



City of Lawrence

# **Lawrence Field Operations Campus**

## Efficiency Summary

*07 January 2021*

	<b>Efficiencies: Constructing a New Campus at the Farmland Site</b>	<b>Cost Savings: One time Occurance</b>	<b>Cost Savings: Yearly</b>
<b>1a</b>	Specialized vehicles lost in major flood event	\$21,000,000	
<b>1b</b>	Higher priced fuel due to fuel island lost in major flood event		\$80,000
<b>1c</b>	Environmental cleanup of fuel island in major flood event		<i>(refer to narrative for more information)</i>
<b>1d</b>	Disruption of operations in major flood event		<i>(refer to narrative for more information)</i>
<b>2a</b>	Extended vehicle life-span		\$300,000
<b>3a</b>	Dedicated Wash Bays--MSO / CMG		\$273,000
<b>3a</b>	Dedicated Wash Bays--Solid Waste		\$475,000
<b>3b</b>	Improved washing frequency		<i>(refer to narrative for more information)</i>
<b>3c</b>	Drainage best practices		<i>(refer to narrative for more information)</i>
<b>3d</b>	Rainwater capture		\$52,000
<b>4a / 4b</b>	Employee training -- MSO / CMG		<i>(refer to narrative for more information)</i>
<b>4c</b>	Employee training -- Solid Waste		<i>(refer to narrative for more information)</i>
<b>4f</b>	Employee turnover -- MSO / CMG		\$112,300 - \$187,000
<b>4f</b>	Employee turnover -- Solid Waste		\$80,700 - \$134,500
<b>5a</b>	Daily check in / work assignment process -- MSO / CMG		\$246,250
<b>5b</b>	Daily check in / work assignment process -- Solid Waste		\$218,750
<b>6</b>	Divisional adjacencies		<i>(refer to narrative for more information)</i>
<b>7</b>	Employee health / sick time		<i>(refer to narrative for more information)</i>
<b>8</b>	Fueling efficiency		\$568,000
<b>9</b>	Resale of existing properties	\$3,317,000 - \$6,132,000	
<b>10</b>	City ownership of property	\$1,400,000	
<b>11</b>	Site remediation	\$5,000,000 - \$10,000,000	
<b>12</b>	Detention basin	\$75,000	
<b>13</b>	Crushing the concrete rubble	\$150,000	

	<b>Efficiencies: Renovation of / Additions to Existing Facilities</b>	<b>Cost Savings: One time Occurance</b>	<b>Cost Savings: Yearly</b>
<b>14a</b>	Renovation / Addition to Streets / Stormwater Division	NA (floodway restrictions)	NA
<b>14b</b>	Water / Wastewater Divisions	NA (site size restriction)	NA
<b>14c</b>	Renovation / Addition to Traffic Division	NA (site size restriction)	NA
<b>14d</b>	Inspections Division	NA (site size restriction)	NA
<b>14e</b>	Renovation / Addition Central Maintenance Garage	NA (site size restriction)	NA
<b>14f</b>	Renovation / Addition Solid Waste Division	NA (floodway restrictions)	NA
<b>14g</b>	Renovation / Addition to Facilities Division	\$3,000,000	NA
<b>14h</b>	Renovation / New Building at Forestry and Horticulture	\$3,000,000	NA
<b>14i</b>	Maintain current Household Hazardous Waste Building	\$4,250,000	NA

Construction of a Field Operations Campus will result in numerous efficiencies related to time and money. A preliminary accounting of these efficiencies is as follows:

