

2023 Business Plan ENGINEERING & PUBLIC WORKS Engineering

DEPARTMENT OVERVIEW

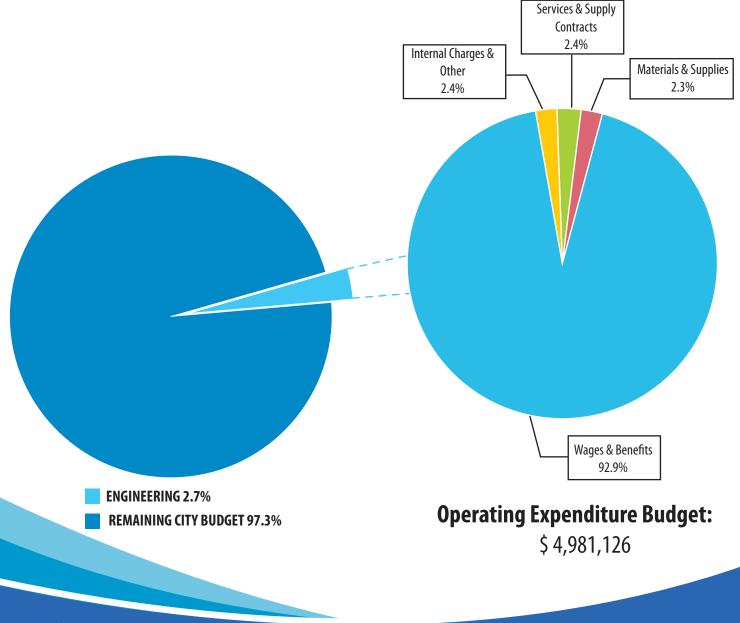
The Engineering Department plans and implements the City's capital works, designs, and constructs City infrastructure residents rely on daily, including: transportation, water distribution, sanitary sewer, drainage, and facilities. A substantial aspect of the work in Engineering is project management, which often includes projects for other departments.

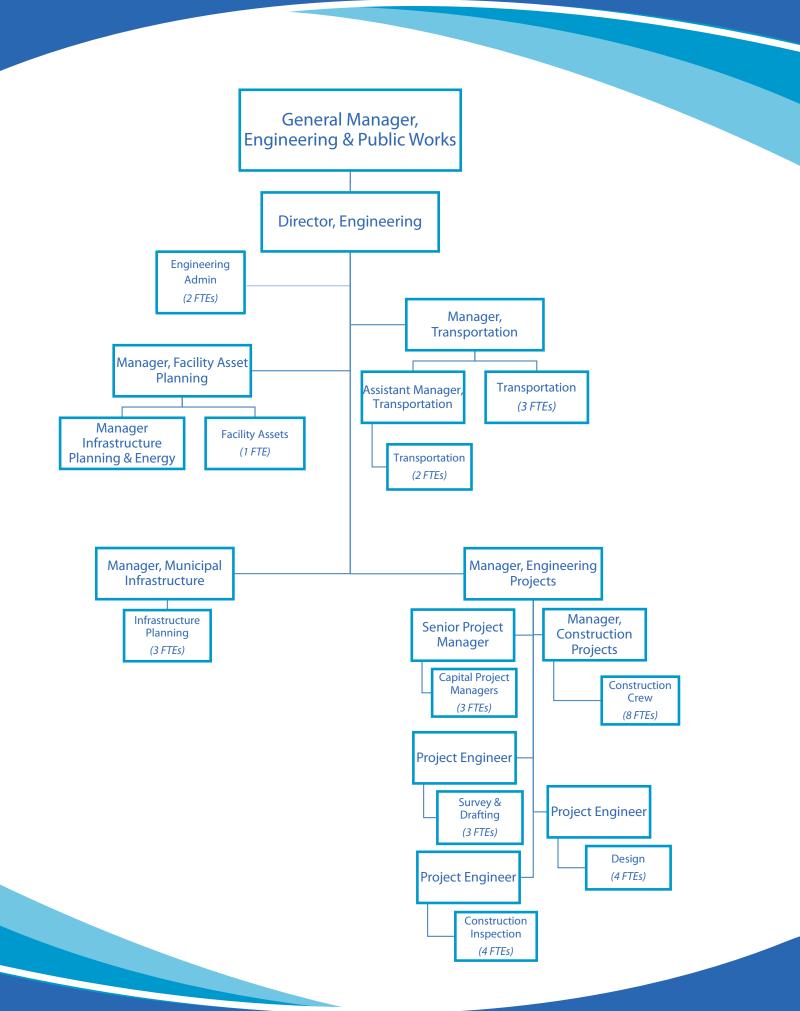
The work of the department focuses on stewarding the condition of public infrastructure, and development of new infrastructure in support of City Plan.

