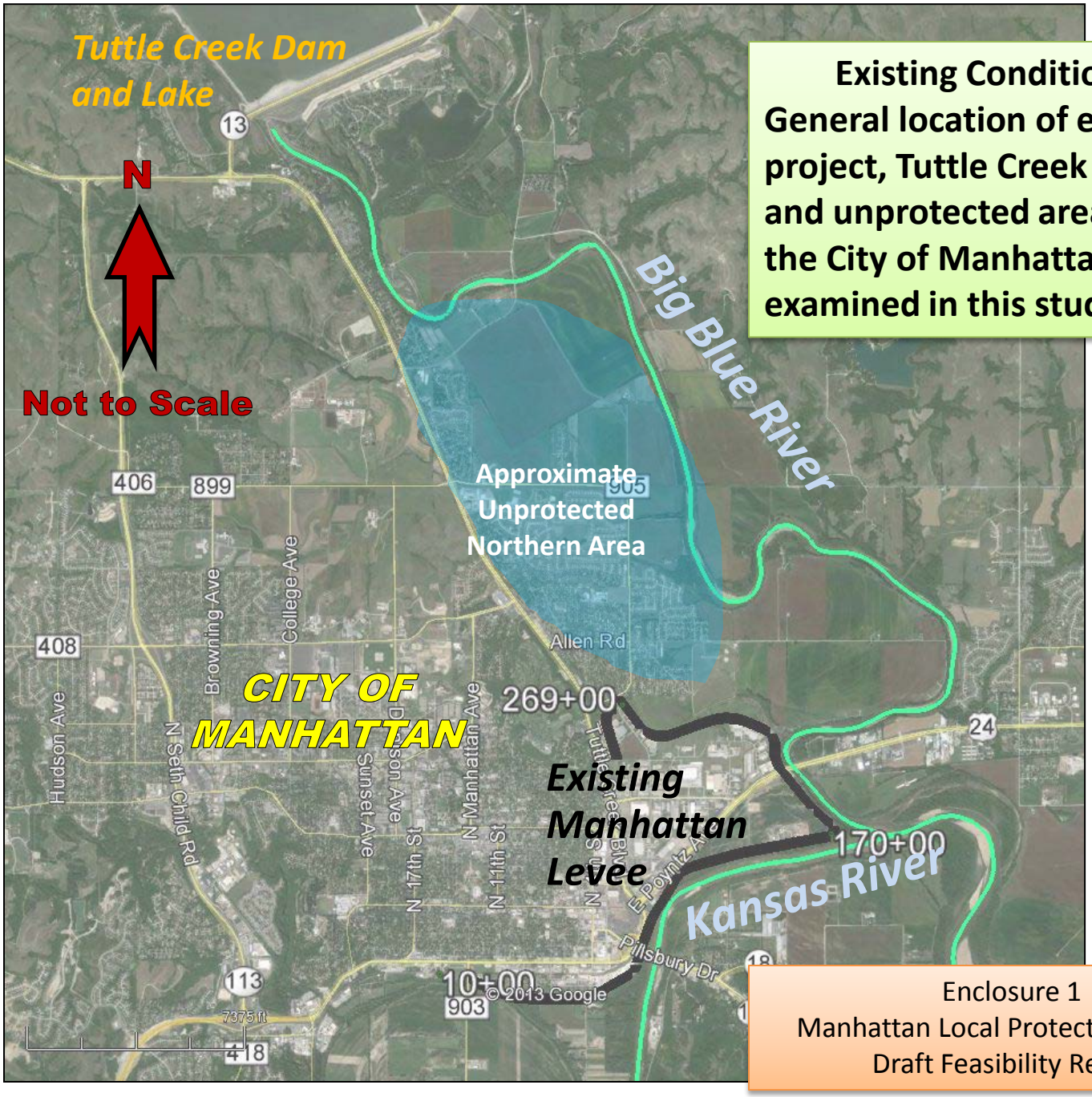
