# Asset Management Investment Plan

*Prepared for the Village of Fruitvale*

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URBAN systems

# TERMS AND DEFINITIONS

The following commonly used terms and definitions have been described as they relate to the Village of Fruitvale's Asset Management Program:

**ANNUAL AVERAGE LIFE CYCLE INVESTMENT (AALCI):** Annual budget based on annual average of the total replacement value of an asset over its expected service life determined by the asset management plan

**ASSET:** A physical component of a system that has value, enables services to be provided, and has an economic life of greater than 12 months

**ASSET CONDITION:** The state of an asset, particularly regarding its appearance, quality, or working order

**ASSET MANAGEMENT:** The process of making decisions about the use and care of infrastructure to deliver services in a way that considers current and future needs, manages risks and opportunities, and makes the best use of resources

**ASSET MANAGEMENT PLAN:** A long term plan to identify asset management needs, establish longer term financing means, and regularly schedule maintenance, rehabilitation and replacement works for the long-term sustainability of the asset

**ASSET MANAGEMENT POLICY:** Principles and mandated requirements derived from, and consistent with, the organizational strategic plan, providing a framework for the development and implementation of the asset management strategy and the setting of the asset management objectives

**ASSET MANAGEMENT STRATEGY:** Long-term optimized approach to management of the assets, derived from, and consistent with, the organizational strategic plan and the asset management policy

**ASSET RENEWAL:** Work on an asset (or component) that brings the asset back to new condition or the complete replacement of the asset (in situ) with a new asset providing the original (intended) level of service

**COST:** In asset management, the financial and human resources required throughout the lifecycle of the asset

**INFRASTRUCTURE RENEWAL DEFICIT (BACKLOG):** A measure of the amount of infrastructure that has passed its theoretical service life but is still providing service to the community

**LEVEL OF SERVICE:** A measure of the quality, quantity, and/or reliability of a service from the perspective of residents, businesses, and customers in the community

**LIFE CYCLE COSTS:** The total costs estimated to be incurred in the design, construction, operation, maintenance, and final disposition of a physical asset or system over its anticipated useful life span

**LIFE CYCLE MANAGEMENT:** Retaining an asset as near as practicable to its original condition, from the point when a need for it is first established, through its design, construction, acquisition, operation and any maintenance or renewal, to its disposal

**REVENUE:** The income received by the Village from taxes, user fees, government transfers and other sources. Own sources revenues is income received from taxation, user fees, and any interest income.

**RISK(S):** Events or occurrences that will have an undesired impact on services (**Risk = Impact x Likelihood**)

**Asset Risk** – An event where an asset failing to perform as you need it to. Examples of asset risks are a broken sewer pipe or potholed road surface.

**Strategic Risk** – Events or occurrences that impact your ability to achieve objectives.

**REGULATORY REQUIREMENT:** Capital works to meet existing or new provincially or federally legislated standards.

**SERVICE:** A system that fulfills a public need such as transportation and sewage collection

**SERVICE LIFE:** The estimated lifespan of a depreciable fixed asset, during which it can be expected to contribute to a municipality's operations/service delivery

**TANGIBLE CAPITAL ASSET (TCA):** An Asset that has a physical form for use in the operations and delivery of services. Tangible assets include fixed assets, such as water, sewer, roadways and buildings (fixed assets are sometimes referred to as 'plant'). Tangible capital assets must be accounted for and reported as assets on the Statement of Financial Position as part of PS 3150.

**TRIPLE BOTTOM LINE APPROACH:** Utilizing economic, social and environmental metrics (i.e. quantifiable impacts to costs, mobility, and watercourses/habitats) in assessing and/or prioritizing investments.

**USEFUL LIFE:** The minimum life expectancy commonly used for asset life. This is typically used for TCA reporting (as opposed to for asset management purposes).

# EXECUTIVE SUMMARY

The Village of Fruitvale owns and maintains a large portfolio of infrastructure assets upon which it greatly relies for the delivery of services to the community. This infrastructure includes the Village's transportation network, sewer systems, storm drainage system as well as a wide variety of civic facilities and vehicles.

Some of the Village's assets, such as the sewer system, date back to the 1960's and a major portion of the Village's road system was constructed during the early 1950's. These assets, and others, have served the community well however many of these assets are now nearing the end of their useful lifespans and will eventually need to be replaced or rehabilitated.

The Asset Management Investment Plan (AMIP) provides a review of all of the Village's infrastructure assets to answer the following questions;

- What assets does the Village own?
- What is the cost to replace the asset?
- How much money needs to be invested annually (on average) to sustain the Village's assets?

By understanding the answer to these questions the Village will be able to budget and plan for the replacement of their infrastructure. Failure to plan would put the community at risk of service disruptions, emergency repairs and the need for sudden and significant tax and user fee increases. By being proactive today the Village can ensure that services are sustainable so that current and future generations can enjoy the same levels of service as well as reasonable tax rates and user fees.

## WHAT ASSETS DOES THE DISTRICT OWN?

For the purposes of the AMIP the Village's assets have been separated into 6 categories: sanitary system, roads, buildings, storm drainage, and fleet and other.

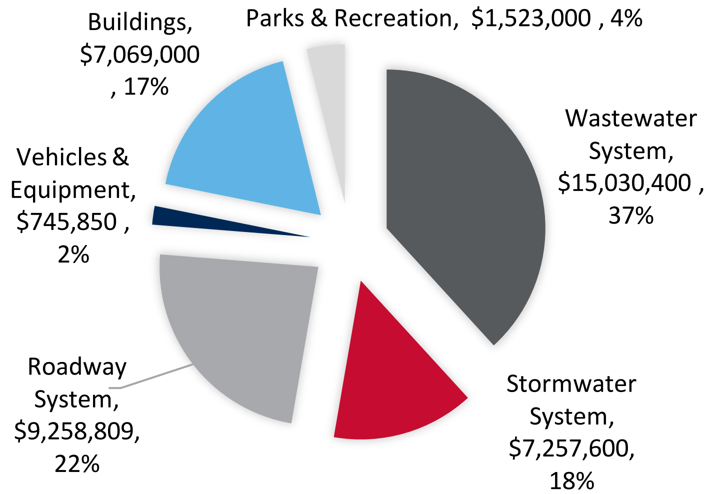
- The ***sanitary sewer*** is comprised of approximately 18km of sewer pipes in addition to manholes, lift stations, force mains and treatment facilities.
- The ***roads system*** includes local and collector roads, bridges, and signage.
- The Village's ***buildings*** include all public buildings and structures including the community hall, municipal hall, public works office and other Village owned structures.
- ***Parks*** includes all land improvements such as bleachers at the ball diamonds, picnic tables and playground equipment but does not include land.
- The ***storm drainage*** system includes nearly 7km of pipes, culverts, catch basins and manholes.
- The ***fleet and other category*** includes Village owned vehicles and mobile equipment including pick-up trucks, dump trucks, and other vehicles and equipment.

All of these infrastructure assets are required to deliver the services that are valued by the residents of Fruitvale.

### WHAT IS THE COST TO REPLACE THE ASSETS?

The total replacement value of the Village's infrastructure is approximately $41 million, based on current construction costs. Broken down as follows;

- Sanitary System $15M
- Roads $9.3M
- Buildings $7M
- Parks $1.5M
- Storm $7.2M
- Fleet and other $0.75M




The road and sewer systems make up the majority of the infrastructure value (60%) with buildings and stormwater accounting for 35% of the total value.

### HOW MUCH MONEY NEEDS TO BE INVESTED ANNUALLY?

There is no single "correct" answer to this question. Accurately predicting when infrastructure will need to be replaced is very difficult if not impossible to do. The service life of an asset such as a pipe depends on many factors such as the materials it is constructed from, the properties of the soils that it is buried in, how it was installed and many, many other factors. For this reason lifespan estimates are generally based on *"rule of thumb"* values. Most rule of thumb lifespans applied by engineers are conservative (on the safe side). In reality many assets could actually last much longer (50% longer or possibly more) than these estimates. For this reason the annual average investment required by the Village is presented as a range between a high of $967,300 annually if a conservative rule of thumb lifespan is applied down to $750,000 if an optimistic assumption is made that assets will last 50% longer than the conservative estimate. The correct answer probably lies somewhere between these two values. By assuming the assets will last longer the Village assumes more risk. It is at the discretion of the Village Council to decide what level of risk they are comfortable with and to revisit those assumptions on a regular basis.

| Asset Category | Average Annual Investment Range |
|---|---|
| Road System | $191,500 - $286,500 |
| Sanitary System | $190,400 - $240,800 |
| Storm System | $96,600 - $165,200 |
| Building System | $119,000 - $159,000 |
| Parks | $42,750 - $57,000 |
| Fleet and Other | $44,100 - $58,800 |
| **Total (Rounded)** | **$750,000 - $967,300** |

# 1.0 INTRODUCTION

Communities, like Fruitvale, are turning toward asset management as a process for making informed infrastructure decisions, build financial capacity to renew, operate and maintain existing infrastructure so that the Village can continue to provide services, effectively manage risks, and provide tax payers with the best value for money.

In 2015, the Village completed an assessment of its current asset management practices. The assessment of practices provided a baseline of the Village's current asset management capacity (information, finances, assets and people) as well as provided a recommended strategy for next steps to improve its capacity. These proposed key actions all relate to improving the Village's information regarding costs, funding, risk and service to better inform and guide infrastructure decision-making.