The Engineering Department is currently composed of five primary groups:

- Administration
- Transportation
- Infrastructure Planning
- Capital Projects
- Facilities Asset Management

DEPARTMENT'S SHARE OF THE BUDGET





ADMINISTRATION

The Administration of Engineering provides essential support to the department. These are front-line staff that interact with the public, provide financial and clerical support, records management, organization, and ensure that other staff have the day-to-day resources they need.

Administrative services for the Engineering Department is provided by 2 staff members located at the Service and Resource Centre (SARC).

Background and Level of Service:

- A front counter is available for the public to access and reach staff in Engineering during normal working hours.
- Permit processing and approvals including trucking, film, street use, third-party utility construction, etc.
- Clerical support for Council and Committee reports.
- Records management for the department is maintained.
- Assistance for financial transactions and processing of invoices.

• Administration for Engineering is primarily internally focused and supports matters relating to infrastructure planning, technical and project standards, capital project design, and construction.

2022 ACHIEVEMENTS

- Over 300 permits processed in 2022.
- Brought a co-op student on board for four months of the year.

2023 CONSIDERATIONS AND OPPORTUNITIES

The public-facing level of service in this area is high. Each resident who calls is able to speak with a member of the Admin team. Residents are accustomed to this service. It is increasingly rare in cities of this size. Many cities have opted to move to an automated answering service. In 2023, staff will continue with this level of service; however, use the voicemail box to provide information during periods of high call volumes.



TRANSPORTATION

As Nanaimo looks to the future, City Plan guides our growth and development with green, healthy, and connected policies. Transportation plays a role in each of these, supporting the safe, equitable, and sustainable movement of people and the goods they need, across our community and region. In collaboration with internal and external stakeholders, Transportation works to ensure fair and equitable use of public space and investment in new infrastructure, while diligently maintaining and optimizing the existing assets. City Plan incorporates mobility and transportation for all users.

In 2022, there were:

- 540 km of roads, 450 km of sidewalks, and 119 km of bicycle lanes/cycle tracks,
- 53 signalized intersections, 4 roundabouts, and 26,107 traffic signs,
- 1,576 pay parking spaces (285 on-street and 1291 off-street),
- 18 bridges and 28 railroad crossings,
- 4,639 City owned streetlights and 4,286 lights leased from BC Hydro,
- 1,399 marked crosswalks and 66 pedestrian activated crosswalk-warning beacons, and
- 12 transit shelters.

Background and Level of Service:

- Safe, equitable, sustainable, and accessible mobility choices are key priorities to create a well linked multi-modal transportation system in Nanaimo. City Plan affirmed these priorities with residents supporting:
 - Complete communities that aim to meet the basic needs of all residents within easy access to reduce our dependence on personal vehicles.

- "Complete Streets" that safely accommodate all people and modes of travel in an attractive and comfortable setting.
- Investment in maximizing safe, healthy, and equitable mobility for all people and goods within the City.
- The use of socioeconomic factors when planning and prioritizing new infrastructure or services.
- Data driven, fact based, and informed decision making is the foundation of Transportation's stewardship of municipal funds. "Smart City" principles improve our asset management and travel demand models make better decisions on future investments that improve quality of life for residents.
- Recent world events have highlighted the need and benefit to provide people with safe, inclusive, and accessible places to meet and connect. Spanning almost 550 km, Nanaimo's streets and road right-ofways are one of the largest public areas to provide this amenity to residents. Community events such as street markets, parades, festivals, and outdoor patios are just a few examples of important points of connection within the City's transportation network that continue to be supported by Transportation.
- In addition to the hard infrastructure the City plans and maintains, Transportation also provides support for strategic initiatives that promote, educate, empower, and encourage our residents to move and connect throughout our City. These include: Go By Bike, the Commuter Challenge, electric vehicle and car share advocacy, and Active School Travel planning.