1. **Relocating Divisional Operations from Floodway.** Safely locating MSO field operations in an area not prone to flooding results in numerous efficiencies. The Fuel Island, along with Solid Waste, Streets and Stormwater Divisions are all located in the Floodway. This term designates an extremely hazardous area due to the velocity of floodwaters that carry debris and potential projectiles. Any encroachment, including fill, new construction, substantial improvements, or cumulative improvements or other development is prohibited by City Code within the Regulatory Floodway. Floodways are designed to flood—it's not a matter of "if", but "when". Avoiding costs associated with a flood event can be translated to numerous efficiencies, including:
  - a. 79 large / specialized vehicles are currently located in the floodway (53 @ Solid Waste and 26 @ MSO). If all were lost in a flood event, this would result in a replacement cost of over \$21,000,000. This number does not include smaller vehicles that would also be lost, nor does it include equipment and bulk materials located on site. Note that this amount does not factor in the time required to acquire new vehicles.
  - b. Loss of use of the Fuel Island could result in some of the fleet fueling at the Wakarusa site, but this would be a long trip, and burn extra fuel. For those not going out to the Wakarusa site, there would be an increase estimated at \$0.20 - \$0.30 per gallon over city Bulk Prices. Both factors could result in approximately \$80,000 per year additional cost increase potential.
  - c. Environmental cleanup of the fuel island following a flood event or damage could result in a minimum of a clean out of underground tanks, up to the full replacement of underground tanks and control systems. In addition, fines and other regional clean up costs could be assessed if deemed appropriate by the Kansas Department of Health and Environment.
  - d. The most significant efficiency is related to the impact of a flood event on field operations. Although this efficiency can be translated to dollars, it is perhaps best appreciated with regard to the disruption of critical city services provided by MSO. Improvements to damaged buildings are not allowed by City Code, so major disruptions would occur until a new code-compliant facility was established. It is important to note that these disruptions would occur in the aftermath of a disaster—the flood event—a time when many services provided by MSO are needed. Given the scale of field operations, locating and establishing a new makeshift facility could take 2-4 months, with the efficiency of field operations severely diminished until a permanent facility could be constructed, which could take 2 years or longer to effectively locate a site, design and construct a new facility.
2. **Extended vehicle life-span.** A properly sized and outfitted Central Maintenance Garage will improve the lifespan of all serviced vehicles, reducing turnover costs. The most dramatic efficiencies are related to large and specialized vehicles:
  - a. A new, enclosed facility could result in 1-2 vehicles not replaced in a calendar year. This would equate to an average savings of \$300,000 per year. Note that if the City does switch to an alternative fuel vehicles fleet, fuel types, replacement schedules and maintenance activities will change. In this case, future efficiencies would be realized by appropriating flexible service bays within CMG to allow ease of adaptation to changing technologies.
3. **Dedicated Wash Bays.** The first three phases of the Lawrence Field Operations Campus include 6 dedicated wash bays (2 @ MSO Building, 1 @ CMG, and 3 @ Solid Waste Building.) By locating dedicated wash bays (with state of the art washing equipment) within each Division, there are multiple efficiencies:

- a. Increased number of dedicated wash bays reduces queuing time from 20 minutes to 10 minutes.
  - b. Increased number of dedicated wash bays / increased frequency of washing equates to a reduced time per wash from 40 minutes to 20 minutes, based on the fact that less time is needed.
    - i.  $\text{MSO / CMG} = 200 \text{ vehicles} * 104 \text{ washes/yr} * 30 \text{ min saved} * 2019 \text{ Rate } (\$26.25) = \text{average savings of } \$273,000 \text{ per year}$
    - ii.  $\text{Solid Waste} = 109 \text{ vehicles} * 312 \text{ washes/yr} * 30 \text{ min saved} * 2019 \text{ Rate } (\$28.00) = \text{average savings of } \$475,000 \text{ per year}$
  - c. Improved washing frequency raises awareness and observation, triggering problems being caught earlier.
  - d. Best practices on drainage decrease frequency of maintenance on wash water capture equipment by 75%.
  - e. Assuming 75% rainwater capture for usage in washbays, the system has the potential to save over 3,500,000 gallons of potable water per year for MSO / CMG; and 5,730,000 gallons for Solid Waste.
4. **Employee turnover and training.** The creation of properly sized and outfitted workspaces, combined with glare-free daylight, ventilation and access to fresh air, will lead to increased attraction for potential employees, and increased retention once they are hired. Estimated efficiencies include:
- a. MSO (Streets, Stormwater, Water, Wastewater and Traffic Divisions) invest on average 25 hours of yearly training per employee (82 FTE - 2019), at an average hourly rate for 2019 of \$26.25 per employee, which is roughly \$54,000 invested per year in training time alone for these Divisions.
    - i.  $132 \text{ FTE Projected} * 2019 \text{ Rate } (\$26.25) * 30 \text{ Hours / year} = \$104,000 / \text{Year}$
  - b. Central Maintenance Garage (CMG) invests 30 hours/year per employee, (17FTE - 2019) \* \$26.25 = \$14,000 / Year
    - i.  $30 \text{ FTE Projected} * 2019 \text{ Rate } (26.25) * 30 \text{ Hours / year} = \$23,600 / \text{year}$
  - c. Solid Waste Division (SWD) invests 25 hours /year per employee, (80 FTE - 2019) \* \$28.00 = \$56,000 / Year
    - i.  $128 \text{ FTE Projected} * 2019 \text{ Rate } (\$28.00) * 30 \text{ Hours / year} = \$108,000 / \text{year}$
  - d. National average for employee attrition is 30% (2019 Retention Report, Work Institute). Most often citing training, career advancement and work conditions / environment as reasons for voluntary departure.
    - i. 2019 Retention Report, Works Institute states the cost of a lost worker is \$15,000 per employee at minimum.
    - ii. MSO Turnover over the last 5 years:
      - 1. 2016 - 10.35%
      - 2. 2017 - 14.97%
      - 3. 2018 - 20.87%
      - 4. 2019 - 14.63%
      - 5. 2020 - 12.60%
    - iii. Removing the high and low turnover percentages to normalize, the average attrition rate is 14%
  - e. Potential cost of turnover, per year:
    - i. *New i: Current Staffing:* MSO 14% of 93 employees \* \$15,000 = \$195,300 Loss
    - ii. *New ii: Projected Staffing:* MSO 14% of 148 \* \$15,000 = \$310,800 Loss
    - iii. *Current Staffing:* CMG 14% of 17 employees \* \$15,000 = \$35,700 Loss
    - iv. *Projected Staffing:* CMG 14% of 30 employees \* \$15,000 = \$63,000 Loss
    - v. *Current Staffing:* SWD 14% of 80 employees \* \$15,000 = \$168,000 Loss
    - vi. *Projected Staffing:* SWD 14% of 128 employees \* \$15,000 = \$268,800 Loss
  - f. Safe, functional workspaces with effective daylight and ventilation improve working conditions and environment, which have been shown to reduce yearly employee turnover.

- i. Total MSO Turn-Over Potential Loss (Projected) \$311,000.
  - 1. 30% Reduction in Loss = \$93,300 Savings
  - 2. 50% Reduction in Loss = \$155,500 savings
- ii. Total CMG Turn-Over Potential Loss (Projected) \$63,000.
  - 1. 30% Reduction in Loss = \$19,000
  - 2. 50% Reduction in Loss = \$31,500
- iii. Total SWD Turn-Over Potential Loss (Projected) \$269,000.
  - 1. 30% Reduction in Loss = \$80,700
  - 2. 50% Reduction in Loss = \$134,500

**5. Daily check in / work assignment process.** Programming, observation and design have resulted in layouts that put daily check-in spaces, work assignment spaces and training rooms in strategic areas. Efficiencies include:

- a. By providing strategic meeting areas, the new facilities reduce daily work assignment times by 50%. Thirty minutes daily reduced to 15 minutes hours daily (MSO and CMG)
  - i. Current Hourly Rate:  $\$26.25 * 0.5 \text{ hours daily} * 150 \text{ Employees} = \$1,970 \text{ daily}$
  - ii. Reduction by 50% =  $\$985 \text{ daily savings} * 5 \text{ days / weeks} * 50 \text{ work weeks}$
  - iii. \$246,250 in yearly wage savings.
- b. By providing strategic meeting areas, the new facilities reduce daily work assignment times by 50%. Two hours daily reduced to 1 hour daily. (Solid Waste)
  - i. Current Hourly Rate:  $\$28.00 * 0.5 \text{ hours} * 125 \text{ Employees} = \$1,750 \text{ daily}$
  - ii. Reduction by 50% =  $\$875 \text{ daily savings} * 5 \text{ days / weeks} * 50 \text{ work weeks}$
  - iii. \$218,750 in yearly wage savings.

