City of Richmond

# Report to Committee

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| **To:** | Parks, Recreation and Cultural Services Committee | **Date:** | June 30, 2025 |
| **From:** | Todd Gross<br>Director, Parks Services | **File:** | 06-2400-20-RAIL1/Vol 01 |
| **Re:** | **Railway Greenway Solar Lighting Options** | | |

**Staff Recommendation**

That Option 2, "Two Phase Implementation", as outlined in the staff report titled "Railway Greenway Solar Lighting Options", dated June 30, 2025, from the Director, Parks Services, be approved.

Todd Gross
Director, Parks Services
(604-247-4942)

Att. 1

| REPORT CONCURRENCE | | |
|---|---|---|
| **ROUTED TO:** | **CONCURRENCE** | **CONCURRENCE OF GENERAL MANAGER** |
| Finance Department | ☑ | |
| Engineering | ☑ | |
| Climate and Environment | ☑ | |
| Transportation | ☑ | |
| Public Works | ☑ | |
| Risk Management | ☑ | |
| **SENIOR STAFF REPORT REVIEW** | **INITIALS:** CJ | **APPROVED BY CAO** |

## Staff Report

### Origin

At the May 12, 2025, Council meeting, staff received the following referral in regards to the report titled "Railway Greenway Lighting – 2025 Update":

> *That staff investigate and report back on the feasibility of a solar lighting only option, including its functionality, costs, potential for phased implementation, advantages and disadvantages, and the estimated cost of retrofitting should the solar option prove unviable.*

The purpose of this report is to respond to the referral and present solar lighting implementation options for the Railway Greenway (the greenway) for consideration by Council.

This report supports Council's Strategic Plan 2022–2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*
>
> *1.2 Advocate for the needs of Richmond in collaboration with partners and stakeholders.*

This report supports Council's Strategic Plan 2022–2026 Focus Area #2 Strategic and Sustainable Community Growth:

> *Strategic and sustainable growth that supports long-term community needs and a well-planned and prosperous city.*
>
> *2.4 Enhance Richmond's robust transportation network by balancing commercial, public, private and active transportation needs.*

This report supports Council's Strategic Plan 2022–2026 Focus Area #3 A Safe and Prepared Community:

> *Community safety and preparedness through effective planning, strategic partnerships and proactive programs.*
>
> *3.4 Ensure civic infrastructure, assets and resources are effectively maintained and continue to meet the needs of the community as it grows.*

### Background

In 2024, a public engagement process was conducted to determine resident preferences for lighting along the Railway Greenway (between Westminster Highway and Garry Street, totalling approximately 4.4 kilometres in length). The results indicated strong support for lighting, with 78.5 per cent of 529 respondents in favour. Respondents also expressed a clear preference for lighting strategies that seek to reduce adverse impacts on both adjacent residents and wildlife.

Following receipt of the referral from Council, solar lighting implementation options have been explored within the previously identified seven dark areas (totalling approximately 1.7 kilometres in length) – refer to Table 1 below, and the Railway Greenway Lighting Areas Map (Attachment 1) – where lighting should be prioritized. These areas, which were determined to be the darkest based on factors including distance from existing adjacent lighting and proximity of dense vegetation, would greatly benefit from additional illumination. Table 1 outlines the locations and approximate lengths of each lighting area.

Table 1: Railway Greenway Lighting Areas (north to south)

| Area No. | Name | Northern Cross Street | Southern Cross Street | Length |
|---|---|---|---|---|
| 1 | Westminster Highway to Granville Avenue | Westminster Highway | Granville Avenue | 787m |
| 2 | 7320 to 7400 Railway Avenue | Linfield Gate | Lancing Road | 86m |
| 3 | 8340 to 8720 Railway Avenue | Colbeck Road | Francis Road | 374m |
| 4 | 9500 to 9588 Railway Avenue | Woodwards Road | Williams Road | 117m |
| 5 | 10040 to 10160 Railway Avenue | Williams Road | Hollymount Gate | 140m |
| 6 | 10180 to 10300 Railway Avenue | Williams Road | Hollymount Gate | 116m |
| 7 | 10660 to 10720 Railway Avenue | Hollymount Gate | Steveston Highway | 97m |

## Analysis

The following section outlines considerations for solar lighting, including its functionality, advantages, disadvantages, cost implications, potential for phased implementation and retrofit, and relevant case studies.