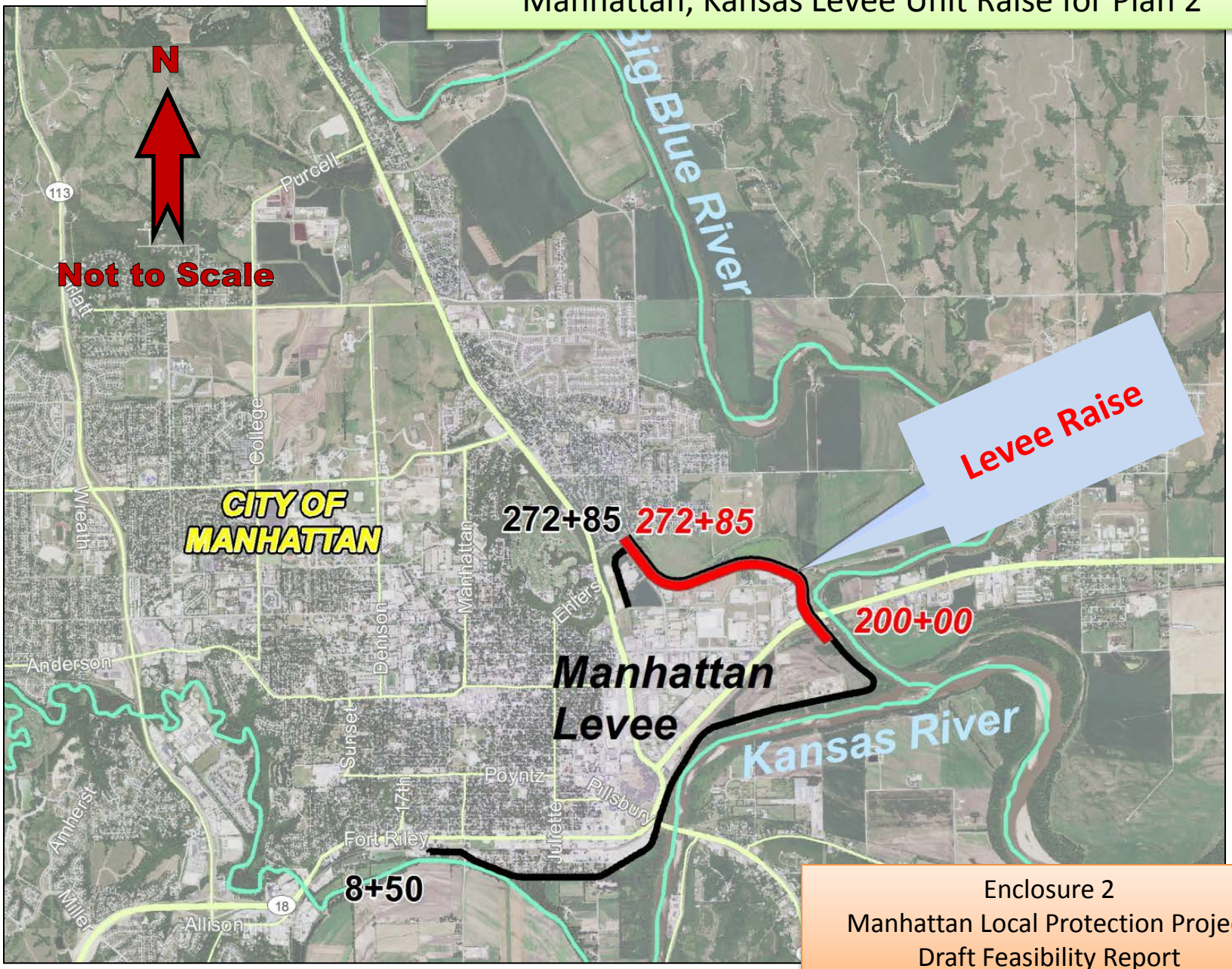