One of the key next steps was to improve its understanding of costs through completing a detailed asset assessment (cost forecast) of the community's future infrastructure renewal investment requirements. This forecast will provide staff with improved information (cost and timing) and key indicators to inform infrastructure investment decision-making and assist in aligning priorities. To accomplish this, the Village engaged Urban Systems to complete a long term (integrated) Asset Management Investment Plan (AMIP).

The AMIP is based on the BC Framework (see **Figure 1**) and was developed to identify and assess the expected replacement costs and needs for each of Fruitvale's assets. The AMIP (**Appendix A**) consolidates all of the long term costs and timing for a community's major infrastructure categories. This enables the Village to see all of their infrastructure's life cycle cost pressures in one place, at a glance. The AMIP is also an ideal tool to engage rate payers by showing how infrastructure performance and age is linked to annual investments. The AMIP includes details and summaries of:

- Current replacement value
- Infrastructure deficit
- Looming future costs
- Average Annual Life Cycle Investment (AALCI) required for the ongoing renewal of public infrastructure

### What is Asset Management?

The process of bringing together the skills and activities of people; with information about the community's physical infrastructure assets and financial resources to ensure long term sustainable service delivery.

Sound asset management practices support sustainable service delivery by considering community priorities, informed by an understanding of the trade-offs between the available resources, risk and the desired services.

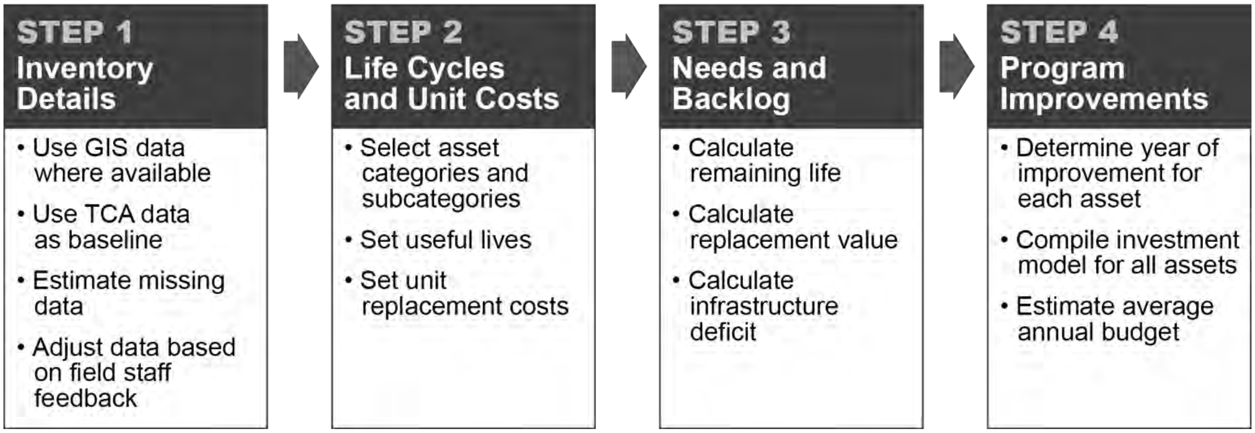
Sustainable service delivery ensures that current community services are delivered in a social, economic, and environmentally responsible manner that does not compromise the ability of future generations to meet their own needs.


***Figure 1.1: Asset Management for Sustainable Service Delivery, A BC Framework***

## 2.0 AMIP METHODOLOGY

The AMIP is predominantly based upon infrastructure service lives, but also considers condition assessment information where available. To develop the AMIP, a 4-Step analytical approach was used (see **Figure 2.1** below).

***Figure 2.1: AMIP Development Steps***




Fruitvale's AMIP for asset renewal was built using the best linear and non-linear asset data available. The most recent digital infrastructure information for Fruitvale has been reviewed for use in developing the AMIP. This information is primarily based on compiled infrastructure record drawings received from the Village, coupled with information from the Tangible Capital Assets (TCA) inventory. An estimate was made for missing data where possible. The GIS information was the primary source used for the majority of the asset inventory which was cross checked against the public works department's record information and anecdotal knowledge of the systems. A more detailed review of the Village's data has been previously provided under separate cover.

The Village's road data was updated using TCA inventory and the Regional District of Kootenay Boundary roads database. The RDKB roads database was used to update the spatial geometry of the roads, while attribute information, such as width and in-service year, were incorporated from the TCA. Fruitvale's building appraisal report was used to inform the building and facility valuation and expected remaining life. The existing asset inventory was found to be missing some key spatial attributes and age information which is comparable to other communities similar in size to Fruitvale. Summary maps illustrating the assumed ages of key assets (sewer pipes and roads) is provided under separate cover.

As a next step in the evolution of the Village's asset management process, the AMIP inventory should be built upon to develop a prioritized capital plan based on risk, service and cost. It also is suggested that the Village continue to undertake an on-going program for improving data collection in order to refine the complete data set for long term asset management purposes.

The AMIP outlines the following:

- Current replacement value;
- Remaining value;
- Expected life remaining[1];
- Infrastructure deficit (backlog);
- 20 year renewal costs and timing (including future looming costs); and,
- Average Annual Life Cycle Investment (AALCI)[2].

The AMIP is a spreadsheet which is delivered in three (3) inter-connected levels:

**Level 1.** Summary for investment planning and decision-makers;

**Level 2.** Detailed data for ongoing reporting, operations and maintenance; and

**Level 3.** Highly detailed segment by segment information regarding the linear infrastructure such as pipe and roads.

The benefits of the AMIP's Level 1 summary include:

- Presents a complete and concise summary of all infrastructure assets on 1 page;
- Provides a comprehensive focus and format for community infrastructure outreach programs;
- Uses very detailed information from Level 2, which provides invaluable asset details for more credible and defensible decisions on infrastructure re-investment; and
- Encourages exploration of sustainable infrastructure renewal funding levels.

## 2.1. ASSET CATEGORIES

In order to provide an appropriate level of accuracy for the analysis of linear and non-linear asset categories, each category was divided into sub-categories. Sub-categories were based upon similar infrastructure components and limited to major sub-categories that are significant for investment planning and trade-off analysis. The asset categories and sub-categories are shown in **Table 3.1**.

[1] The expected life remaining is a ratio between remaining life and replacement value. This is based on straight line depreciation of the asset over its service life.
[2] AALCI is the annual depreciation of the replacement value. The AALCI represents the ideal annual budget allocation. Annual surpluses would go into reserves and be drawn upon for renewal of assets. When the annual budget is less than the AALCI, the sustainability gap grows.

*Table 2.1: Fruitvale's Asset Categories and Sub-Categories*

| Sanitary System | Storm System | Road System | Buildings | Fleet & Equipment | Parks |
|---|---|---|---|---|---|
| *Mains* | Mains | Roads | Recreation | Vehicles | Land Improvements |
| *Force Mains* | Culverts | Bridges | Administration | Equipment | Natural Assets |
| *Appurtenances* | Manholes | Signage | Public Works | | |
| *Lift Stations/ Siphons* | Catch basins | | | | |
| *Treatment* | Outfalls | | | | |

## 2.2. HOW TO USE THE INVESTMENT PLAN MODEL

The model is driven by input tables; however, when sufficient data is not available for the input tables, or asset-specific changes are made, then estimates are done in the excel worksheets. In addition to its financial information, the investment plan database also uses the following asset attributes:

- Location;
- Material or Make;
- Size or Model;
- Dimensions;
- Quantity;
- Year Built;
- Service Life;
- Condition rating (where available); and
- Installation cost:
    - Recent Tendered Construction costs;
    - Construction contingency costs;
    - Planning and design costs;
    - Project management costs; and
    - Construction administration costs.

The AMIP model is designed to keep calculating year after year. The AMIP can be updated each year by adjusting the model to the current year (Input Table), updating unit costs and other replacement values to reflect inflation, and updating the asset inventory to include annual project renewals, decommissioning, and new acquisitions.

The power of the AMIP model is that it uses actual replacement costs, service lives based upon healthy maintenance programs, and summarizes all infrastructure information in Level 1 to assist Fruitvale in better understanding their cost pressures to help inform their budgeting and infrastructure decisions.

*Figure 2.2: Informed Decision Making*

# 3.0 AMIP RESULTS

The AMIP's Level 1 summary (see **Appendix A**) presents a one page overview of asset renewal needs, rolled-up for all asset categories and sub-categories in Fruitvale. It presents the current renewal investment for Fruitvale's major asset categories over a 20 year period, using a conservative life span estimate and includes indicators for determining a sustainable infrastructure funding level.

This AMIP scenario assumes that an adequate annual operations and maintenance (O&M) budget is in place to optimize asset service lives. Reduced or inadequate O&M budget levels would reduce the service lives. More detailed information regarding each individual asset category can be seen in the level 2 summaries (section 5). **Table 4.1** summarizes the key results of the AMIP.