### Solar Lighting Considerations

*Functionality*

Solar pedestrian lights are approximately 4.5-metre tall poles with LED fixtures. While solar pedestrian light poles, bases, and luminaires are nearly identical to their non-solar counterparts in terms of functionality and lifespan, they require specialized components that allow them to operate without a hardwired power supply, including a solar panel, battery, and lighting controller.

Solar lighting performance is primarily affected by the amount of energy available to fixtures from the battery. Batteries and solar panels are sized specifically for each project, based on comprehensive, location-specific climate data, to maximize functionality and reliability.

*Advantages*

Solar pedestrian lights offer a range of advantages, including their ease of implementation and associated cost savings since no hardwired service connection is required. In addition, the environmental impacts are considerably lower than those associated with non-solar lighting, as less excavation is required for conduit trenching and service connections. Copper wire theft concerns are also eliminated.

*Disadvantages*

The disadvantages of solar pedestrian lights include the susceptibility of solar components to be affected by environmental factors, including weather and adjacent vegetation. Solar panels and batteries, while not inherently accessible, could be potential targets for vandalism and theft. Regular inspection and management of adjacent vegetation, e.g., tree pruning, would be required to ensure solar panel functionality is not compromised by these external factors. In addition, as there are more specialized components required for solar lights to function, their anticipated lifespan must be factored into long term maintenance and operation (25 years for solar panels, 10 years for batteries, 10+ years for controllers).

*Cost*

Solar pedestrian lights are anticipated to have lower overall implementation costs compared to City standard pedestrian lights. While solar pedestrian lights include more specialized components, they do not require a connection to the power grid, and thus avoid costs associated with a hardwired service connection. High level cost estimates for implementation and operation, which consider solar component replacement, vegetation management and routine inspection and maintenance are provided in the Solar Lighting Options section of the report.

*Potential for Phased Implementation*

Solar pedestrian lights offer opportunities for phased implementation, which may offer benefits in the form of operational risk management, allowing the City to gauge the success of a solar lighting system prior to broader implementation. However, there are cost implications for a multi-phase approach, including unknowns related to inflation and other potential cost escalations over time, and the requirement for multiple mobilization efforts to achieve full implementation. The Solar Lighting Options section of the report outlines potential phased implementation scenarios, along with anticipated costs and key considerations.

*Potential for Retrofitting*

The options presented in this report are based on hybrid-ready solar pedestrian lights. These lights offer significant benefits in the form of financial risk mitigation, cost savings, and adaptability, should standalone solar lighting be deemed unviable. In such a scenario, installed light poles could be connected to alternating current (AC) power with typical service connection requirements and the addition of an adapter component (approximately $200 per light); luminaires, batteries, solar panels, and controllers could remain in place without being modified, and would allow for solar and AC power to be used concurrently to provide energy savings when compared with utilizing AC power only. All solar pedestrian light bases would be outfitted with capped conduit stubs to allow for this potential modification.

*Case studies*

In previous reports, solar lighting along the Arbutus Greenway in Vancouver, British Columbia, was highlighted as a case study. The following projects offer further examples of similar solar lighting applications in British Columbia and Oregon.

Port Alberni, British Columbia

In September 2024, the City of Port Alberni installed 56 solar lights along a new, 4-kilometre waterfront multi-use path. This decision was based on a successful pilot project several years earlier that saw eight solar lights installed over a 250-metre stretch of pathway. Solar panels and batteries were sized according to Port Alberni's climate, and the system was designed to tolerate colder temperatures during the winter. Motion detection sensors were incorporated to optimize energy use, increasing output when activity is detected and lowering when not. Port Alberni Parks staff advised that they have not experienced vandalism or technical challenges with any of the lights to date, and that the solar lighting installation has been successful.