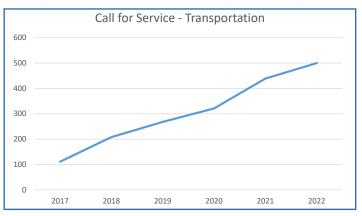
2022 ACHIEVEMENTS

- Renewed over 35,000m² of asphalt road surface.
- Major corridor upgrades:
 - Metral Drive Turner to Aulds
 - Fourth Street Harewood Mines to Pine
- Added 5.4 km of cycling facilities.
- · Added 2.6 km of sidewalks.
- As a partner to the Regional District of Nanaimo (RDN), the City contributed to the successful completion of the Transit Redevelopment Strategy. This plan outlines a 5 year strategy to increase transit service by 50%. This work affirmed the Rapid and Frequent routes tied to densification of land use reflected in City Plan. In concurrence with Relmagine/City Plan, this process also highlighted and addressed a discrepancy in service across socio-economical demographics.
- In collaboration with the RDN, Transportation and Parks staff initiated a pilot program to offer a transit shuttle and bike valet service to special events within the City. This program aspired to reduce barriers to those wanting to attend events, but not have to rely on a personal vehicle.
- City and School District staff continued collaborative efforts to support safe and healthy travel to and from school by undertaking an Active School Travel project at Uplands Elementary and a review and update of the City's School Zone policy. Dynamic speed limit signs have also been installed at Cilaire Elementary to enhance driver compliance during school hours.
- Building on the successful creation of the web based traffic data analysis platform, a tool has been created to quickly and efficiently identify high collision locations across the City. This will enable staff to more effectively plan projects and respond to the community.

- Utilizing the recently created pedestrian prioritization tool uses common safety and demand metrics and includes socio-economic factors, \$1 million in mobility improvements were moved forward. This includes:
 - Pedestrian connections on the Trans Canada Highway between Cranberry Avenue and 12th Street, and on Departure Bay Road between Highway 19A and Highland Boulevard.
 - Crosswalk improvements at:
 - Departure Bay Road at Barons Road,
 - · Fitzwilliam Street at Selby Street,
 - · Applecross Road at Calinda Street,
 - Franklyn Street at Selby Street, and
 - Townsite Road at Holly Avenue.
- A Traffic Impact Assessment Guideline for development projects has been created that reflects the goals and visions within City Plan and provides applicants with clear and predictable expectations.
- Land Development has continued at a fast pace with many projects being complex and challenging to integrate into the existing system. Engineering and Planning staff continue to support each other to successfully approve close to 200 applications.
 - Significant ongoing applications include:
 - Sandstone,
 - Green Thumb, and
 - One Terminal Avenue.
- The Transportation Group is the initial point of contact for all businesses, residents, and visitors to Nanaimo who have enquiries or concerns with mobility within the City. In 2022 staff received and responded to almost 500 enquiries, with speeding, parking, and intersection/pedestrian safety, being the most common concerns.

- With the adoption of City Plan, Transportation staff will review, update, and create new Policy and Procedure documentation to ensure that future City or Development projects support the Goals and Objectives of the Community. This will be a process that continues to strengthen the interdepartmental and outside agency collaboration, but will be limited by resource availability.
- Monitoring and reviewing is a critical aspect of the implementation phase of City Plan. Transportation already has a robust archive of transportation data but will need to continue to explore new opportunities to more efficiently and holistically track trends in mobility patterns. This process was initiated with the updating of the Traffic Analysis software in 2021, but it is now a matter of consuming and validating new data into the platform. This will take years to build confidence and reliability.
- Current market conditions are having significant impacts on the opportunities to create new infrastructure. Staff will be focusing on program-based Transportation Demand Management Strategies to more effectively use funds to encourage and empower residents to find ways to travel without the use of a personal vehicle. Go By Bike, Event Shuttle/Bike Valet, Active School Travel, U-Pass, Ride Hailing, Car Share, etc are all examples of this.