***Table 3.1: AMIP Summary***

| ***Asset Category*** | **Replacement Value** | **Expected Remaining Life** | **Infrastructure Deficit (Backlog)** | **20 Year Total** | **Average Annual Life Cycle Investment (AALCI)** |
|---|---|---|---|---|---|
| *Wastewater System* | $15,030,400 | 38% | $2,123,800 | $7,406,000 | $240,800 |
| *Stormwater System* | $7,257,600 | 30% | $3,434,200 | $4,375,000 | $165,200 |
| *Roadway System* | $9,258,809 | 26% | $7,579,949 | $7,593,949 | $286,500 |
| *Vehicles & Equipment* | $745,850 | 67% | $63,350 | $1,079,400 | $58,800 |
| *Buildings* | $7,069,000 | 57% | $0 | $437,000 | $159,000 |
| *Parks & Recreation* | $1,523,000 | 38% | $630,000 | $1,078,000 | $57,000 |
| ***Sub-Total*** | **$40,884,659** | **35%** | **$13,831,299** | **$21,969,349** | **$967,300** |

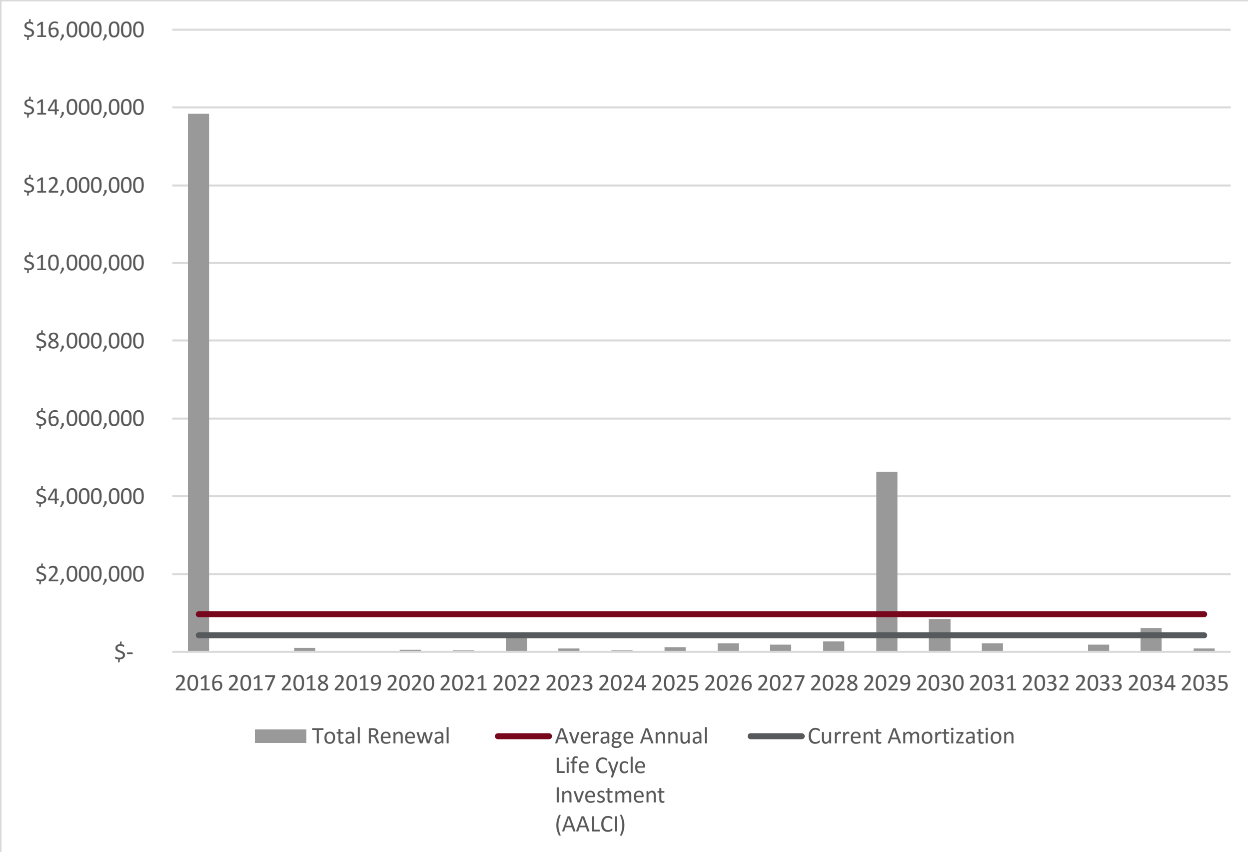
**Average Annual Life Cycle Investment (AALCI):** forecasted annual investment needed to sustain existing infrastructure over its service life (over the next 20 years and beyond).

**20 Year Total:** total forecasted investment needed to replace infrastructure that has passed its theoretical service within the next 20 years.

**Infrastructure Deficit:** is a measure of the amount of infrastructure that has already passed its theoretical service life but is still providing service to the community. This infrastructure should be inspected to determine if replacement is necessary for not.

**Figure 3.1** below illustrates the asset renewal investment forecast for the next twenty years.

***Figure 3.1: Forecasted Asset Renewal Investment Profile***



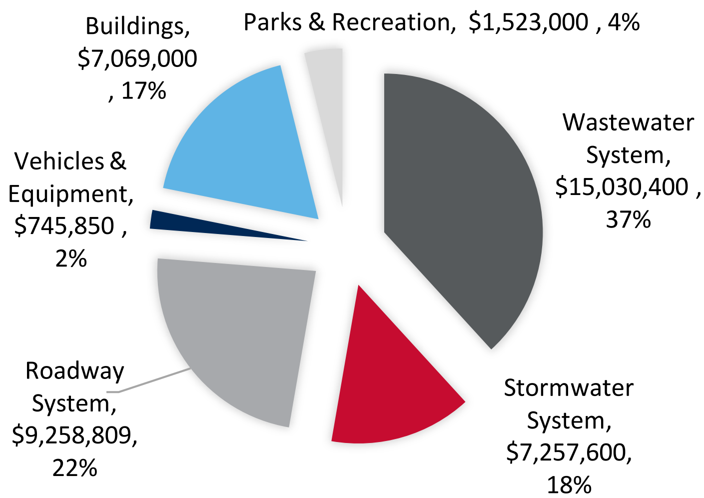

## 3.1. ASSET REPLACEMENT VALUE

The estimated full replacement value of Fruitvale's major infrastructure assets is approximately **$41 million** (2016) based on current tender prices in the BC Interior region and best practices for setting service lives. A copy of the inputs (unit costs and service lives) is located in **Appendix B**.

**Table 3.1** (above) provides a summary of the replacement value of existing infrastructure only; it does not touch on regulatory requirements, growth/expansion, safety improvements, and economic development. The AMIP should be integrated into a comprehensive capital plan so that these items can be integrated together.

**Figure 3.2** illustrates the percent breakdown of Fruitvale's infrastructure value by asset category.

*Figure 3.2: Infrastructure Value Distribution*




Approximately 60% of Fruitvale's infrastructure is made of up Road and Sanitary assets which mean majority of the total long term expenditures should be on these assets. On average, Fruitvale assets are considered to be in fair to poor condition with an average expected remaining life of 35% and there are assets (**$13.8M**) that have passed their theoretical service life which should be inspected in the field prior to investing in their replacement. In the twenty year horizon there is approximately $22M forecasted in assets that may need to be renewed. These results are comparable to other communities of similar size and age to Fruitvale.

## 3.2. INFRASTRUCTURE DEFICIT

Infrastructure deficit ($13.8M) is a measure of the amount of infrastructure that has passed its theoretical service life but is still providing service to the community.

**Current Year > Year of Asset Replacement**

Although the asset is still providing service, it is typically nearing the end of its life and will require field investigation to determine if the asset needs to be replaced or not. Changes in the asset service life can turn future expenditures to a deficit or vice versa. For example: an asset is scheduled for replacement in 2016 which means the asset has passed its theoretical service life and will be recorded as a deficit. If that assets service life is extended, the asset is now scheduled in a future year as an asset replacement and not a deficit.

## 3.3. AVERAGE ANNUAL LIFE CYCLE INVESTMENT (AALCI)

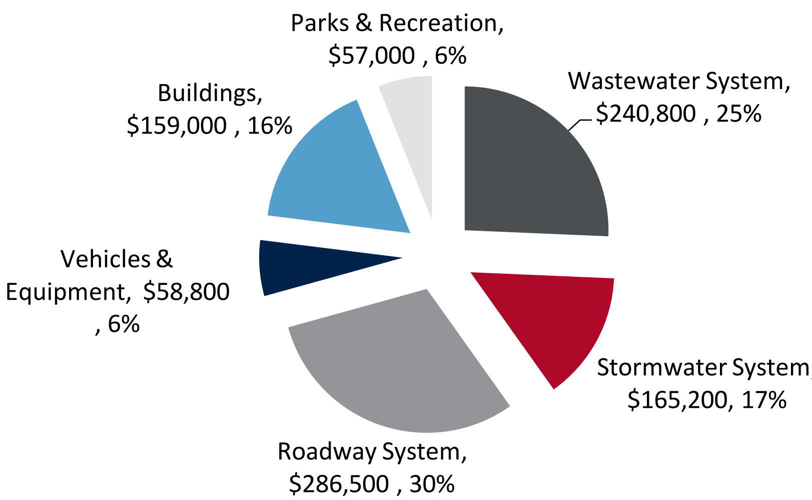
The Average Annual Life Cycle Investment (AALCI) is defined as the summation of each asset's annual depreciation which is based on the assets replacement cost and service life.

$$\sum \frac{\textbf{Replacement Cost}}{\textbf{Service Life}}$$

The AALCI (**$967,300**) is the ideal (**maximum**) funding level for sustaining existing infrastructure over the life cycle of the assets and should be a long term target for the community. When planned for appropriately, the AALCI can be used in ensuring long term revenue stability, preventing unnecessary risk, and enabling a community to apply one-time funding to support new asset/capital needs as opposed to addressing emergency situations.

Ideally Fruitvale should endeavor to budget for this amount each year, and what is not spent goes into infrastructure reserve accounts for future renewal. **Figure 4.3** illustrates the value and percent breakdown of Fruitvale's AALCI distribution based on the conservative estimate of service life scenario.