Eugene, Oregon

In October 2024, the City of Eugene, Oregon installed 66 solar lights along an approximately 800-metre segment of one of its most popular recreational corridors, the Fern Ridge Path. The decision to implement solar-powered lighting was based on prior experience with copper wire theft, and site-specific challenges associated with lack of access to power. Similar to the Railway Greenway, the surrounding environment included sensitive habitat areas, and in response the project employed lights with soft colour temperature, shielding to direct light downward, and programmable dimming to minimize wildlife disturbance. This project utilized the same solar light specification that has been proposed in this report.

The following section outlines potential solar lighting options and anticipated cost estimates for implementation and operation.

<u>Solar Lighting Options</u>

*Option 1 – Single Phase Implementation*

Option 1 is to implement solar lighting in the seven lighting areas identified in Attachment 1 in a single phase. This option would see 52 lights in total, spaced at approximately 30 metres on centre, installed over the 1.7-kilometre length of greenway in a single phase. This option has been determined to be most cost-effective, as it avoids potential cost increases associated with a multi-phase implementation. However, it also presents the highest operational risk, given the unknowns associated with adopting a new lighting standard for the City without an initial trial period. While a construction cost estimate would be developed through the detailed design stage, a high level cost estimate summary is provided in Table 2. All noted costs include a contingency, factor in potential cost escalation, and represent 2025 dollars.

Table 2: Option 1 Cost Estimate Summary

| | Phase 1 | Phase 2 | Phase 3 | Total |
|---|---|---|---|---|
| Implementation costs | $741,000 | N/A | N/A | $741,000 |
| Operating budget impact (OBI) | $47,000 | N/A | N/A | $47,000 |
| Retrofitting costs (if required) | $652,000 | N/A | N/A | $652,000 |

If Option 1 is endorsed, an existing Council-approved capital project, Parks Advance Planning and Design, will be used to develop detailed design drawings. A capital submission including an operating budget impact (OBI) will be submitted for Council consideration as part of the 2026 budget process. The detailed lighting plans would include assessment and mitigation of lighting impacts on both adjacent residents and wildlife within the greenway corridor. Mitigation measures would include utilizing lights with appropriate colour temperature, luminaires with adequate house-side and up-light shielding, and lighting controls.

If solar lighting is deemed unviable in the future, retrofitting of the lighting system may be required. In this scenario, a capital submission would be submitted for Council consideration as part of the annual budget process.

Option 1 is not recommended. While it would most promptly implement lighting in the greenway areas determined to be the darkest and offers the lowest capital cost for implementation, it presents the highest level of operational risk that could be mitigated by adopting a multi-phase implementation approach.

*Option 2 – Two Phase Implementation (Recommended)*

Option 2 is to implement solar lighting in the seven lighting areas identified in Attachment 1 over two phases. Phase 1 would see 26 lights in total, spaced at approximately 30 metres on centre, installed in Lighting Areas 1 and 2 (approximately 900 metres in length); and Phase 2 would see 26 lights, spaced at approximately 30 metres on centre, installed in Lighting Areas 3 through 7 (approximately 800 metres in length). It is anticipated that Phase 1 would be implemented and remain in place for approximately one year prior to implementation of the subsequent phase to sufficiently assess performance and future viability. This option has been determined to be the second most cost-effective and mitigates operational risk by affording a trial period for solar lighting. While a construction cost estimate would be developed through the detailed design stage, a high level cost estimate summary is provided in Table 3. All noted costs include a contingency, factor in potential cost escalation, and represent 2025 dollars.

Table 3: Option 2 Cost Estimate Summary

| | Phase 1 | Phase 2 | Phase 3 | Total |
|---|---|---|---|---|
| Implementation costs | $360,000 | $407,000 | N/A | $767,000 |
| Operating budget impact (OBI) | $24,000 | $24,000 | N/A | $48,000 |
| Retrofitting costs (if required) | $278,000 | $400,000 | N/A | $678,000 |

If Option 2 is endorsed, an existing Council-approved capital project, Parks Advance Planning and Design, will be used to develop detailed design drawings. Capital submissions including an OBI will be submitted for Council consideration as part of the annual budget process. The detailed lighting plans would include assessment and mitigation of lighting impacts on both adjacent residents and wildlife within the greenway corridor. Mitigation measures would include utilizing lights with appropriate colour temperature, luminaires with adequate house-side and up-light shielding, and lighting controls.

