Lawrence and Douglas County
Planning Department
In Care Of:
City Hall
6E6 Street
Lawrence, KS 66044

May 17, 2010

Dear Planning Department:

Please accept and evaluate the 4 part, 7 page technological assessment that is enclosed for you. It is relevant to the proposed development, SUP-3-4-10... and to several other things more crucial to the City of Lawrence.

The subjects of this assessment are, 1. the dam at Lawrence, 2. the levee along Lawrence, 3. flood-related concerns in Lawrence, and 4. the Northeast Douglas County Sector Plan. Everything in the assessment concerns things important to the safety and liveability of the Lawrence community.

I've resided at my current address since 2000.

Would you please return a card or letter to let me know what can be done about these things? Thank you.

Sincerely, Lawrence Eugene Smith

LES:les

Lawrence Eugene Smith
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Observations Relevant to the Northeast Sector Plan for Lawrence and Douglas County: A Technological Assessment

Four Parts

To whomever it may concern:

A. Insufficiencies of the North Lawrence Levee

Here are 5 reasons that show the levee in North Lawrence isn't as good as it should be, at least east of the bridges at U.S. Hwy 40/59. 1. The levee conduit stream and ditch drain valves and boxes are installed backwards! The concrete valve boxes are made to face upstream, to capture debris. A top steel grate is to be removed to manually access the box, to extricate debris. In backwards, and debris extrication is slowed and difficult, because debris must be grappled and pulled through the valve seat opening. The gate valve and seat are unidirectional to some extent. In backwards, and small debris more easily accumulates in the bottom of the seat, which can prevent complete closing. In backwards, and the valve and seat can leak, even though completely closed. That allows flood water to flow from the river into those streams and ditches. That increases the rate of overflow flooding behind the levee, unless pumped at a faster rate into the river. The entire innards of the valve boxes must be reversed. That might require new boxes. I don't recognize any shortcut. Perhaps the expense of correction wasn't figured to be worthwhile, because the difference in performance between the opposite directions was evaluated as marginal or slight. 2. The riprap rock surface on the river side of the levee is defective! A durable riprap surface protects the levee itself from large floating debris, which might gouge the surface and expose it to rapid erosion by waves or wind-driven rain. In general and in numerous locations to a greater degree, the limestone riprap has delaminated and shattered into approx. inch thick slabs, and then gravels. That must be consequent to excess absorbsion of moisture along lamination planes, followed by freeze and expansion, and cracking. The gravels that form can't protect the levee, even in deep piles, because gravels are too easily gouged by large floating debris. Durable riprap should overlay the levee surface, but the defective riprap must either be removed or completely shattered into gravels, so as to completely underlay the durable riprap rock. 3. The riprap surface ends at N. 7th Street. From there east, at least a mile or so, the river side of the levee is unprotected. Should the levee fail along there, floodwater will slow and flow back into North Lawrence, depending upon how much flood occurs. The entire river side of the entire levee should have the protective durable riprap rock surface, because the potential for flood damage along the Kansas River is now greater than ever, both urban and rural. Most 10-50 year climate and weather extrapolations probably include equal or somewhat greater, both annual precipitation and potential precipitation

extremes. 4. The river side of the levee is now also too exposed to potential large flood debris, which is mostly tree trunks, which can gouge the levee and allow rain or river turbulence to erode into and through the levee. Wind driven precipitation and waves can aggravate levee erosion, with failure in less than an hour, because the levee core is a waterproof but not very structural bentonite clay. The levee is now too exposed to floating debris, because trees were pushed over along the river side several years ago. Those trees served to slow and trap debris, such as floating tree trunks. Recently, trees were pushed over near N.4th Street. That has completely exposed the levee to flood debris that might drift in along the levee because of the upstream curvature of the river and the levee to that location. A durable riprap rock surfaced, substancial groin is desireable there, to deflect floating debris out into the river proper, even if the levee surface is restored by durable riprap, because repeated or simultaneous impacts by groups of large debris might gouge the levee right through the durable riprap surface. 5. The levee road is routinely damaged, especially while muddy. The levee top road isn't crowned, so rain water doesn't run off to each side. Rainwater saturates the upper layer of clay and gravel road surface, and its non-bentonite road-bed, and it becomes mud, in some places inches deep. Is the buried top of the bentonite clay core also routinely saturated? That depends upon how much it is crowned. If the bentonite saturates and freezes, it expands upward. As it later thaws, it might shift and mix with overlying non-bentonite clay, and lose waterproofing capacity, perhaps to several inches deep. If so, that means that the levee has deteriorated in that measure in its capacity to prevent weepage leak-through by highest flood waters. The road atop the levee should be surfaced with a durable mix of interlocking aggregate of multiple sharp sand and pea gravel sizes with a heavy clay matrix, and tamped into the best crown curvature, perhaps steepest. Vehicular traffic atop the levee should be restricted to emergency or levee maintenance only. Heavy equiptment shouldn't be permitted on the levee unless structural planking is laid first, to spread the weight over a large area, because the top of the bentonite core can deform somewhat like modeling clay, especially if saturated by water. However, I haven't observed any exposed levee core deformation, from the bridges east to N.8th Street. One location that might be suspect of core deformation is the access road over the levee at N. 3rd Street. Heavy equiptment was recently utilized to rebuild the dam at Lawrence, which must've accessed by that road. Because of all these things, is it suspect that the bentonite core itself is installed incorrectly? And, the levee should have a frontage road for heavy equiptment along its non-river side.