- Asset Management/Renewal is emerging as one of the most influential decision-making criteria for transportation infrastructure. Many roads and traffic control devices are approaching end of life and are at risk of failure which could disrupt service. The City has planned for replacement, but rising costs are creating competition between maintaining existing and building new. It is unlikely that this situation is going to diminish, so staff are focusing heavily on taking opportunities to add walking, cycling, or transit facilities as part of renewal projects.
- Community awareness and concerns for transportation are steadily rising. Speeding, parking and pedestrian mobility are the most common concerns raised to staff. Staff are also observing a growing expectation for public consultation associated with potential changes to the transportation system. This rising expectation for levels of service are significantly impacting staff ability to process and address safety or mobility issues.





City Plan

Initiative	Connected Goal							
Begin updating Policy and Procedure Documents to align with City Plan.								
Expand and enhance monitoring processes to track targets and indicators for City Plan.								
Create Vision Zero Toolkit to supports safe and sustainable mobility.								
Creation of End of Trip Active Mobility Strategy (temp~bike valet and permanent~updates to build- ing requirements).								
Update Transportation Development Cost Charge Projects with prioritization aligned to support Goals and Objectives within City Plan.								





City Plan

Initiative	Connected Goal
Utilize program based initiatives to support Active Mobility.	
Create Memorandum of Understanding between City, MOTI, and RDN to create a hollistic Transporta- tion system.	



INFRASTRUCTURE PLANNING

The Infrastructure Group plans, organizes and implements programs and policies and standards necessary to provide a safe and efficient water distribution, sanitary sewer collection, and storm drainage infrastructure to support existing needs and future growth.

The group also assembles the 10 year Capital Plan, and prepares revisions to the Manual of Engineering Standards and Specifications, coordinating across departments for both updates.

In 2022, there were:

- 631 km of Sanitary Sewer,
- 629 km of Storm Drainage Sewer, and
- 649 km of Watermains.

Background and Level of Service:

- Develop and implement of the City's Infrastructure Modeling programs for water distribution, sanitary sewer, and storm drainage systems. The group uses the models as a tool to plan infrastructure capacity improvements, develop operational maintenance strategies, and proactively manage our underground utilities systems.
- Oversee the Sanitary Sewer Flow, Storm Drainage Flow, and Rainfall Monitoring programs. Sanitary Sewer Monitoring stations and Rainfall gauges that provide critical real-time rainfall, flow, and level data necessary for calibration of our Sanitary Sewer and Storm Drainage hydraulic models and for storm and sanitary sewer pipe sizing. The group, with the support of Public Works staff, oversees and maintains 15 sanitary sewer flow, 5 rainfall, and 3 level sensors monitoring stations.
- Manage annual program that employs Closed Circuit Television (CCTV) inspection of critical sanitary sewers and storm drainage. The defect coding output from the program provides the ability to identify defects of both a structural and operational nature, including observed locations of infiltrating ground water. Manage yearly inspection program of critical watermains.

- Complete master plans and studies for water distribution, sanitary sewer collection, and storm drainage infrastructure. Staff from the Infrastructure Planning group are the team leaders and project managers overseeing the engaged consultants.
- Develop scope of projects to renew infrastructure based on network models, condition assessments, operational input, master plans, and studies recommendations. The identified projects are prioritized with a triple bottom line risk assessment methodology that considered environmental, social, and economic consequences of failure for each pipe segment, both under existing and future conditions, for inclusion in the 10 year capital plan. Staff prepare conceptual designs for highest-ranked projects and conceptual designs are handed over to the Projects group for detailed design.
- Coordinates the 10 year capital plan across departments on behalf of the Engineering and Public Works (E&PW) group for inclusion into the City's annual Financial Plan.
- Oversees updates to the Manual of Engineering Standards and Specifications.
- Engages with RDN through participation in Liquid Waste Monitoring Committee.
- Develops policy, bylaws, standards, and tools with regards to climate change, storm water management, and asset management that take into account the most current City Plan goals and objectives, Climate Change, industry trends, and initiatives from other jurisdictions.

2022 ACCOMPLISHMENTS

- Completed two utility master plans, two drainage studies, and two sanitary sewer studies.
- Started a new utility master plan and a joint sanitary study with the RDN.
- Completed mini update, Revision 14 (R14) of the City's Manual of Engineering Standards and Specifications to add some rigour around geotechnical requirements.