**6. Divisional adjacencies.** Centralizing the Divisions offer multiple efficiencies. One case in point is Solid Waste Collection Operations being directly adjacent to Solid Waste Fabrication / Maintenance operations. By centralizing Solid Waste to a single facility, trucks and roll off containers no longer need to travel between 11th and Haskell and Solid Waste Annex North (SWAN) sites for roll of container fabrication and maintenance.

- a. Calculated distance / travel time between facilities is 2.8 miles / 8 minutes and done on average 10 times / week resulting in a savings of 70 hours in a 1 year period.
- b. Painting and decaling of roll off containers will now also happen on site vs at second facility, resulting in travel time saved.
- c. During the day when trucks are on route and are in need of repair, the crew will go directly to the Solid Waste Annex North (SWAN) site for minor repairs. The operators either need to be shuttled back to the 11th and Haskell site or wait for repairs to be completed. If these operations were combined at one location, this downtime will be avoided.

**7. Employee Health / Sick time.** Current facilities working conditions have a significant potential to contribute to health issues. One such example is the use and function of the Streets Division "Red Barn", where trucks run within the facility without minimum safety requirements for ventilation of harmful CO and NO2 fumes from the exhaust of these vehicles. These fumes can cause respiratory illnesses and exacerbate existing health conditions. Another example is the cramped conditions at the Central Maintenance Garage, which can increase the risk of injury to technicians.

- a. One of highest potential areas for employee loss is work conditions and environment (see item 4)
  - i. Improving working conditions improves potential for employee turnover loss.

- b. Facilities with ample glare-free daylight can result in a 2-4% increase in productivity, and an 84% drop in symptoms of eyestrain, blurred vision and headaches.
- c. Flood events are often followed by the growth of mold, which can exacerbate respiratory conditions.
- d. It should be noted that illness and injury are sometimes associated with legal action and therefore the cost of defending a claim and any awards related to that claim.

**8. Fueling Efficiency.** A Fuel Island designed to meet the needs of a Field Operations Campus offers efficiencies related to time and operational costs.

- a. The current Fuel Island does not have sufficient capacity, resulting in longer fueling times. A new fuel island would reduce fueling time from 30 minutes to 20 minutes during peak times (fueling time = queuing time + filling time).
  - i.  $416 \text{ vehicles} * 10 \text{ min saved} * \text{Daily Fueling} * \$26.25 \text{ Wage Rate} = \$568,000$
- b. A properly located Fuel Island would allow for safer vehicle and equipment access, reducing additional queuing potential for accidents / collisions.

**9. Resale of existing properties.** The value of selling existing facilities not located in the floodway will also help offset costs of constructing new facilities. The facility valuations listed below are the county's assessed value and the insured valuation of each property. These values are noted as an estimated range, however actual fair market values if sold may vary.

