Vancouver Fraser Port Authority

Centerm Expansion Project / South Shore Access Project
View and Shade Study

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Revision History

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<th>Description</th>
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<tr>
<td>AGL</td>
<td>Above Ground Level</td>
</tr>
<tr>
<td>BC</td>
<td>British Columbia</td>
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<tr>
<td>Centerm</td>
<td>Centerm Container Terminal</td>
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<tr>
<td>CEP</td>
<td>Centerm Expansion Project</td>
</tr>
<tr>
<td>CNR</td>
<td>Canadian National Railway</td>
</tr>
<tr>
<td>CRAB</td>
<td>Create a Real Available Beach</td>
</tr>
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<td>DPWV</td>
<td>DP World Vancouver</td>
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<tr>
<td>GIS</td>
<td>Geographical Information System</td>
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<td>KOP</td>
<td>Key Observation Points</td>
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<td>PMV</td>
<td>Port Metro Vancouver</td>
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<td>SRY</td>
<td>Southern Railway of BC</td>
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<td>SSAP</td>
<td>South Shore Access Project</td>
</tr>
<tr>
<td>TEU</td>
<td>twenty-foot equivalent unit</td>
</tr>
<tr>
<td>UAV</td>
<td>unmanned aerial vehicle</td>
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<tr>
<td>UTM</td>
<td>Universal Transverse Mercator</td>
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<td>VFPA</td>
<td>Vancouver Fraser Port Authority</td>
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1. Introduction

The Centerm Container Terminal (Centerm) on the south shore of Vancouver’s inner harbour is one of three primary container terminals in the Vancouver area and handles approximately one-fifth of the container goods shipped through Vancouver. DP World Vancouver (DPWV) operates the terminal on federal lands and waters which is leased from the port authority.

Trade of containerized goods shipped through Canada’s west coast is increasing; In 2015, container terminals on the west coast of Canada (including Vancouver and Prince Rupert) handled more than 3.8 million Twenty-foot Equivalent Units (TEUs), with nearly 3.1 million TEUs handled by container terminals in the Port of Vancouver. The Port of Vancouver’s container terminals (Vanterm, Deltaport, Fraser Surrey Docks, and Centerm) are currently able to handle an estimated 3.9 million TEUs per year.

Independent forecasts completed for the Vancouver Fraser Port Authority (port authority) by international experts in transportation and trade indicate that container traffic through the west coast of Canada will increase by approximately 3.5 million TEUs by 2035. This growth is driven primarily by the growing demand between Canada and Asian markets for imported products such as clothing, food, electronics and manufacturing inputs, such as car parts, and exports of Canadian products such as pulp, paper, lumber and specialty grains.

The proposed Centerm Expansion Project (CEP) is a series of improvements to the Centerm Container Terminal. The proposed infrastructure improvements will increase the number of containers that can be handled at Centerm by approximately two-thirds, from a current maximum annual capacity of 900,000 Twenty-foot Equivalent Units (TEUs) to 1.5 million TEUs. During peak operations, the number of containers that can be handled at the terminal will increase from an annual sustainable capacity of 750,000 TEUs to 1.3 million TEUs. To increase the container capacity of the terminal by 67 per cent, the proposed terminal improvements include an expansion of the terminal footprint by 15 per cent and reconfiguration of the terminal.

This report describes changes in viewscapes and shadow casting anticipated to result from proposed alterations of the Centerm Container Terminal (Centerm) and associated road and rail access routes.

Centerm is located in Vancouver harbour on the south shore of Burrard Inlet, British Columbia (BC), on federal lands and waters managed by the Vancouver Fraser Port Authority (VFPA; Figure 1-1). DP World Vancouver (DP World), a container terminal operator and stevedore, has operated Centerm since 2006. Centerm is one of three primary container terminals operating within the Port of Vancouver (the Port) and handles approximately 20% of the container traffic passing through the Port each year.

1.1 Study Purpose and Context

As part of its Project and Environmental Review Process, the VFPA has in place Project and Environmental Review Guidelines – View and Shade Impact (PMV 2015) (View and Shade Guidelines) to assist applicants of projects on lands and waters managed by VFPA in the characterisation of potential view and shade impacts associated with operational activities and proposed projects. The additional infrastructure associated with the proposed Project has the potential to alter the view from key vantage points and to create shade.