If solar lighting is deemed unviable in the future, retrofitting of the lighting system may be required. In this scenario, a capital submission would be submitted for Council consideration as part of the annual budget process.

Option 2 is recommended, as it would prioritize lighting in the darkest area of the Railway Greenway that is most removed from existing light sources (Lighting Area 1) and implement lighting in an area that is more likely to be affected by existing vegetation (Lighting Area 2) and thus presents optimal conditions for a solar lighting trial to gauge its success. While this option is the second most cost-effective option, it employs a measured approach that strikes an appropriate balance between mitigating operational risk, cost-efficiency, and timely implementation.

*Option 3 – Three Phase Implementation*

Option 3 is to implement solar lighting in the seven lighting areas identified in Attachment 1 over three phases. Phase 1 would see 23 lights in total, spaced at approximately 30 metres on centre, installed in Lighting Area 1 (approximately 800 metres in length); Phase 2 would see 17 lights, spaced at approximately 30 metres on centre, installed in Lighting Areas 2, 3, and 7 (approximately 600 metres in length); and Phase 3 would see 12 lights, spaced at approximately 30 metres on centre, installed in Lighting Areas 4, 5, and 6 (approximately 400 metres in length). It is anticipated that Phase 1 and 2 would each be implemented and remain in place for approximately one year prior to implementation of the subsequent phase(s) to sufficiently assess performance and future viability. This option has been determined to be the least cost-effective, due to the three separate mobilization efforts that would be required for full implementation, and its susceptibility to inflation and other potential cost escalations over time. While a construction cost estimate would be developed through the detailed design stage, a high level cost estimate summary is provided in Table 4. All noted costs include a contingency, factor in potential cost escalation, and represent 2025 dollars.

Table 4: Option 3 Cost Estimate Summary

| | Phase 1 | Phase 2 | Phase 3 | Total |
|---|---|---|---|---|
| Implementation costs | $313,000 | $264,000 | $207,000 | $784,000 |
| Operating budget impact (OBI) | $21,000 | $17,000 | $12,000 | $50,000 |
| Retrofitting costs (if required) | $217,000 | $258,000 | $220,000 | $695,000 |

If Option 3 is endorsed, an existing Council-approved capital project, Parks Advance Planning and Design, will be used to develop detailed design drawings. Capital submissions including an OBI will be submitted for Council consideration as part of the annual budget process. The detailed lighting plans would include assessment and mitigation of lighting impacts on both adjacent residents and wildlife within the greenway corridor. Mitigation measures would include utilizing lights with appropriate colour temperature, luminaires with adequate house-side and up-light shielding, and lighting controls.

If solar lighting is deemed unviable in the future, retrofitting of the lighting system may be required. In this scenario, a capital submission would be submitted for Council consideration as part of the annual budget process.

Option 3 is not recommended, as it represents the least cost-effective option and presents the greatest financial risk of unknowns associated with inflation and potential cost escalations over a multi-phase implementation period.

**Financial Impact**

Option 2, implementation of solar pedestrian lighting over two phases, is recommended. With endorsement, an existing Council-approved capital project, Parks Advance Planning and Design, will be used to prepare detailed design drawings, a construction cost estimate, and an OBI. Capital submissions including the construction cost estimate and OBI will be submitted for Council consideration as part of the annual budget process.

If retrofitting of the solar lighting system is required in the future, additional capital submissions outlining associated costs would be submitted for Council consideration as part of the annual budget process.

**Conclusion**

The feasibility of implementing solar lighting along the Railway Greenway, with consideration given to its functionality, advantages, disadvantages, cost implications, potential for phased implementation and retrofit, and relevant case studies, has been examined.

Option 2, implementation of solar pedestrian lighting over two phases, is recommended. The first phase would allow lighting to be implemented within the darkest area of the Railway Greenway, along with one that presents optimal conditions for a solar lighting trial to gauge success. It offers the second most cost-effective option and would strike an appropriate balance between mitigating operational risk, cost-efficiency, and timely implementation to address the strong community preference for lighting and resident concerns related to public health, safety, and welfare, while improving accessibility and minimizing ecological impacts along the Railway Greenway.