- Maintained yearly Sewer Flow, Storm Drainage Flow and Rainfall Monitoring program for City wide sewer and storm drainage model calibration.
- Completed construction of sewer monitoring station to monitor flows from the Linley Valley sewer catchment.
- Collaborated with planning staff to complete 200+ development reviews. Watermain and sanitary sewer models are run to identify impacts/flows from proposed development. Collaborated with Community Planning to complete water and sanitary sewer reviews for City Plan to identify ability to service the different proposed development scenarios.
- Oversaw video inspection and condition assessment of 38 km of sewer pipe and of 15.4 km of drainage pipe.
- Continued work towards establishing Storm Water Utility.
- Provided technical support for Asset Management 2022 update.

 Collaborated with the RDN and RDN jurisdictions working group on possible Inflow & Infiltration (I&I) reduction strategies to include in the Liquid Waste Management Plan (LWMP) Amendment. Work will be ongoing for the next few years.

- To construct an additional priority sewer monitoring station to monitor flows within the sanitary sewer system.
- To complete DCC review for water Distribution, sanitary sewer, and drainage utilities.
- To further develop a Storm Water utility funding model.
- To develop Natural Asset Inventory as part of stormwater management.



City Plan

Initiative	Connected Goal						
Construction of additional priority sewer monitor- ing station to monitor flows within the sanitary sewer system.							
Complete DCC review for Water Distribution, Sani- tary Sewer and Drainage utilities.							
Further develop a Storm Water utility funding model.							
Develop Natural Asset Inventory as part of stormwa- ter management.							





CAPITAL PROJECTS

Responsible for the delivery of the majority of capital projects for the City. The Capital Projects group ensures that each project has a dedicated project manager who works with various operational departments to guide the project from a concept idea to finished construction using Nanaimo's robust Project Management Framework (PMF).

The City is located on the traditional territory of the Snuneymuxw First Nation (SFN), and projects, such as the Needham Street sidewalk, have been completed in partnership with SFN. The City also constructs projects which are in registered archeological sites or near watercourses that are of interest to Snuneymuxw First Nation. The projects group continually engages with SFN to ensure that these projects are completed in a respectful manner consistent with the City's commitments to reconciliation, supporting the goals under Empowered Nanaimo.

The City's in-house construction crew completes several million dollars' worth of projects each year, and primarily focuses on projects that would be difficult to tender, such as smaller projects, short notice projects, or projects that require a high degree of engagement with the public during construction. The construction crew is also tasked with emergency work. The remainder of the projects are completed by external contractors, most of which are located within Nanaimo, allowing the City's capital construction dollars to flow back into the local economy.

The timing of projects is driven by a number of factors including:

- Staff capacity,
- Market capacity (contractors),
- · Environmental consultation, and
- Seasonal efficiencies.

Background and Level of Service:

- Project governance is undertaken in alignment with the Project Management Framework and the Project Management Policy.
- Projects are generally underway in the year they are budgeted.
- Budgets are set with high quality cost estimates prepared by professionals.
- The public is well informed about work that may affect them or their neighbourhood.
- Project risks are identified early in the project and appropriate risk mitigation measures are put into place.
- Engineering work is completed within the City's Professional Practice Guidelines.

2022 ACCOMPLISHMENTS

The year started off with a very ambitious 54 projects with a value of nearly \$70 million, either carried over from 2021 or budgeted for construction in 2022, it was an unusually challenging year. The booming construction market and unexpected inflation led to significantly reduced market capacity and prices exceeding project budgets. Projects were revaluated based on risk, corporate priority, project schedule, and market capacity to undertake the projects. In total, 17 projects with a value of \$23 million were deferred to 2023.

Major projects that were under construction in 2021 and will be completed in 2022 include:

- Fire Station No. 1,
- Metral Drive Complete Streets Phase 2,
- Fourth Street Complete Streets Harewood Road to Pine Street,
- · Seabold Drainage Upgrades, and
- Serauxmen Stadium Plaza Upgrades (PRC Project).

Major Projects that were designed in 2022 and completed or underway by the end of the year include:

- Midtown Gateway Phase 2A,
- Park Avenue Sewer Upgrades,
- · Haliburton Street Sidewalk,
- White Eagle Terrace Upgrades,
- · Lenhart Bridge Upgrades,
- · Neck Point Washrooms, and
- Westwood Lake Parking Lot Improvements (PRC Project).

Major Projects that are in design and expected to be under way in 2022 include:

- · Loudoun Park Activity Centre (PRC Project),
- 580 Fitzwilliam Street Renovations (RCMP Project),
- Albert Streets Complete Streets, and
- Midtown Gateway Phase 2B.