Existing Conditions
General location of existing project, Tuttle Creek Lake, and unprotected areas of the City of Manhattan examined in this study.

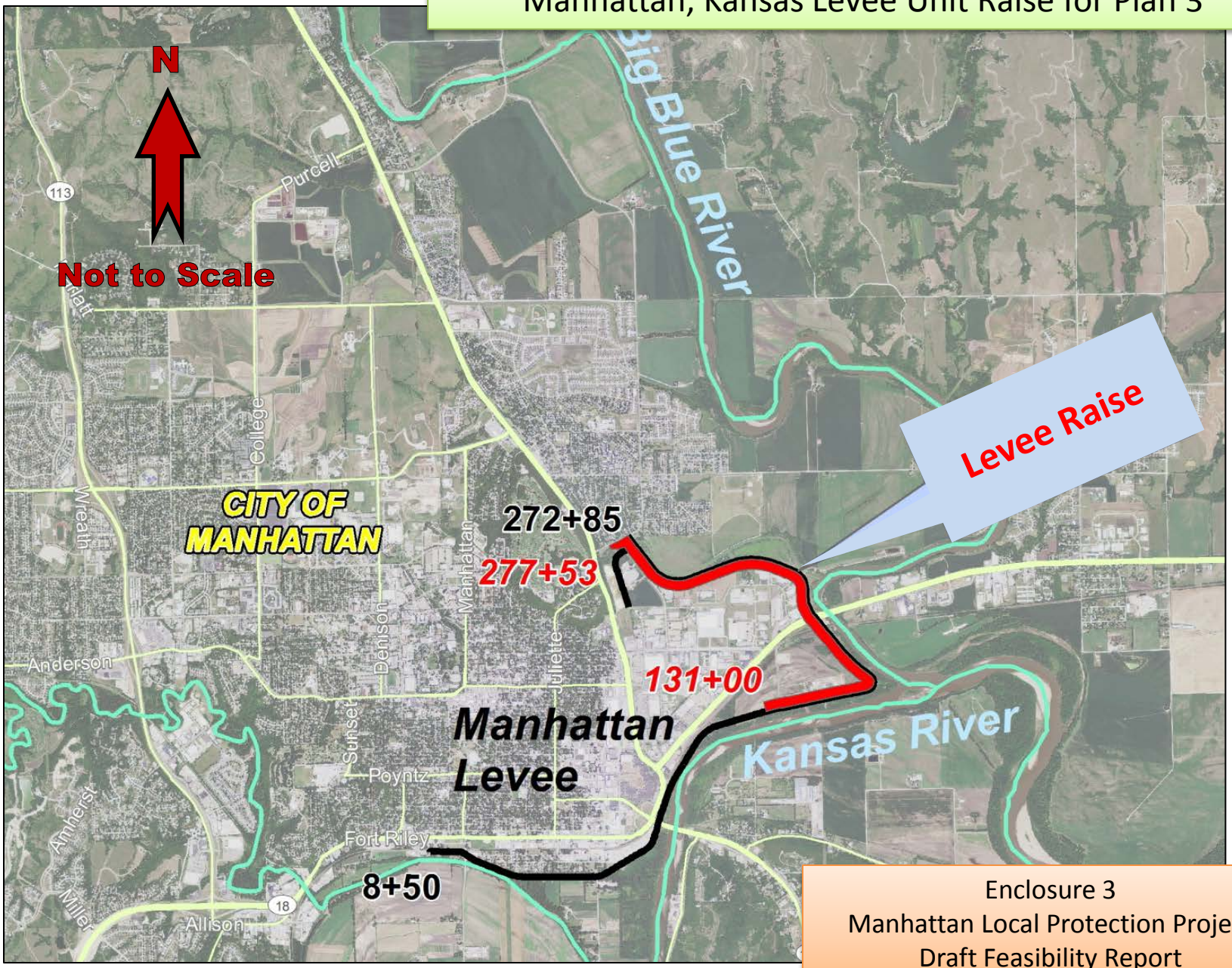
Enclosure 1
Manhattan Local Protection Project
Draft Feasibility Report