The view and shade study focussed on determining the extent of change to existing views, the sensitivity of the view to change, the potential for areas to be shaded by structures, and the effects of those shadows.
The study entailed:

- Selecting representative key observation points (KOPs), which are public vantage points with above-average sensitivity to visual changes from the proposed Project.
- For each KOP, comparing current viewscapes with the viewscape that will exist after construction of the proposed Project.
- Characterizing potential shade effects of the proposed development on the surrounding community during four time periods throughout the year.

### 1.2 Project Location and Setting

The proposed Project is located along the south shore of the Burrard Inlet within Vancouver Inner Harbour, which is formed by the waters between the First and Second Narrows (Figure 1-1). The Project footprint is depicted in Figure 1-2. The Terminal site (the Site) is bounded by East Waterfront Road, Centennial Road, and the CN Rail yard to the south, and extends northward into Burrard Inlet a maximum distance of 500 m from shore. Centerm currently covers approximately 31 hectares (ha) of Port land from Hawks Avenue in the east to Main Street in the west. The Site occupies about 2 kilometres (km) of the Burrard Inlet shore, in the area east of Canada Place and the SeaBus terminal, north of CRAB Park, and west of Lantic (Rogers Sugar) and the Vanterm Terminal. Geographic coordinates of the approximate centre of the Site are 49°17′14″N, 123°05′34″W.

The Off-Terminal improvements to road and rail access would be made along the south shore roadway corridor, between Clark Drive and Main Street (Figure 1-3). Geographic co-ordinates of the approximate centre of the corridor are 49°16′59.5″N, 123°04′50″W.

### 1.3 Project Components

The proposed improvements included in the Project are summarized in Table 1-1 and depicted in Figure 1-2, Figure 1-3 and Figure 1-4. VFPA is proposing to concurrently deliver two projects to increase goods movement through the South Shore Trade Area. One project, the Centerm Expansion Project (CEP), is a series of improvements at the Terminal itself to increase container handling capacity and accommodate larger vessels. The other project, the South Shore Access Project (SSAP), will provide improvements to road and rail networks Off-Terminal adjacent to Centerm to accommodate the predicted increases in containerized goods movement. SSAP includes removal of the Southern Railway (SRY) rail crossing of Centennial Road, extension of Waterfront Road to link Waterfront Road East with Centennial Road, and a new Centennial Road Overpass extending westward from Clark Drive to the Terminal entrance along Centennial Road (Figure 1-4), and positioned adjacent to Lantic (Rogers Sugar). Collectively, the CEP and SSAP projects are referred to throughout this report as “the proposed Project.”

Photograph 1-1 provides an aerial perspective of the western terminal expansion area, and Photograph 1-2 an aerial perspective of the eastern terminal expansion area. The red lines approximate the expected extent of that work.
## Table 1-1: CEP and SSAP Components

<table>
<thead>
<tr>
<th>Centerm Expansion Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westward Expansion of Centerm</td>
<td>Expansion of the terminal footprint to accommodate an extension of the container yard and intermodal yard to the west. Components to include a larger wharf structure, dredging, rock dykes, and earth fill.</td>
</tr>
<tr>
<td>Eastward Expansion of Centerm</td>
<td>Expansion of the terminal footprint to accommodate additional container storage, a new terminal gate, parking, and a new administrative building (Container Operations Facility). Components to include the removal and replacement of the existing Ballantyne Pier with rock dykes and earth fill following dredging.</td>
</tr>
<tr>
<td>Expansion of the Terminal Intermodal Rail Yard</td>
<td>Expansion of the intermodal yard through the addition of a fifth rail track and rail track extensions to the west and east, to increase intermodal yard capacity. Introduction of rail-mounted gantry cranes to improve the efficiency of rail operations.</td>
</tr>
<tr>
<td>Removal of the Heatley Avenue Overpass and parking</td>
<td>Removal of the Heatley Avenue Overpass to accommodate the eastern extension of the intermodal yard. The functionality of this overpass will be replaced with the Centennial Road Overpass.</td>
</tr>
<tr>
<td>Reconfiguration of the Container Yard</td>
<td>Increased capacity and efficiency for container yard operations, including loaded containers, empties, and refrigerated container stacks.</td>
</tr>
<tr>
<td>Modernized Truck Gate System</td>
<td>Reconstruction of the terminal entrance and exit gates using modern gate technologies to increase container truck throughput.</td>
</tr>
<tr>
<td>Terminal Outfitting</td>
<td>Upgrades to control systems and yard equipment to complement the physical changes to the Terminal. Introduction of new operational activities.</td>
</tr>
<tr>
<td>Navigational Turning Basin for Cruise Ship Berth</td>
<td>Dredging to enhance a navigational turning basin in the area between the westward extension of Centerm and the SeaBus Terminal.</td>
</tr>
</tbody>
</table>