Other Accomplishments:

- Navigated the lengthy and time consuming process of general contractor bankruptcy on a major project.
- Implemented new Complete Streets guideline on Transportation projects.
- Successfully implemented the City's new negotiated request for proposal document on several construction projects, allowing the City to obtain the best value from the procurement process and implement the principles from the City's sustainable procurement policy on some of the largest purchases the City makes.
- Managed the Design Commercial planning process.

- The global market conditions have led to significant uncertainty with respect to the cost of construction. Continued inflation has made it challenging to estimate costs accurately and control costs.
- Supply chain issues will continue to challenge construction schedules.
- Deferment of several projects from 2022 to 2023 will present both staff and market capacity challenges for 2023.
- Increase the ability to proactively communicate with the public about projects, and manage public complaints. In 2022, the number of public inquiries on projects have been overwhelming and have consumed a significant amount of staff time.
- To continue researching and collaborating with other jurisdictions to learn new and more efficient ways of managing capital projects.

City Plan

Initiative	Connected Goal
Complete Intersection upgrades at Bruce Avenue & Fifth Street.	
Complete the Midtown Gateway Transportation & Utility Project.	
Complete the Albert Street Complete Streets Projects.	
Complete a functional design for Design Commercial.	
Complete the design for the Downtown Transit Exchange.	
Complete the Terminal Avenue Phase 1 project.	
Upgrade aging underground infrastructure.	





FACILITIES ASSET MANAGEMENT

Responsible for capital planning, asset management, and energy and emissions management within facilities, the Facility Asset Management (FAM) group works closely with Facility Operations to plan for and execute capital renewals within the various facilities. While structured as part of the Engineering Department, FAM works closely with Parks, Recreation and Culture, Nanaimo Fire Rescue, and Corporate Services on a portfolio of approximately 100 corporate service and recreation facilities. This group also publishes an annual update to our Strategic Energy Management Plan, and works with BC Hydro and other funding agencies toward implementation of our energy and emission goals within the Corporate Facility Portfolio. The Corporate Energy Manager resides in this group and works closely with the Community Energy Manager ensuring alignment with goals and initiatives.

Background and Level of Service:

- Provide long-term capital planning for facility asset renewals and upgrades
- Seek out and optimize opportunities to reduce energy consumption and greenhouse gas emissions within the City's facilities.

- Works with Facility Managers and Operators to prioritize capital renewals to maintain levels of service at recreation and corporate service facilities.
- Manages condition assessments for City-owned facilities and building components, such as building enclosure, electrical and mechanical systems, (including plumbing and HVAC), and structural considerations (including seismic).
- Strategic energy management planning for the organization, including meeting energy saving targets and the reduction of greenhouse gas emissions, and a 19-year partnership with BC Hydro, who has provided \$1.8M in funding for studies, grants, incentives, etc. since partnership inception.
- Provides project management and project support for projects, overseeing the budget planning, tender process, and project execution for several City departments including, Parks, Recreation and Culture, Bylaw Services, Nanaimo Fire Rescue, Police Services, and other civic facilities as resources allow.



2022 ACCOMPLISHMENTS

- Completing the last detailed condition assessments of our major corporate and recreational facilities to inventory current assets and their condition.
- Populated the Project Plan with newly identified asset renewals resulting from the Condition Assessments.
- Continual coordination of engineering studies for equipment and system renewals, manage design and tender preparation, and stakeholder involvement for construction activities.
- Continued to gather input from stakeholders for the Facility Asset Management Strategy.
- Established a centralized location for facility asset and historic information allowing broad and easy access for all.
- Applied for significant Senior Government Grant Funding to support a mechanical renewal at Nanaimo Aquatic Centre. Once implemented, it would reduce humidity levels in the pool area, improve energy efficiency, and reduce greenhouse gas emissions by 70%.
- Replaced existing lighting at three facilities with more energy efficient, brighter bulbs, for an expected savings of \$20,500 annually.
- Secured \$97,000 in grants and incentives to offset the capital cost of energy reduction strategies.