It should be recognized that the tree work along the levee wasn't and still isn't environmentally responsible. Animals evidently aren't live trapped and safely transported to other ecologically acceptable natural habitat prior to tree work. Trees are mostly pushed over by heavy equiptment. Some trees that remain show scars evidently caused by impacts with trees that were pushed over. Tree trunk, branch and brush piles are left behind, which become potential flood debris, and attract animals to excess numbers.

Most trees that remain show trunk bottom scars probably caused by impacts with power mowers. That upset of animal habitat exposes the adjacent North Lawrence community to excess numbers of animals as pests. That includes roadkill and garden damage. The injuries to the trees that remain are susceptible to fungal/bacteral infection, which can spread by airborne spores into the adjacent community. Those might infect similar injuries to desireable landscape trees. That tree work, then, violates the truer sense of 'Tree City' principles, which the City of Lawrence has promoted for years.

North Lawrence residents should have a process to access the handwheels necessary to close the levee valves should it be required but the usual government organization procedure fails. Also, they should have similar emergency access to the motor/pumps, fittings and generators necessary to pump the valve box streams and ditches over the levee, to prevent stream and ditch overflow flooding. It would be best to have a small, automatic motor/pump installed at each valve box. Mile to multi-mile stretches might be interconnected by waterproof underground conduit to a central control and electricity distribution connection. That should have auxiliary connections for a diesel/generator truck, in event of power failure. Those pumps would reduce interconnected ditch flow drainage by already functioning installed pumps, and increase total capacity.

B. Some North and South Lawrence Flood-Related Susceptibilities

There are several North Lawrence ditch locations which have shown several days of stagnant water following periods of ground-saturating precipitation. Those persistent large puddles can develop and mature mosquitos, for example. Those puddles should be located and the ditches there recut to drain completely. All protruding concrete or steel culvert fittings in ditches should be located and reworked so as to be flush, to reduce damage to a vehicle and its occupants if it slides off a road and over or into such a protrusion. That includes motorcyclists and bicyclists. Culvert junction boxes that have settled in excess hold stagnant water. Those should be located, and the water completely displaced by concrete, or by sand and gravel mix. Gravel prevents sand washout, and sand fills the pores between.

Low areas, such as southeastern portions of Lyon Park, should have topsoil fill spread to several more feet elevation, and planted to restore lawn and landscape, so as to completely drain after saturation by precipitation. Adjacent ditches there should be recut to drain completely. A line of drains and underlying culverts might be required in those two adjacent ditches, because both show deep stagnant water almost from end to end. An automatic motor/pump with self-cleaning inlet, might be installed underground at the southwest corner of Lyon Park, to rapidly drain that area, with outflow piped underground to the river. Adjacent low-lying structures might be jacked and raised, and set higher upon improved foundations. Low

lots might have topsoil fill spread to a height sufficient to drain completely, and planted to restore lawn and landscape. Low interest loans might be facilitated to those lot owners, since it is to everyone's gain to prevent stagnant water there.