***Figure 3.3: AALCI Value Distribution***



# 4.0 STATE OF FRUITVALE'S INFRASTRUCTURE

This section details the AMIP findings by each of the Fruitvale's six (6) asset categories (level 2) for the conservative service life estimate scenario.

## 4.1. WASTEWATER SYSTEM

The wastewater system has a total replacement value of approximately $15 million with 18km of mains. It has an expected remaining life of 38%, meaning that the overall condition of the wastewater system is fair to poor. The current backlog is $2.1 million (see **Table 5.1**). The majority of this backlog is attributable to the dates in the data for the Village's manhole and pipe asset data.

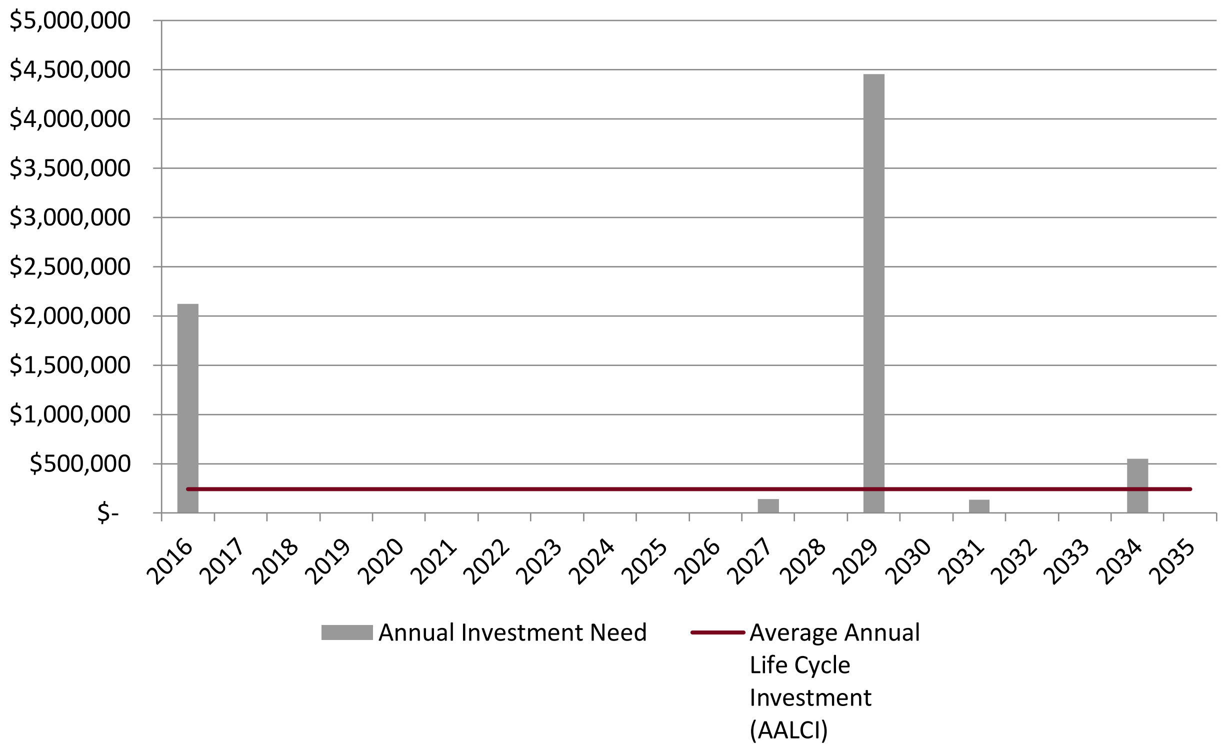
*Table 4.1: Wastewater System Details*

| ***Asset Category*** | **Replacement Value** | **Expected Remaining Life** | **Infrastructure Deficit (Backlog)** | **20 Year Total** | **Average Annual Life Cycle Investment (AALCI)** |
|---|---|---|---|---|---|
| *Gravity Pipe* | $10,459,400 | 40% | $14,000 | $4,783,800 | $147,000 |
| *Forcemains* | $252,000 | 29% | $0 | $0 | $4,200 |
| *Appurtenances* | $2,150,400 | 3% | $1,873,200 | $2,150,400 | $43,400 |
| *Lift Stations* | $471,800 | 13% | $236,600 | $471,800 | $14,000 |
| *Treatment* | $1,696,800 | 82% | $0 | $0 | $32,200 |
| ***Sub-total*** | **$15,030,400** | **38%** | **$2,123,800** | **$7,406,000** | **$240,800** |

The AALCI for the wastewater system is $240,800 and the weighted service life of all wastewater system assets is 62 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $190,400.

The forecasted wastewater system capital renewal schedule for the next 20 years is shown in **Figure 5.1**. There is an investment spike forecasted for 2029 when the majority of the piping assets have passed their design service life.

*Figure 4.1: Forecasted Wastewater 20 Year Funding Needs*




## 4.2. STORMWATER SYSTEM

The stormwater system has a total replacement value of approximately $7.2 million with 7km of mains. It has an expected remaining life of 30%, meaning that the overall condition of the stormwater system is poor. The current backlog is $3.4 million (see **Table 5.2**). The majority of this backlog is attributable to age of the pipe (mains and culverts) assets.

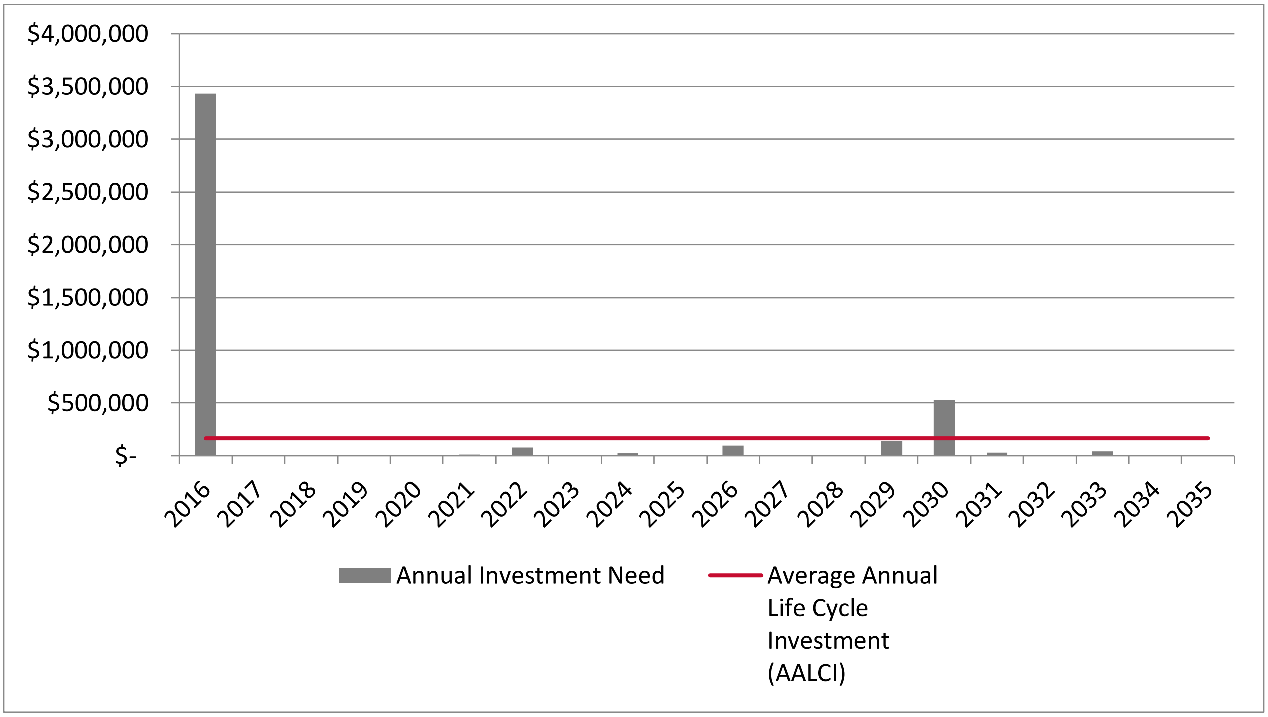
*Table 4.2: Stormwater System Details*

| ***Asset Category*** | **Replacement Value** | **Expected Remaining Life** | **Infrastructure Deficit (Backlog)** | **20 Year Total** | **Average Annual Life Cycle Investment (AALCI)** |
|---|---|---|---|---|---|
| *Gravity Mains* | $4,723,600 | 31% | $2,431,800 | $2,727,200 | $117,600 |
| *Culverts* | $1,244,600 | 9% | $957,600 | $1,073,800 | $35,000 |
| *Manholes* | $529,200 | 20% | $0 | $529,200 | $7,000 |
| *Catchbasins* | $715,400 | 64% | $0 | $0 | $4,200 |
| *Outfalls* | $44,800 | 0% | $44,800 | $44,800 | $1,400 |
| ***Sub-total*** | **$7,257,600** | **30%** | **$3,434,200** | **$4,375,000** | **$165,200** |

The AALCI for the stormwater system is $165,200 and the weighted service life of all stormwater system assets is 44 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $96,600.

The forecasted stormwater system capital renewal schedule for the next 20 years is shown in **Figure 5.2**.

***Figure 4.2: Forecasted Stormwater 20 Year Funding Needs***




## 4.3. TRANSPORTATION SYSTEM

The transportation system has a total replacement value of approximately $9.2 million. It has an expected remaining life of 26%, meaning that the overall condition of the transportation system is in the poor range. The current backlog is $7.6 million (see **Table 5.3**) of transportation assets that are past their design service life and require renewal.