- Relocate the redundant back up generator from the Water Treatment Plant to Beban Complex where the support structure and wiring is already in place, providing resiliency for an additional facility in the event of a power outage.
- Continue maturing our asset management plans with the information from the Condition Assessments.
- Collaborate with stakeholders on sustainable policy updates using the feedback from ReImagine Nanaimo.
- Undertake a gap analysis to understand investment required to meet our corporate emissions targets.
- Complete the prioritization matrix for facility renewals within recommended funding levels.
- Continue to grow the Facilities Asset Management team to service the influx of renewal activities identified in the condition assessments.
- Continue to source and optimize grant and other external funding opportunities for energy reduction within facilities.
- Implement decision matrix for facility renewals to maximize investment in alignment with the City's goals.

City Plan

Initiative	Connected Goal							
Relocate the redundant emergency generator from the Water Treatment Plant to Beban Complex.								
Mature Asset Management Plan with Condition Assessment information.								
Update sustainability policies to meet corporate energy and emission reduction goals.	Ø							
Undertake a gap analysis to understand investment required to meet our corporate emissions targets.	\bigcirc							



City Plan

Initiative	Connected Goal							
Complete the prioritization matrix for facility renew- als within recommended funding levels.								
Grow the Facility Asset Management Team to ser- vice renewals of capital assets.								
Source grants and other external funding to optimize resources and emissions and energy reduction.								
Implement decision matrix for facility renewals to maximize investment in alignment with the City's goals								



PROPOSED OPERATING BUDGET

		2022 20		2023 2024			2025			2026		2027
	Ар	proved		Draft		Draft		Draft		Draft		Draft
	В	udget		Budget Budget Budget Budget		Budget	Budget					
Revenues								-				
Engineering & Public Works Administra	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Construction Management		-		-		-		-		-		-
Engineering Support		5,300		2,800		2,828		2,856		2,885		2,914
Facility Asset Planning		50,000		60,000		60,600		61,206		61,818		62,436
Infrastructure Planning		-		-		-		-		-		-
Transportation		-		-		-		-		-		-
Annual Operating Revenues	\$	55,300	\$	62,800	\$	63,428	\$	64,062	\$	64,703	\$	65,350
Expenditures												
Construction Management		2,387,098		2,444,984		2,493,623		2,543,242		2,593,847		2,645,474
Engineering & Public Works Administra	\$	259,330	\$	259,235	\$	264,419	\$	269,708	\$	275,101	\$	280,603
Engineering Support		455,450		450,511		459,519		468,709		478,084		487,996
Facility Asset Planning		423,764		434,175		442,855		451,713		460,746		469,963
Infrastructure Planning		505,418		509,868		520,063		530,465		541,073		551,894
Transportation		886,207		882,353		905,095		923,197		941,658		960,492
Annual Operating Expenditures	\$	4,917,267	\$	4,981,126	\$	5,085,574	\$	5,187,034	\$	5,290,509	\$	5,396,422
Net Annual Operating Expenditures	\$	4,861,967	\$	4,918,326	\$	5,022,146	\$	5,122,972	\$	5,225,806	\$	5,331,072
Staffing (FTEs) - Budgeted		46.0		46.0		46.0		46.0		46.0		46.0

Includes ENGPW Admin - General Manager

PROPOSED OPERATING BUDGET

	2022		2023		2024			2025	2026			2027	
		Approved		Draft		Draft		Draft		Draft		Draft	
		Budget		Budget		Budget		Budget		Budget		Budget	
Expenditure Summary													
Wages & Benefits	\$	4,576,006	\$	4,626,156	\$	4,718,677	\$	4,813,050	\$	4,909,316	\$	5,007,497	
Services & Supply Contracts		109,941		119,536		127,026		129,565		132,159		134,800	
Materials & Supplies		118,945		114,270		116,303		118,375		120,489		122,652	
Utilities		-		-		-		-		-		-	
Internal Charges & Other		112,375		121,164		123,568		126,044		128,545		131,473	
Debt Servicing		-		-		-		-		-		-	
Grants & Subsidies		-		-		-		-		-		-	
Annual Operating Expenditures	\$	4,917,267	\$	4,981,126	\$	5,085,574	\$	5,187,034	\$	5,290,509	\$	5,396,422	
Includes ENGPW Admin - General Manag	ger												

Proposed Changes

A business case for a Project Accountant position has been prepared for Council's consideration for inclusion in the 2023 – 2027 Financial Plan.