It should be recognized that the dam at Lawrence actually increases upstream river height even during maximum pre-flooding height, because it absolutely stops lower river current. That obstructs the entire river flow rate per time, proportional to river height. It functions much like a very short section of smaller diameter pipe in a length of larger diameter pipe. As pressure increases, the proportion of reduction of total pipe flow decreases. But there is always some reduction. In the river, the dam-induced obstruction of river current increases river surface height upstream. As river total height increases, the proportion of reduction of river flow, to total river flow, decreases. But, even at maximum pre-flood height, it still is a quantity, and that quantity increases the river surface height upstream of the dam. A quarter-foot might be added. Once past the dam, unobstructed bottom to top river current rapidly reduces dam-induced extra upstream river height. The 1993 high water mark location near N.3rd Street was the downstream lower of the two different heights, perhaps by a third-foot or so. At that mark, approx. 8 feet above, actual flooding begins, depending upon how much weepage through the top of the levee occurs, and whether it worsens or not. Some weepages self-seal, because of silts in the flood water. The upstream higher height is the more-crucial measurement, even though merely inches greater. So, the dam at Lawrence causes higher water to linger longer, and pile slightly higher. That can be crucial during river flood height, if the flood crest is itself but inches near the maximum pre-flooding height capacity of the levee. However, permanent removal of the formerly defunct deep north side dam control gates would reduce that dam-induced obstruction somewhat, and might not reduce the adjacent hydroelectric production by much, on average. Removal of those gates would improve the river ecosystem, to pass fish and marine organisms down and upstream, even though during higher water only. It should also be recognized that the recent rebuild of that dam appears to hazard the piers of the adjacent, upstream, U.S. Hwy 40/59 bridges, by gouging and erosion by floating flood debris mats, which might accumulate atop the broader top of the rebuilt dam, even though it is submerged.

It should also be recognized that the dam, and the North Lawrence levee, confine Kansas River water height sufficient to flood low-lying areas of South Lawrence. That includes the railway, residences adjacent lower Constant and Burcham Parks, and perhaps the old municipal water treatment facility. The 1993 high water did flood up to the railway tracks. That saturated and softened the railroad roadbed, and that halted railway operation. A South Lawrence levee, with stream valves and automatic pump installations, might parallel the railway, to prevent potential flood damage. Lower Constant and Burcham Parks should be allowed to flood, because their surface area has considerable capacity to laterally spread river

flood volume, and reduce total flood height.

It might be extended upriver, to protect the railway, perhaps even partway to Lecompton. It might extend downriver some, too. Is the new structure in Burcham Park constructed to endure flood and flood borne debris without damage? It should also be recognized that high river water and its debris might gouge, erode and damage the old turbine/generator facility structure adjacent the dam at Lawrence. It should be comprehended, that northeast Kansas would've gained better, if the resources that were recently utilized to rebuild the dam at Lawrence, were instead utilized toward purchase of a modern, efficient turbine/generator and installation into an ' invisible,' automated facility at Lake Perry Reservoir outflow structure. Although the 4 largest Kansas reservoirs might each be so converted to small hydroelectric, would those remain comparatively self-economical for decades to come?

C. A Potential Prototypical Flood Crest Reduction Arrangement for the Kansas River

An installation might be evaluated which would reduce flood crest height. It centers around a pair of large, high capacity motor/pumps located near the junction of the Kansas and Delaware Rivers. Excess flood crest would be pumped through smooth interior, streamlined curvatures pipelines, into either or both Perry and Clinton Reservoirs. A pipeline would be laid to drain into the best of the two northwestern streams into Lake Clinton, but sufficiently downstream from headwaters, to prevent any erosive or disruptive volume, or potential pollution, even if the stream itself is flooded. This arrangement requires almost automatic, synchronized comprehensive flood prevention sequence operation of Perry, Clinton, Tuttle Creek, Milford, and perhaps the other smaller Kansas River watershed reservoirs. During flood susceptible periods, reservoirs are usually kept lower, to increase flood prevention capacity. Prior to anticipated near-flood conditions anywhere downstream, Perry and Clinton Reservoirs might drain at the maximum rates, until near-flood conditions will actually occur. That requires very careful timing, and depends upon all of the watershed precipitation measurements, the current and flow rates of all the watershed rivers and streams, and all other variables at that time. Then, the reservoirs would reduce drainage to the minimum rates. Then, those pumps would reduce the Kansas River flood crest height, A quarter-foot might be reduced out of a sudden flood crest. The same might be reduced out of a stretched flood crest. While a sudden flood crest mightn't last long, and lack much actual flooding volume, a stretched flood crest which persists for a day or more, which might not be but inches over a levee, might accumulate considerable actual flooding and potential damage. To help control the reservoir gates and the crest reduction pumps, a number of automatic, accurate, stream and river height sensors would be installed along and upstream of each area prone to flood, both urban and rural, with wire and auxiliary radio connections to a central control facility. Similar pump installations might be located upstream and downstream. A set of pumps might be installed near Topeka, which pump into streams that

drain into Lake Perry, and into the Wakarusa River and Lake Clinton, again sufficiently downstream of headwaters to prevent any erosive or disruptive volume, or potential pollution, even if a stream is itself flooded. A set of pumps might be installed near Kansas City, Kansas, to pump Kansas River flood pre-crest and crest water into the Missouri River downstream of Kansas City, Missouri, if the Missouri River itself isn't simultaneously flooded there. This pumped flood crest reduction arrangement is generally better than 2 alternatives. 1. Flood crest water might be pumped underground into porous strata. Western Douglas County has an underground, ancient former river bed strata, north to south, at approx. 500 feet, a suitable geology of porous gravels and sands. But the maximum rate of geologically safe, non-erosion injection might be comparatively much less, and prevention or remediation of potential flood borne pollution might be too difficult. 2. Flood crest water might be pumped upward through extra large mist and fog forming nozzles, so as to form low altitude clouds. But it is difficult to prevent clogging of nozzles by flood borne silt and minerals, and some wind in a direction perpendicular to the flood watershed is required. And, fog rapidly precipitates along with other precipitations.