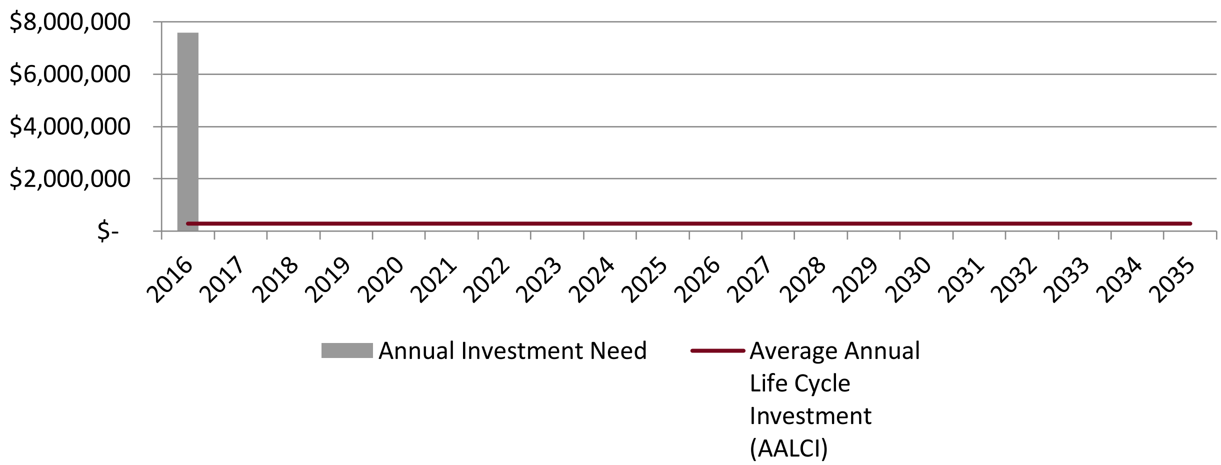
***Table 4.3: Roadway System Details***

| ***Asset Category*** | **Replacement Value** | **Expected Remaining Life** | **Infrastructure Deficit (Backlog)** | **20 Year Total** | **Average Annual Life Cycle Investment (AALCI)** |
|---:|---|---|---|---|---|
| *Roads* | $9,083,809 | 14% | $7,579,949 | $7,579,949 | $283,000 |
| *Bridges* | $161,000 | 30% | $0 | $0 | $2,800 |
| *Signs* | $14,000 | 40% | $0 | $14,000 | $700 |
| ***Sub-total*** | **$9,258,809** | **26%** | **$7,579,949** | **$7,593,949** | **$286,500** |

The AALCI for the transportation system is $286,500 and the weighted service life of the assets is 32 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $191,500.

The forecasted capital renewal schedule for the next 20 years is shown in **Figure 5.3.** The $7.5 million backlog is included as part of the 2016 investment renewal needs.

***Figure 4.3: Forecasted Roadway 20 Year Funding Needs***




The following table summarizes some of the key results by classification for roads from the AMIP.

***Table 4.4: Results by Roadway Classification***

| ***Roadway Class*** | **Length (km)** | **AALCI (Rounded)** | **Infrastructure Deficit (Rounded)** | **Remaining Life** |
|---|---|---|---|---|
| *Collector* | 5.1 | $133,000 | $2,195,000 | 30% |
| *Local* | 11.0 | $135,000 | $5,014,000 | 6% |
| *Lanes* | 2.1 | $15,000 | $371,000 | 0% |
| *Sub-Total* | 18.2 | $283,000 | $7,580,000 | 14% |

Based on the infrastructure deficit value of **~$7M** and a remaining life of <20% for **collector** and **local** roads, these roads are likely in poor or failed condition. We suggest Fruitvale focus its roadway capital re-investment and maintenance efforts into its collector roadways to extend the service life and protect the integrity of the service provided by these important high capacity assets.

## 4.4. VEHICLES AND EQUIPMENT

These assets have a total replacement value of approximately $0.75M. These assets typically have a shorter service life than other assets and only have an expected remaining life of 67%, meaning that the overall condition of the assets is in the fair range. The current backlog is only $63,000 (see **Table 5.4**).

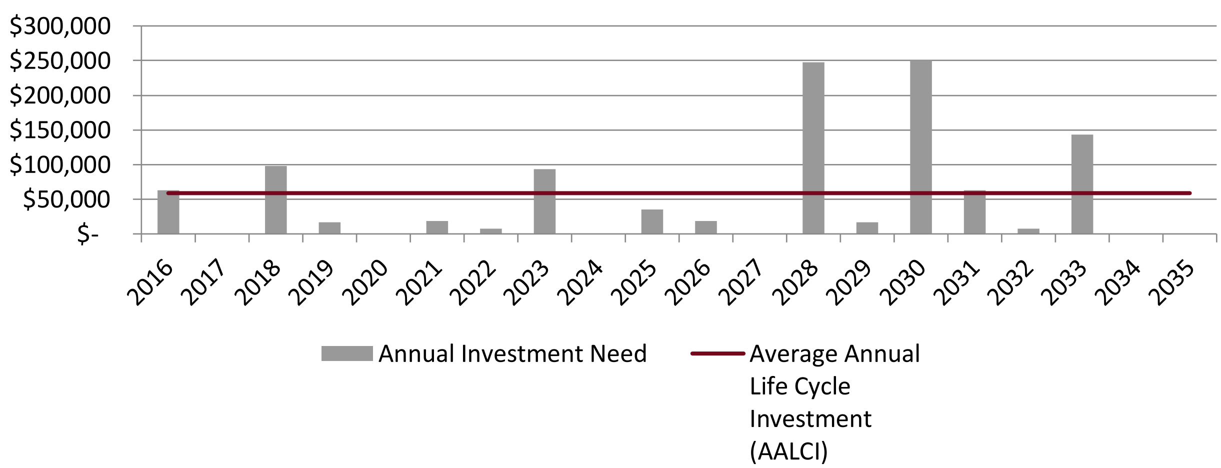
*Table 4.5: Vehicles and Equipment Details*

| *Asset Category* | Replacement Value | Expected Remaining Life | Infrastructure Deficit (Backlog) | 20 Year Total | Average Annual Life Cycle Investment (AALCI) |
|---|---|---|---|---|---|
| *Vehicles* | $123,000 | 54% | $0 | $282,000 | $14,000 |
| *Equipment* | $622,850 | 69% | $63,350 | $797,400 | $44,800 |
| ***Sub-total*** | **$745,850** | **67%** | **$63,350** | **$1,079,400** | **$58,800** |

The AALCI for these assets is $58,800 and the weighted service life of all vehicle and equipment assets is 12 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $44,100.

The forecasted capital renewal schedule for the next 20 years is shown in **Figure 5.4**. The backlog is included as part of the 2016 investment renewal needs.

*Figure 4.4: Forecasted Vehicle and Equipment 20 Year Funding Needs*



## 4.5. BUILDINGS

Fruitvale's buildings have a total replacement value of approximately $7 million. It has an expected remaining life of 38%, meaning that the overall condition of the buildings is in the fair to poor range. There is a current backlog (see **Table 5.5**) of $437,000 based on the age of the buildings.

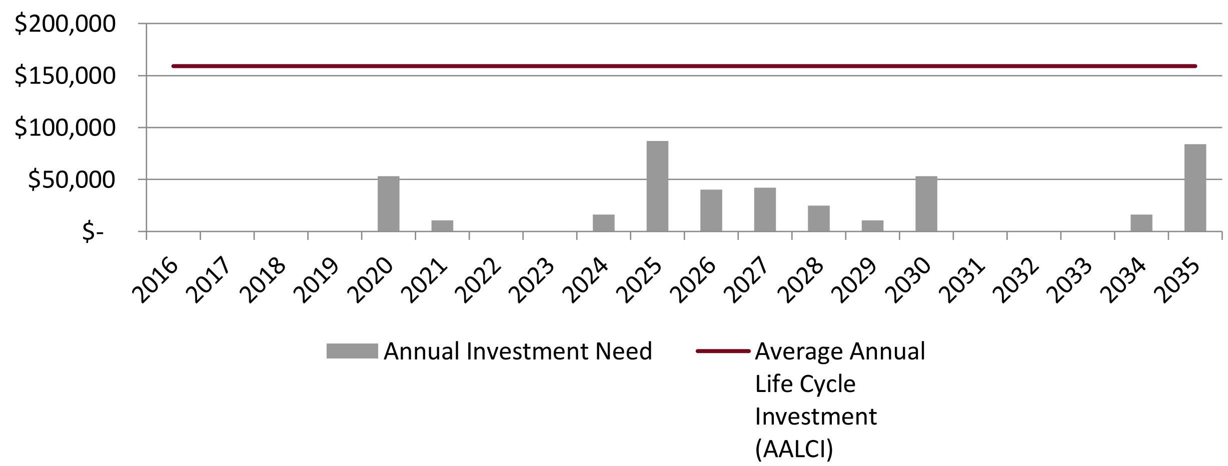
***Table 4.6: Building Details***

| *Asset Category* | Replacement Value | Expected Remaining Life | Infrastructure Deficit (Backlog) | 20 Year Total | Average Annual Life Cycle Investment (AALCI) |
|---|---|---|---|---|---|
| *Recreational* | $5,431,000 | 58% | $0 | $373,000 | $124,000 |
| *Administrative* | $758,000 | 50% | $0 | $46,000 | $17,000 |
| *Public Works* | $880,000 | 57% | $0 | $18,000 | $18,000 |
| ***Sub-total*** | **$7,069,000** | **57%** | **$0** | **$437,000** | **$159,000** |

The AALCI for the buildings is $159,000 and the weighted service life of all buildings is 44 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $119,250.