- a. The Central Maintenance Garage and Turf Management property has value to an automotive or industrial business. It has been estimated to be valued in the range of \$471,000 to \$1,425,000.
- b. The Traffic Division facility is located in a residential neighborhood. It has some appealing architectural spaces that could be beneficial to a community-based project, or even a multi-family mixed use development. It has been estimated to be valued in the range of \$359,000 to \$1,122,000.
- c. The Forestry Division facility is relatively well maintained and has value as an industrial property. It has been estimated to be valued in the range of \$343,000 to \$459,000.
- d. The Horticulture Division facility has value as an industrial property. It has been estimated to be valued in the range of \$200,000 to \$201,000 (assumes Northernmost 25% of the entire 1110 Haskell Ave parcel would be replated and sold, this equates to the approximate area out of the floodway).
- e. The Facilities Division and Household Hazardous Waste Division facilities are in a prime location for resale. If the entire parcel is sold, the estimated value ranges from \$1,320,000 to \$1,825,000. However, if the Household Hazardous Waste facility is to remain on that parcel and only the rear portion is sold, it has been estimated to be valued in the range of \$1,205,000 to \$1,320,000.
- f. The Solid Waste Division facility at 320 NE Industrial Ln is relatively well maintained and has value as an industrial property. It has been estimated to be valued in the range of \$737,000 to \$1,100,000.
- g. The total estimated valuation of current city held properties for existing Division facilities ranges from \$3,317,000 to \$6,132,000 and could be liquidated to help offset costs of a new facility.

**10. City Ownership of Property.** The Farmland Site has added value because it is already City owned and there is not a need to purchase another property. The cost of equivalent sites ranged from \$1,400,000 and higher.

**11. Site Remediation.** \$13,500,000 has been earmarked in the 2021 - 2025 CIP, although long-term remediation could approach an estimated \$40,000,000. Capping affected areas with paving or buildings could reduce the net cost of remediation by an estimated \$5,000,000 - \$10,000,000.

12. **Detention Basin.** The Farmland Site has an existing detention basin, eliminating the need to design and build a pond. This would result in a savings of around \$75,000 for design, construction of the pond control structure, earthwork, erosion control, seeding.
13. **Crushing the Concrete Rubble.** Crushing the pile of existing onsite concrete rubble was explored for sustainability and cost savings purposes. The resulting crushed aggregate would be used for building and pavement subgrade preparation. Three estimates were received from contractors, and on average, \$17.17 would be saved per ton by crushing this concrete as opposed to bringing in new material plus having to haul off the existing rubble. Estimates show needing approximately 10,000 tons of rock for pavement subgrades, and 4,000 Tons for building subgrades for full buildout, possibly more. It is also estimated that the concrete in the rubble pile, the concrete around Tank 6 and the pavement areas and building foundations east of Tank 5 total is approximately 10,000 Tons. (Based on assumptions of areas and thicknesses of the concrete on this lot). This would result in approximately \$150,000 in savings. It is also possible to crush the concrete of the existing building foundations on the lot to the south located at the NE corner of Venture Park Drive & O'Connell Road.
14. **Efficiencies of Renovating / Adding to existing Division Facilities.** In an effort to explore reducing costs, the Design Team explored the option of renovating / adding onto existing Divisional facilities, on a case by case basis. After the review, it is apparent that remaining at existing facilities is only an option for four Divisions: Facilities, Household Hazardous Waste, Forestry and Horticulture. Thus, \$10,250,000 would be saved by these renovation/ addition projects and the development of a smaller Campus at the Farmland site.
- a. *Streets and Stormwater Divisions:* Major renovations / additions not allowed per current Lawrence Building Codes due to existing facility location in floodway.
  - b. *Water & Wastewater Divisions:* Site is not large enough to renovate / add on to the existing facility. In addition, the site currently shares space with a water treatment facility, which is not operationally efficient.
  - c. *Traffic Division:* Site is not large enough to support an appropriately-sized addition.
  - d. *Inspections Division:* Site is not large enough to renovate / add on to the existing facility. In addition, the site currently shares space with a water treatment facility, which is not operationally efficient.
  - e. *Central Maintenance Garage:* Site is not large enough to support an appropriately-sized addition
  - f. *Solid Waste Division:* Major renovations / additions are not allowed per current Lawrence Building Codes due existing facility location in the floodway.
  - g. *Facilities Division:* The new building as designed is an approximately \$7,500,000 project. Because the existing Facilities building is not in the floodway, it could potentially be renovated/ added onto for \$4,500,000, resulting in cost savings of \$3,000,000. (10,000 SF @ \$150 / sf for renovation, plus \$500,000 site improvements, plus \$2,000,000 conditioned storage building)
  - h. *Forestry & Horticulture Divisions:* The new combination Forestry/Horticulture building as designed is an approximately \$8,000,000 project. By renovating and adding to the existing Forestry Building (\$1,000,000) and by demolishing the existing Horticulture Building and erecting a new facility on it's site (\$4,000,000) for a total project cost of \$5,000,000, savings of \$3,000,000 could be realized. Although the two Divisions would not be located in the floodway, Horticulture would be located in the 100 year floodplain and Forestry in the 500 year floodplain.
  - i. *Household Hazardous Waste:* By not building a new facility at the Campus site and staying at the 5 year old facility, savings of \$4,250,000 could be realized. However, the current location of HHW is not as operationally efficient in relation to the new Campus.