D. Potentially Beneficial Rearrangements for Grant Township Business Park Plans

Two things should be recognized relevant to the Northeast Sector Plan. 1. The railway should eventually bypass North Lawrence. That can be laid out into a protected, noise attenuation fenced corridor, with 4 automatic warning and barrier road crossings. Both tracks would curve and angle through the railway underpass of I 70 east of Lawrence, but the adjacent road would be dead ended each side. Several structures might have to be jacked and fitted for transport to new locations. The railway bypass should be laid out to allow the railway to recover some of its construction costs, by fuel and time savings as trains bypass at full velocity. To do that, there might be only one best route. 2. Highways U.S. 40/59, U.S. 24/40 to K32, and K32, should eventually be improved into a non-stop, 4 lane North Lawrence Bypass. To do so, the intersection at 40/59 and 24/40 should be replaced by a structure of adjacent overpasses, which allows the railway bypass to underpass on the level. That location allows a single railway underpass/highways overpass structure, which is most distant from central North Lawrence. Other layouts require two railway/highway underpass/overpass structures, and perhaps greater time loss. That intersection should be made non-stop from and to each direction, but the adjacent county road intersection should be separated northward by a mile at least. Local access frontage roads would parallel ramps to the overpass, along each side. To allow turnaround, the frontage roads should connect parallel to the railway, under the southern part of the overpass structure, and might connect also to that same county road to the west. Access to K32 as a North Lawrence Bypass would be from K10, at I435 and K7, and by constructing a bridge access highway around Eudora, and not through it. Except for that,

a North Lawrence Bypass might fit within established highway right of ways only. It would save through traffic time and fuel, and it would access 4 lane U.S. 24 to and through North Topeka. That has shown development toward a non-stop, 4 lane North Topeka Bypass, by overpasses combined with parallel pairs of local access frontage roads, and adjacent dead ends of lesser traffic streets. A North Lawrence Bypass might serve most interests better than the South Lawrence Bypass. A four-lane combined bridge and ramped overpass for Hwys.24/40 and K32 would be required at Mud Creek.

The Lawrence Municipal Airport, and the other prospective business park, are each adjacent to both potential railway and highway bypasses. Therefore, it should be recognized that any further actual development of the real estate of either the airport or the other business park, should wait until the railway and highway bypasses are laid out, when and if that occurs, especially if railway access is possibly ever desired. Consequently, those two groups might initiate cooperating planning arrangements together with the relevant railway and highway authorities. If that isn't done, uncomfortable traffic conditions might eventually develop, at the least. With a railway bypass, the railway overpass at N.2nd Street would be removed. U.S. Highways 40/59 would be made level through it. That would benefit highway users and North Lawrence. The railway would continue to access the tracks of each side of the closed and removed railway bridge. Almost all North Lawrence railway commerce is already switched in from Topeka. As it is, I've observed that some if not most trains through North Lawrence are excess velocity for an unfenced urban corridor. On each of a number of occasions through recent years, including Monday, March 22, 2010, I've observed several dead animal corpses, mostly rabbits and opossums, along the tracks of the railway through North Lawrence, from the visitor's center to N. 9th Street: evidently all railroad kill.

Conclusion

These observations were accumulated during several years, since I undertook study of these things beginning 2002. You are welcome to utilize this letter as a technological assessment. My work serves as my qualification.

I regret I haven't any further time to devote to these subjects. However, if you have any questions, you might send them. I'm writing a 20 section book to describe my utility invention discoveries, which I've accumulated since my self-financed, Christ-inspired private studies began, 1998. I'm grateful I found the report, 'Local Dirt,' in BLUE SKY, GREEN EARTH, Issue 3, and that I recalled these observations. I was directly inspired to compose this technological assessment. I've written several less developed letters about these same subjects, dating to 2003, which were evidently ignored. You might have the grasp on these things sufficient to gain the corrections that are most beneficial, all things considered. God help you.

Sincerely, Lawrence Eugene Smith

March 19-22, 2010 LES:les 4/12/2010