The forecasted building capital renewal schedule for the next 20 years is shown in **Figure 5.5**. There are investment spikes forecasted for 2020, 2025, 2030, and 2035 when some of the short lived assets (i.e. building components) for the recreational buildings will have past their design service live. In order to improve the accuracy of this information, a building condition assessment and energy audit should be completed in the future.

***Figure 4.5: Forecasted Buildings 20 Year Funding Needs***



## 4.6. PARKS

Fruitvale's parks (land improvements only) have a total replacement value of approximately $1.5 million. It has an expected remaining life of 38%, meaning that the overall condition of the parks is in the fair to poor range. There is a current backlog (see **Table 5.6**) based on the estimated age of the park improvements. A placeholder for natural assets has been included in this asset category. Natural assets are discussed further in Section 6.

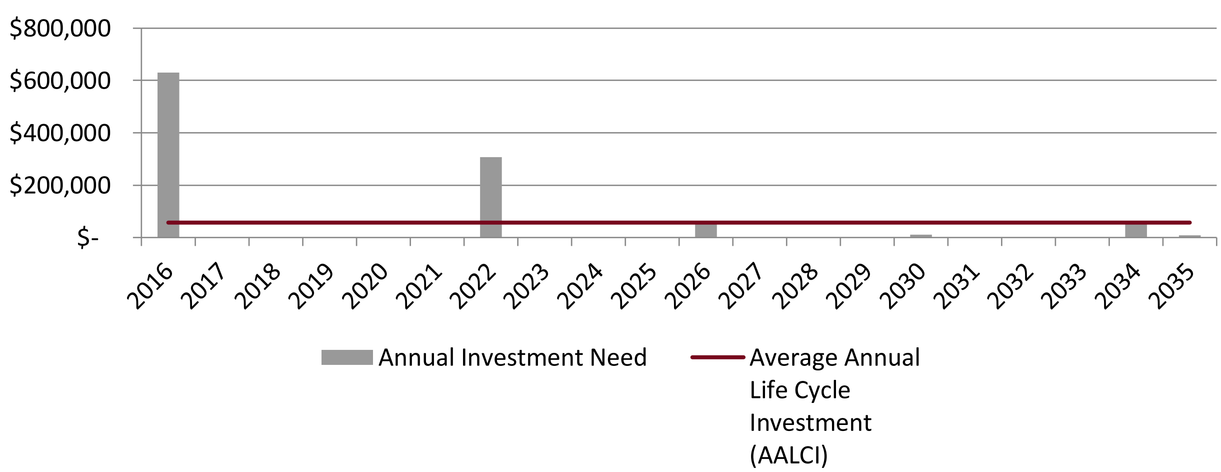
***Table 4.7: Parks Details***

| *Asset Category* | Replacement Value | Expected Remaining Life | Infrastructure Deficit (Backlog) | 20 Year Total | Average Annual Life Cycle Investment (AALCI) |
|---|---|---|---|---|---|
| *Land Improvements* | $1,523,000 | 38% | $630,000 | $1,078,000 | $57,000 |
| *Natural Assets* | $0 | 0% | $0 | $0 | $0 |
| ***Sub-total*** | **$1,523,000** | **38%** | **$630,000** | **$1,078,000** | **$57,000** |

The AALCI for the parks assets is $57,000 and the weighted service life of the assets is 26 years. The AALCI in the optimistic scenario (service life lasts 50% longer than the conservative estimate) is $42,750.

The forecasted parks asset capital renewal schedule for the next 20 years is shown in **Figure 5.6** with several assets exceeding their design service life within the 20 year horizon.

***Figure 4.6: Forecasted Parks 20 Year Funding Needs***



# 5.0 OTHER ASSET MANAGEMENT CONSIDERATIONS

The following sections are included to introduce some additional topics related to asset management implementation to support on-going informed infrastructure decision-making.

## 5.1. DECISION-MAKING THROUGH AN UNDERSTANDING OF SERVICE, RISK, AND COST

Making good decisions requires that the right people have the right information at the right time. Achieving this requires a process of communication and ongoing information management. Asset management is not about having perfect information, but it's about ensuring decisions are informed by the best information available, and then working to improve information where appropriate.

The collection and use of information about services, risk, and cost can be integrated into Fruitvale's existing budget processes based on the **Figure 6.1**.

Often, the best way of implementing asset management is not through building new and complicated processes or purchasing software – it is through making incremental improvements to your current processes. The collection and use of information about services, risk, and cost can be integrated into the existing budget processes.

***Figure 5.1: Typical Budget Process***


### Software & Asset Management

Software systems are tools that can support management of information, but they can also cause problems when staff with specialized training are lost, or people who need information cannot access it. Basic asset management in small communities can be conducted with simple spreadsheets and maps. Think you probably need a sofware program to make sense of it all?

Here are some things you should consider before selecting one:

1. Know your information and communication needs clearly first. For example, if you want to be able to access information though GIS but you don't need to edit it regularly, you might be able to make use of an externally hosted service which could save you a lot of money.

2. Identify what existing software programs you have and whether they need to be linked to asset management software.

3. Think about who will have the training to access the system, and what you will do if those people aren't around.

4. Software needs to be maintained over time. Have a plan for who will be responsible for maintaining the system as the program changes.

**What to do:**

- Include considerations of level of service, risk, and cost at each stage of the budget process.
- Service, risk, and cost cannot be fully understood in isolation – the three need to be brought together to understand connections and trade-offs.
- Use best information is available at the time.
- If there are gaps in important information, include actions to fill those data gaps in your budget.

## UNDERSTANDING SERVICE AND RISK

***Level of service** is a measure of the quality, quantity, and/or reliability of a service from the perspective of members, businesses, and customers in the community.* Understanding service means having a clear and consistent understanding of:

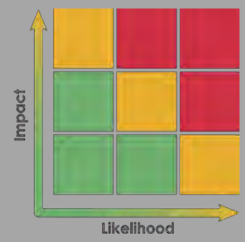
1. The types of services you provide;
2. The groups of residents, businesses, and institutions that you provide them to;
3. The level of service being delivered currently (your performance); and
4. The level of service you're aiming to provide (your target).

Infrastructure is not inherently valuable; it is only as valuable as the service it provides to the community. Rather than jumping straight to pipe breakage rates or pavement quality index, it's important to start with defining the service in terms that residents and businesses would understand – like water service outages, or driving comfort. This helps to ensure the priorities for limited resources are aligned with what the community values.

***Risk(s)*** are events or occurrences that will have undesired impacts on services (Risk = Impact x Likelihood). Some events that impact delivery of services will have a higher probability or greater impact than others – which make them a bigger risk. Often, with the right planning and actions, the likelihood or impact of these events can be reduced. To understand risk, you need to understand:

1. What your risks are and where they are;
2. The impact and likelihood of these risks;
3. What can be done to control or mitigate them and what resources are required; and
4. Whether they are worth mitigating or if they should be tolerated.

Risks are assessed by identifying the impact and the likelihood of the event, and then finding the corresponding level of risk. Doing this for each risk helps you to figure out which are your biggest risks and which risks are not as important to worry about.




## 5.2. INFORMATION AND DATA MANAGEMENT

As circumstances change over time, information needs to be updated or improved. Information updates may be done on an ongoing basis, or may be completed as part of an annual process. Updates should reflect new assets, retired assets, refurbished or replaced assets, replacement cost changes, updates to operating costs to repair and maintain and asset condition information.

Updates may also be made to improve the accuracy of information, such as replacing anecdotal condition information with results from a condition assessment. Collecting more data or more accurate data can be very valuable in decision making, but it can be time consuming and expensive, so it's not worth investing in unless you know it will improve your decision making. When working with vendors or consultants, ask them (at the beginning of the project) to provide you information in a format that makes updating your inventory as easy as possible.

***Figure 5.2: Information Management Process***




URBAN systems

## 5.3. COMMUNICATION AND ENGAGEMENT

Communication is considered to be a set of ongoing activities that are applied within each stage of the asset management process. The purpose of communicating is to ensure that people and departments within an organization are aligned, working towards the same goals, and efficiently implementing asset management by applying the information and outputs in decision-making and programming. Communication and engagement is also important in obtaining support for asset management from Village Council, staff, members, and other ratepayers. Common topics for asset management communication and engagement include:

- The importance of infrastructure in service delivery
- State of assets
- State of finances and funding challenges
- Levels of service
- Service delivery costs and trade-offs
- The organization's approach to asset management
- Staff and community members roles
- The work being done to ensure long-term sustainable service delivery

It is often advisable to develop internal alignment and an understanding of assets, services, and related costs and risks prior to external communication and engagement.

## 5.4. POLICY

Asset management and financial policies assist to align priorities, guide annual decisions which give the community direction on how investments should be made to achieve Fruitvale's annual and long term infrastructure needs and how much of the AALCI should be budgeted. In particular, policies can guide infrastructure investments and revenue generation with regards to reserves, debt, grants, asset renewal, growth and capital priorities. This will help Fruitvale work towards their stretch target of funding the AALCI.

## 5.5. NATURAL ASSETS

There is a growing recognition of the pivotal role that all natural areas play in providing services to communities. Natural Capital Assets are defined as the natural assets which provide a value and service to the community over time and are essential to the delivery of services. Fruitvale has already recognized the importance as noted in the Village's community vision.