Manhattan, Kansas Levee Unit Raise for Plan 2



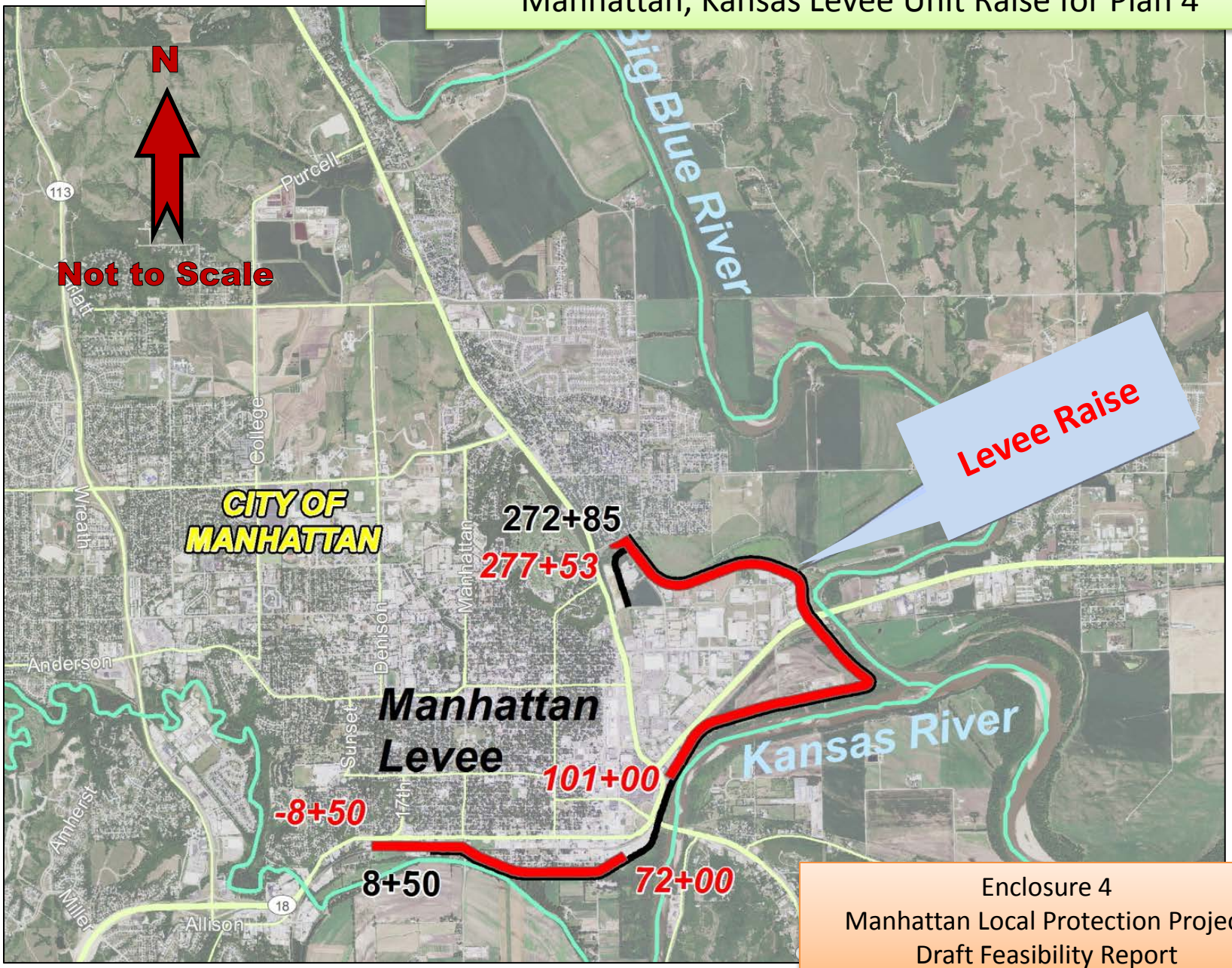
Enclosure 2
Manhattan Local Protection Project
Draft Feasibility Report