With endorsement of this option, an existing Council-approved capital project, Parks Advance Planning and Design, will be used to develop detailed design drawings and a construction cost estimate. Capital submissions for Railway Greenway solar lighting would be brought forward for Council consideration as part of the annual budget process.

Kevin Fraser
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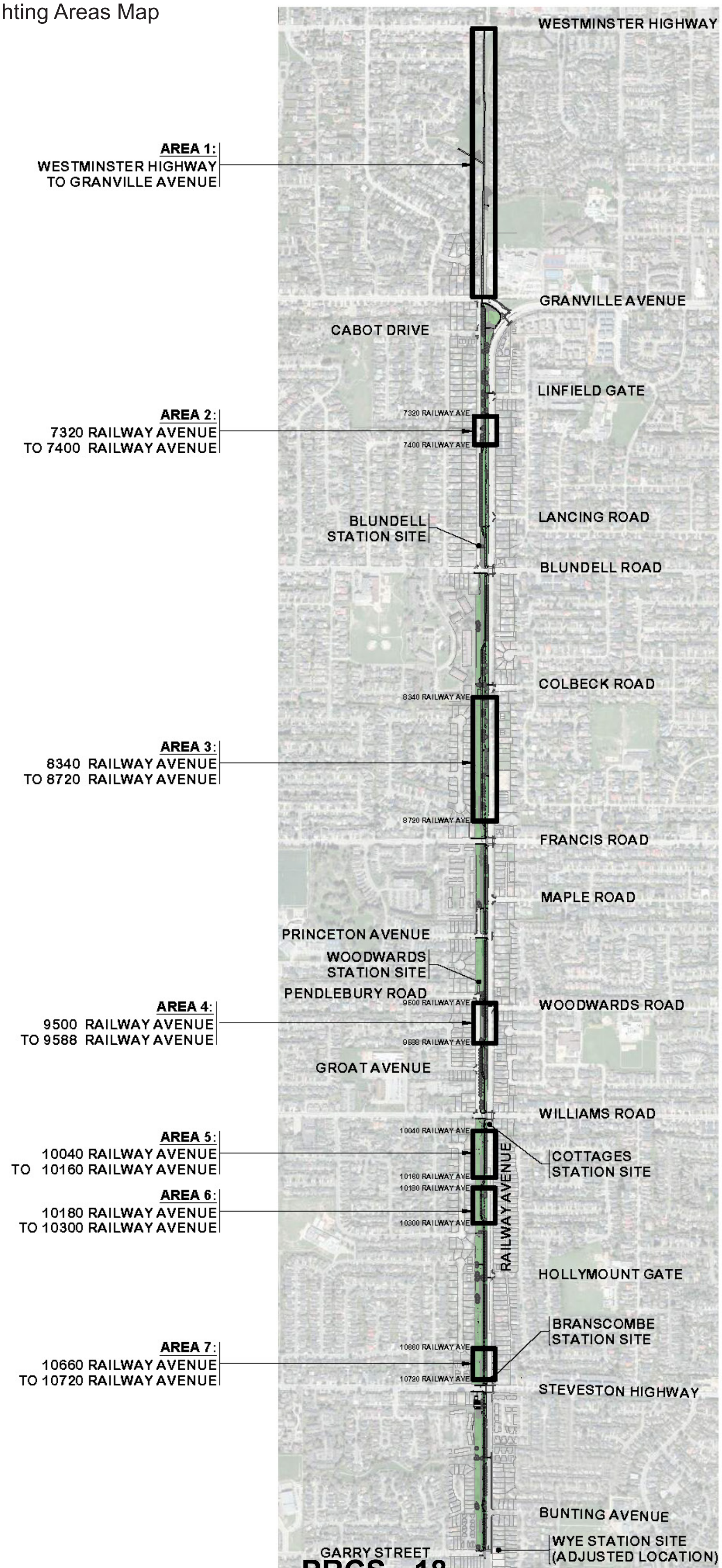
Att. 1: Railway Greenway Lighting Areas Map

Railway Greenway Lighting Areas Map

Attachment 1

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