> *"The Village of Fruitvale will be a visually appealing, well-designed, warm-hearted, family-oriented community where residents of all ages can feel safe, and where lifestyle is enriched by common access to cultural, recreational and life services. Fruitvale recognizes that natural resources are finite, and will strive to develop the community in a sustainable and responsible manner."*
>
> \- *Village of Fruitvale, Official Community Plan, 2011*



URBAN systems

Examples of natural assets would include Beaver Creek for receiving stormwater run-off and the Fruitvale and Kelly Creeks which provide the supply of source water for Fruitvale’s drinking water system (owned by RDKB).

It will be important for Fruitvale to identify and quantify the economic benefits of protecting its natural assets and understand the costs associated with replicating these natural functions in response to the loss or destruction of any components of these ‘eco-assets’. Natural capital assets do not have a market value so assessing their importance and assigning an economic value will aid in raising awareness of their importance to the community. The substitutes for natural capital can be much more expensive to duplicate and operate than those provided by nature. Also, there are many services only nature can provide.

We suggest that Fruitvale identify all of its significant natural capital assets and the value of they provide. This value could be considered in future infrastructure decision-making, planning and **budgeting for the protection** of these assets.

# 6.0 RECOMMENDED NEXT STEPS

Based on the results of the AMIP, the previously completed assessment of current practices, and the process outlined in the *Asset Management for Sustainable Service Delivery, A BC Framework*, the following section outlines a matrix with a list of possible next steps (tools) and priorities for consideration to achieve an advanced level of practicing asset management.

The steps outlined below are organized deliberately in order to promote successful implementation and improve understanding in the three pillars that inform infrastructure decisions – Cost, Risk and Service.

***Table 6.1: Key Next Steps***

| *Number* | Priority Name | BC Asset Management Framework Process | Description |
|---|---|---|---|
| *1* | Cross-Functional Team | People | Create a collaborative cross functional team made up of core departmental representatives to support and mentor on infrastructure decision-making and budgeting within the Fruitvale and their respective departments. The team should consider taking external training opportunities where possible. |
| *2* | Centralized asset database (underway) | Information | Create a centralized database for all assets that includes all existing spatial and attribute data from each department. Initially focus on the linear assets- wastewater, drainage and roads. Integrate web services when ready. |
| *3* | Risk and Level of Service based Assessments (underway) | Plan | Based on the AMIP, the creation of a risk-based decision support tool that incorporates technical level of service to create a prioritized capital plan that embraces a triple bottom line approach to set levels of service, performance and addresses all legislation/regulations, aging infrastructure (condition and capacity priorities), consider climate change and future growth. |
| *4* | Capital Prioritization Framework (underway) | Plan | Develop a set of weighted criteria to evaluate and rank capital projects in order to prioritize infrastructure investments. These criteria would be utilized to make incremental changes to your existing budgeting process. As a result, investment decisions will be defensible, easy to understand, transparent, effective and efficient. |

| Number | Priority Name | BC Asset Management Framework Process | Description |
|---|---|---|---|
| 5 | Asset Management/ Financial Policy(s) | Plan | Develop an asset management policy that encompasses procedures for data handling/tracking/updating and sharing, project prioritization, risk, and infrastructure investment decisions.<br>The policy could also include principles and policy statements on how infrastructure investment will be funded whether it's through building reserves, debt or taxes, levies, user fees. etc. |
| 6 | Setting Annual Infrastructure Investment Levels | Plan | Consider the results of the AMIP and policy discussions to determine the affordable annual contribution to infrastructure investment (likely somewhere between the current amortization and the AALCI amount ~$1 M). |
| 7 | Building Assessments | Information | In order to improve your understanding of the costs and risks associated with buildings, undertake an energy audit and condition assessments for community owned buildings. |
| 8 | Maintenance Management Plans | Implement Asset Management Practices | The importance of maintenance in extending service lives of assets and deferring their inevitable replacement (reducing the annual capital investment) is paramount to provide acceptable levels of service with fewer financial resources. Develop plans (including work orders, standard operating procedures, etc) for the O&M of assets to optimize/extend asset service lives. |
| 9 | Communications/Engagement | Core Element | Develop asset management/infrastructure communications with staff and Council and the public (e.g. benefits, requirements, products, progress). Community buy-in will be essential for setting levels of service and achieving financial sustainability/full cost recovery for service delivery. |

| *Number* | Priority Name | BC Asset Management Framework Process | Description |
|---|---|---|---|
| *10* | Performance Measures | Measure and Report | Develop performance metrics to measure and report out on the service delivery/asset management status to both Council and the community. These would include a set of both “leading” and “lagging” indicators that evaluate the sustainability of services (E.g. number of m of pipe replaced, number of $m^2$ of pavement replaced or avoided etc.) |
| *11* | Refine Asset Inventory | Information | Continually update and refine your infrastructure data over time with new spatial and attribute data to improve accuracy as it becomes available through field activities. Consider completing an inventory and valuation of your natural Assets. |

# APPENDIX A

## AMIP Level 1

**Village of Fruitvale**

**Asset Management Investment Plan**

**Level 1 - Summary** (Conservative Service Life Scenario)

| Physical Details | | | | | | Forecasted Funding Needs and Timing | | | | | | | | | | | | | | | | | | | | Budget Requirements | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asset Category | Replacement Value | Loss in Value | Remaining Value | Expected Remaining Life | Infrastructure Deficit (Backlog) | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 20 Year Total | Average Annual Life Cycle Investment (AALCI) |
| **Wastewater System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gravity Pipe | $ 10,459,400 | $ 6,307,000 | $ 4,152,400 | 40% | $ 14,000 | $ 14,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4,221,000 | $ - | $ - | $ - | $ - | $ 547,400 | $ - | $ 4,783,800 | $ 147,000 |
| Forcemains | $ 252,000 | $ 179,200 | $ 72,800 | 29% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4,200 |
| Appurtenances | $ 2,150,400 | $ 2,079,000 | $ 71,400 | 3% | $ 1,873,200 | $ 1,873,200 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 142,800 | $ - | $ - | $ - | $ 134,400 | $ - | $ - | $ - | $ - | $ 2,150,400 | $ 43,400 |
| Lift Stations/Siphons | $ 471,800 | $ 410,200 | $ 61,600 | 13% | $ 236,600 | $ 236,600 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 236,600 | $ - | $ - | $ - | $ - | $ - | $ - | $ 471,800 | $ 14,000 |
| Treatment | $ 1,696,800 | $ 308,000 | $ 1,388,800 | 82% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 32,200 |
| **Sub-total** | **$ 15,030,400** | **$ 9,283,400** | **$ 5,747,000** | **38%** | **$ 2,123,800** | **$ 2,123,800** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 142,800** | **$ -** | **$ 4,457,600** | **$ -** | **$ 134,400** | **$ -** | **$ -** | **$ 547,400** | **$ -** | **$ 7,406,000** | **$ 240,800** |
| **Stormwater System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gravity Mains | $ 4,723,600 | $ 3,239,600 | $ 1,484,000 | 31% | $ 2,431,800 | $ 2,431,800 | $ - | $ - | $ - | $ - | $ 11,200 | $ 75,600 | $ - | $ 25,200 | $ - | $ 96,600 | $ - | $ - | $ 19,600 | $ - | $ 26,600 | $ - | $ 42,000 | $ - | $ - | $ 2,727,200 | $ 117,600 |
| Culverts | $ 1,244,600 | $ 1,128,400 | $ 116,200 | 9% | $ 957,600 | $ 957,600 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 116,200 | $ - | $ - | $ - | $ - | $ - | $ - | $ 1,073,800 | $ 35,000 |
| Manholes | $ 529,200 | $ 424,200 | $ 105,000 | 20% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 529,200 | $ - | $ - | $ - | $ - | $ - | $ 529,200 | $ 7,000 |
| Catchbasins | $ 715,400 | $ 257,600 | $ 457,800 | 64% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4,200 |
| Outfalls | $ 44,800 | $ 44,800 | $ - | 0% | $ 44,800 | $ 44,800 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 44,800 | $ 1,400 |
| **Sub-total** | **$ 7,257,600** | **$ 5,094,600** | **$ 2,163,000** | **30%** | **$ 3,434,200** | **$ 3,434,200** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 11,200** | **$ 75,600** | **$ -** | **$ 25,200** | **$ -** | **$ 96,600** | **$ -** | **$ -** | **$ 135,800** | **$ 529,200** | **$ 26,600** | **$ -** | **$ 42,000** | **$ -** | **$ -** | **$ 4,375,000** | **$ 165,200** |
| **Roadway System** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roads | $ 9,083,809 | $ 7,767,088 | $ 1,316,721 | 14% | $ 7,579,949 | $ 7,579,949 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 7,579,949 | $ 283,000 |
| Bridges | $ 161,000 | $ 113,400 | $ 47,600 | 30% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2,800 |
| Signs | $ 14,000 | $ 9,800 | $ 5,600 | 40% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 14,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ 14,000 | $ 700 |
| **Sub-total** | **$ 9,258,809** | **$ 7,890,288** | **$ 1,369,921** | **30%** | **$ 7,579,949** | **$ 7,579,949** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 14,000** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 7,593,949** | **$ 286,500** |
| **Vehicles & Equipment** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicles | $ 123,000 | $ 57,000 | $ 66,000 | 54% | $ - | $ - | $ - | $ 48,000 | $ - | $ - | $ - | $ - | $ 93,000 | $ - | $ - | $ - | $ - | $ 48,000 | $ - | $ - | $ - | $ - | $ 93,000 | $ - | $ - | $ 282,000 | $ 14,000 |
| Equipment | $ 622,850 | $ 192,250 | $ 430,600 | 69% | $ 63,350 | $ 63,350 | $ - | $ 50,000 | $ 17,000 | $ - | $ 18,350 | $ 7,500 | $ - | $ - | $ 35,000 | $ 18,350 | $ - | $ 200,000 | $ 17,000 | $ 250,000 | $ 63,350 | $ 7,500 | $ 50,000 | $ - | $ - | $ 797,400 | $ 44,800 |
| **Sub-total** | **$ 745,850** | **$ 249,250** | **$ 496,600** | **67%** | **$ 63,350** | **$ 63,350** | **$ -** | **$ 98,000** | **$ 17,000** | **$ -** | **$ 18,350** | **$ 7,500** | **$ 93,000** | **$ -** | **$ 35,000** | **$ 18,350** | **$ -** | **$ 248,000** | **$ 17,000** | **$ 250,000** | **$ 63,350** | **$ 7,500** | **$ 143,000** | **$ -** | **$ -** | **$ 1,079,400** | **$ 58,800** |
| **Buildings** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Recreational | $ 5,431,000 | $ 2,286,000 | $ 3,145,000 | 58% | $ - | $ - | $ - | $ - | $ - | $ 53,000 | $ 11,000 | $ - | $ - | $ 16,000 | $ 55,000 | $ 40,000 | $ 10,000 | $ 25,000 | $ 11,000 | $ 53,000 | $ - | $ - | $ - | $ 16,000 | $ 84,000 | $ 373,000 | $ 124,000 |
| Administrative | $ 758,000 | $ 377,000 | $ 381,000 | 50% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 32,000 | $ - | $ 14,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 46,000 | $ 17,000 |
| Public Works | $ 880,000 | $ 377,000 | $ 503,000 | 57% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 18,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 18,000 | $ 18,000 |
| **Sub-total** | **$ 7,069,000** | **$ 3,040,000** | **$ 4,029,000** | **57%** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 53,000** | **$ 11,000** | **$ -** | **$ -** | **$ 16,000** | **$ 87,000** | **$ 40,000** | **$ 42,000** | **$ 25,000** | **$ 11,000** | **$ 53,000** | **$ -** | **$ -** | **$ -** | **$ 16,000** | **$ 84,000** | **$ 437,000** | **$ 159,000** |
| **Parks & Recreation** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Land Improvements | $ 1,523,000 | $ 950,000 | $ 573,000 | 38% | $ 630,000 | $ 630,000 | $ - | $ - | $ - | $ - | $ - | $ 308,000 | $ - | $ - | $ - | $ 63,000 | $ - | $ - | $ - | $ 12,000 | $ - | $ - | $ - | $ 56,000 | $ 9,000 | $ 1,078,000 | $ 57,000 |
| Natural Assets | $ - | $ - | $ - | 0% | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| **Sub-total** | **$ 1,523,000** | **$ 950,000** | **$ 573,000** | **38%** | **$ 630,000** | **$ 630,000** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 308,000** | **$ -** | **$ -** | **$ -** | **$ 63,000** | **$ -** | **$ -** | **$ -** | **$ 12,000** | **$ -** | **$ -** | **$ -** | **$ 56,000** | **$ 9,000** | **$ 1,078,000** | **$ 57,000** |
| **Total Infrastructure** | **$ 40,884,659** | **$ 26,507,538** | **$ 14,378,521** | **35%** | **$ 13,831,299** | **$ 13,831,299** | **$ -** | **$ 98,000** | **$ 17,000** | **$ 53,000** | **$ 40,550** | **$ 391,100** | **$ 93,000** | **$ 41,200** | **$ 122,000** | **$ 217,950** | **$ 184,800** | **$ 273,000** | **$ 4,635,400** | **$ 844,200** | **$ 224,350** | **$ 7,500** | **$ 185,000** | **$ 619,400** | **$ 93,000** | **$ 21,969,349** | **$ 967,300** |