15. **MSO Merger and Consolidation of Operations.** MSO was organized by the City of Lawrence to consolidate all public service departments under one larger organizational structure. Efficiencies will be found in all operations

with divisions of MSO that share common work missions, equipment similarities and service needs. These efficiencies include:

- a. Consolidation of STRT, STWT, WSWT, WTD, TRAF, INS:
  - i. Operations and Divisions charged with maintaining civil infrastructure include Streets, Stormwater, Wastewater Collection, Water Distribution, Traffic and Inspections Divisions. These groups share a common work language and general work responsibilities, thus consolidation into a single location or facility, improves cohesive work efforts, efficiency in training abilities, efficiency in multipurpose space needs such as training rooms, locker rooms and equipment storage and efficiency in shared site functions.
- b. Co-location of CMG with these divisions:
  - i. Vehicle and Equipment maintenance operations, as performed by Central Maintenance are critical to these work divisions. Each municipality supplies these work divisions with critical equipment required to maintain their civil infrastructure. This equipment needs frequent preventative maintenance and observation, as well as the ability to perform large scale maintenance. This critical relationship mandates very close proximity or co-location to improve response time to necessary repairs. It is also common that Central Maintenance operations, like Lawrence, maintain and monitor fueling resources. By co-locating the fueling operations with the consolidation of a large amount of equipment in one location, efficiency in time and material management is gained by this relationship.
- c. Co-location of SWD with CMG Operations
  - i. Sanitation collection services are a municipal service that shares many of the vehicle and equipment typologies with the divisions responsible for maintaining Civil Infrastructure. The equipment employed by these work groups, also has a high level of sophistication and moving parts that need even more attention than that of other Municipal work groups. That requirement makes colocation with the Vehicle and Equipment maintenance operations extremely important for improving efficiency, safety and level of service expectations.
- d. Co-location of FOR/HOR with Consolidated STRT, STWT, WSWT, WTD, TRAF, INS:
  - i. Civil infrastructure also includes Parks Maintenance, Horticulture and Forestry Maintenance and Management divisions. These work groups have very similar space and site needs to that of the other divisions, but operational missions are somewhat different. Thus, if space or function dictates, these space and site needs could be separated from work groups working on streets and public utilities. However, the equipment storage and site storage needs are similar enough that efficiencies are found when being colocated on a consolidated campus. This includes bulk material storage (rock, black dirt, wood chips, etc), and centralized fueling location.
- e. Other MSO Divisions at a Consolidated Campus:
  - i. Co-location of other Municipal Services on a consolidated campus with these services, depend on the amount of available site to accommodate services that are similar, but not necessarily sharing the same operational goals as the previously noted services.
  - ii. FAC: Facility Management and Maintenance services, are also a civil infrastructure maintenance operation. However, their work activities are more detailed and on a smaller scale than roads and utilities. Equipment will be similar, but not need the amount of maintenance or similar storage demands then that of a streets or sanitation division. As such, the colocation on a campus would be efficient in an administrative capacity, but not as critical as other departments on site.
  - iii. HHW: Other services that require a high level of public interaction such as HHW, are also not going to be as efficient on a consolidated campus as the other previously mentioned work groups. The reasons for this lesser level of efficiency include the separation of public and operational vehicle traffic and security and safety of essential public services.