Manhattan, Kansas Levee Unit Raise for Plan 3



Enclosure 3
Manhattan Local Protection Project
Draft Feasibility Report

Manhattan, Kansas Levee Unit Raise for Plan 4



Enclosure 4
Manhattan Local Protection Project
Draft Feasibility Report

Enclosure 5 to Feasibility Report **November 2014**

Manhattan, Kansas, Feasibility Study -- Final Alternatives Array -- Evaluation Criteria and Comparison Matrix

		FINAL ARRAY EVALUATION CRITERIA							
Final Alternatives Array	**Short Description of Each Plan**	**First Cost (Oct 2013) and sponsor affordability**	**Annual Net Benefits**	**BCR (efficiency)**	**Flood Risk Management Effectiveness Rank**	**Environmental & Cultural and Real Estate Effects (Acceptability)**	**Completeness, Effectiveness, Efficiency, Acceptability Summary**	**Annual Induced Damages**	**Ability to Meet Planning Objectives**
Plan 1	No Federal Action	None	na	--	no reduction in risk	None	No -- plan is not effective in reducing flood risks and City finds current level of risk unacceptable in longer-term	None	No cost and no disruption. Future without project condition similar to existing condition. Essentially no contribution to Flood Risk Management. Planning objectives are not met.
Plan 2	Average 0.7 ft. levee riase with accompanying geotechnical and structural reliability improvements.	$21.4M (sponsor-affordable)	$2.08M	2.9	Low	Minor/Insignificant	Marginal -- minimal flood risk reduction; could be unacceptable to sponsor; inefficient given the cost as compared to Plan 3.	Minimal	Minimal overtopping improvements versus existing conditions Implementation would leave a higher overtopping flood risk than is prudent given the investment. Planning objectives only partially met.
Plan 3 (NED Plan)	Average 1.5 ft. levee raise with accompanying geotechnical and structural reliability improvements.	$22.0M (sponsor-affordable)	$2.85M	3.5	Medium	Minor/Insignificant	Yes. Plan is considered Complete, Effective, Efficient, and Acceptable.	$2,040	Supports long-term City flood risk management and somewhat equalizes Big Blue & existing Kansas River levee segments performance for the more common floods. Planning objectives are met.
Plan 4	Average 2.1 ft. levee raise with accompanying geotechnical and structural reliability improvements.	$46.3M (marginal affordability)	$2.76M	2.2	High	Structural Relocations and/or condemnations are likely	Mixed -- plan is considered Complete, Effective, Efficient. Public acceptability is questionable due to real estate impacts and overall cost of project to the community.	> Plan 3 Damages	Supports long-term City flood risk management and provides substantial additional protection against future uncertainty in major Big Blue and Kansas River flood conditions. Best meets the Planning objectives.
Plan 5	Average 1.3 ft. levee raise with widening of the Big Blue River channel and bridge modifications for increased flood conveyance with accompanying geotechnical and structural reliability improvements.	$53.0M (marginal affordability)	$1.39M	1.5	Medium	Would likely require environmental mitigation	Mixed -- not efficient as this Plan provides essentially the same level of risk reduction as the much less costly Plan 3. Acceptability is marginal due to adverse habitat effects.	Minimal	Supports long-term City flood risk management. Provides more flow under bridges & reduces possibility of debris jams; Channel Widening reduces any induced damages from levee raise. Planning objectives are met.

NOTE: Cost and Economci data presented in this table reflect early screening level analysis and do not include refinements made in the scope or estimate of the Recommended Plan following alternative comparison and evaluation.