# APPENDIX B

## Inputs

## Village of Fruitvale
## Asset Management Investment Plan

**Input Tables - Generic**

| Current Year: | 2016 |
|---|---|

*Enter*

| Asset Category | Contingency |
|---|---|
| Water System | 40% |
| Wastewater System | 40% |
| Stormwater System | 40% |
| Roadway System | 40% |
| Buildings and Facilities | 25% |
| Parks and Playgrounds | 15% |
| Other 2 | |

*Enter*

## Village of Fruitvale
## Asset Management Investment Plan

### Input Tables - Roads

| From Roads Assessment | | | | | |
|---|---|---|---|---|---|
| | **Reconstruct** | **Mill 50** | **Overlay 50** | **Reclaim** | **Maintenance** |
| **Local** | $50 | $35 | $45 | $55 | $0 |
| **Collector** | $60 | $35 | $45 | $55 | $0 |
| **Arterial** | $70 | $35 | $45 | $55 | $0 |
| **Strata** | $50 | $35 | $45 | $55 | $0 |
| **Lane** | $30 | $35 | $45 | $55 | $0 |

| Service Life | |
|---|---|
| **Local** | 40 |
| **Collector** | 25 |
| **Arterial** | 20 |
| **Strata** | 25 |
| **Lane** | 25 |

Village of Fruitvale

Asset Management Investment Plan

## Input Tables - Wastewater

| Cost category | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pipe | $ 150.00 | $ 150.00 | $ 200.00 | $ 250.00 | $ 300.00 | $ 350.00 | $ 400.00 | $ 450.00 |
| Appurtenances | $ 15.00 | $ 15.00 | $ 20.00 | $ 25.00 | $ 30.00 | $ 35.00 | $ 40.00 | $ 45.00 |
| Road Restoration | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 |
| Mob/De-Mob/Bonding/Ins. | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% |

| Code | Material | Service Life | TCA Useful Life | 50 | 75 | 100 | 150 | 200 | 250 | 300 | 350 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AC | Asbestos Cement[2] | 70 | 70 | $265 | $265 | $320 | $375 | $430 | $485 | $540 | $595 |
| CI | Cast Iron | 70 | 70 | | | | | | | | |
| STEEL | Steel Pipe | 70 | 70 | | | | | | | | |
| CONC | Concrete | 70 | 70 | | | | | | | | |
| HDPE | High Density Polyethylene | 80 | 80 | | | | | | | | |
| PVC | Polyvinyl Chloride | 80 | 80 | | | | | | | | |
| CIPP | Cured in Place | 50 | 50 | | | | | | | | |
| | | 70 | 70 | | | | | | | | |

***Note 1:*** *Includes fittings, services, road restoration, and contingency*

***Note 2:*** *All pipe will be replaced with PVC once service life has been reached*

| Code | Material | Service Life | TCA Useful Life | Cost | Units |
|---|---|---|---|---|---|
| Flow Meter | | | | | Each |
| Lift Station | | 25 | 25 | $ 250,000 | Each |
| Manhole | | 50 | 50 | $ 6,000 | Each |
| Cleanout | | 50 | 50 | $ 4,000 | Each |
| Treatment | | 50 | 40 | | Each |

Village of Fruitvale
Asset Management Investment Plan
**Input Tables - Stormwater**

| Cost category | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe - PVC | $ 165.00 | $ 175.00 | $ 190.00 | $ 200.00 | $ 240.00 | $ 260.00 | $ 280.00 | $ 325.00 | $ 325.00 | $ 400.00 | $ 500.00 |
| Road Restoration | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 | $ 100.00 |
| Mob/De-Mob/Bonding/Ins. | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% | 13.0% |

| | | | | Cost per Linear Metre of Pipe by D | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Code** | **Material** | **Service Life** | **TCA Useful Life** | **100** | **150** | **200** | **250** | **300** | **350** | **375** | **400** | **450** | **530** | **600** |
| AC | Asbestos Cement[2] | 70 | 70 | $299 | $311 | $328 | $339 | $384 | $407 | $429 | $480 | $480 | $565 | $678 |
| CON | Concrete | 70 | 70 | | | | | | | | | | | |
| CI | Cast Iron | 70 | 70 | | | | | | | | | | | |
| CSP | Corrugated Steell Pipe | 30 | 30 | | | | | | | | | | | |
| HDPE | High Density Polyethylene | 80 | 80 | | | | | | | | | | | |
| PERF | Perforated Drain | 60 | 60 | | | | | | | | | | | |
| PERFPVC | Perforated PVC | 50 | 50 | | | | | | | | | | | |
| PVC | Polyvinyl Chloride | 80 | 80 | | | | | | | | | | | |
| PWT | Perforated Weeping Tile | 60 | 60 | | | | | | | | | | | |
| RCP | Reinforced Concrete | 70 | 70 | | | | | | | | | | | |
| ST | Steel | 70 | 70 | | | | | | | | | | | |
| UNK | Reinforced Steel Pipe | 70 | 70 | | | | | | | | | | | |

***Note 1:*** *Includes fittings, services, road restoration, and contingency*

***Note 2:*** *All pipe below 900mm will be replaced with PVC once service life has been reached; 600mm and above will be replaced with concrete*

| **Code** | **Material** | **Service Life** | **TCA Useful Life** | **Cost** | **Units** |
|---|---|---|---|---|---|
| Catchbasin | | 80 | 80 | $ 3,500 | Each |
| Ditch | Grass | 80 | 80 | $ 150 | lm |
| Ditch | Concrete | 80 | 80 | $ 279 | lm |
| Lift Station | | | | | Each |
| Manhole | | 50 | 50 | $ 6,000 | Each |
| Pipes | | Per Above | Per Above | | |
| Ponds | | 76 | 76 | | Each |

# APPENDIX C

## Summary Maps of Key Asset Assumptions