### South Shore Access Project

| Waterfront Road Extension and VACs Gates | Extension of Waterfront Road to Centennial Road, thereby providing a connection to the Main Street Overpass and effectively creating a continuous roadway through port lands between downtown Vancouver and Highway 1. Installation of new Vehicle Access Control Gates on Waterfront Road under Main Street Overpass |
| Construction of a Centennial Road Overpass | Introduction of grade-separated access to the Terminal entrance, from Clark Drive via Centennial Road. The overpass would cross multiple at-grade rail crossings. Container trucks would continue to access the terminal via Centennial Road from port access points at Clark Drive and Commissioner Street. |
Figure 1-1
AREA = 2.91 ha

PARKING AREA = 1.02 ha

Figure 1-3

CENTERM EXPANSION PROJECT
PROJECT OVERVIEW
PROPOSED DESIGN
Photograph 1-1: Aerial view at 100 m AGL of current conditions with the western expansion area outlined.

Photograph 1-2: Northward aerial view at 90 m AGL of the eastern terminal expansion area
1.4 Study Scope

The scope of review of effects on view and shade is listed in Table 1-2, the column headings in which are defined as follows:

- **Project Interactions**: The components and activities of the proposed Project that are part of the review
- **Potential Effects**: The effects associated with the project interactions that are characterized
- **Study Area**: The geographic extent within which effects are considered
- **Indicators**: The existing state of the view and shade and the potential changes that could result from project effects
- **Guidelines and Threshold References**: Guidance used to establish thresholds or limits that have been used to characterize changes to the views and shade as a result the Project.

### Table 1-2: Interaction, Potential Effects, and Indicators for Views and Shade Analyses

<table>
<thead>
<tr>
<th>Project Interaction</th>
<th>Potential Effects of the Proposed Project</th>
<th>Study Area</th>
<th>Indicators</th>
<th>Guidelines and Threshold References</th>
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</thead>
<tbody>
<tr>
<td>Construction and Operations:</td>
<td>• Extent of change to existing views and the sensitivity of the view to change</td>
<td>• Views: KOPs, which are public vantage points with above-average sensitivity to visual changes from the proposed Project. Views from these KOPs extend to the farthest extent of each viewshed, including the North Shore Mountains, Canada Place, and other industrial buildings to the east</td>
<td>• Appearance of terminal expansion from KOPs, Area of land that will be subject to shading arising from the project</td>
<td>VFPA’s Project &amp; Environmental Review Guidelines – View and Shade Impact</td>
</tr>
<tr>
<td></td>
<td>• Potential for areas to be shaded by project structures</td>
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1.5 Regulatory Standards and Guidelines

Characterization of potential Project effects on views and shade was based on the requirements of VFPA’s View and Shade Guidelines (PMV 2015g). The aspirational objectives of VFPA's View and Shade Guidelines are that:

- Where Port-related developments are proposed in areas within close proximity to residential or public areas, those designing these developments should take into account the potential view and shade impacts they may have on surrounding communities.
- Where possible, developments should be designed in ways that avoid view and shade impacts on the surrounding community, or mitigate those impacts.
- Where both private and public views may be affected, maintaining public viewpoints or mitigating impacts on those viewpoints is considered a priority.
2. Viewscape Analysis

2.1 Study Methods

Methods used to conduct the visual analysis consisted of the following steps:

1. Review site plans, including those for the existing site and the proposed expansion.
2. Select and map candidate KOPs of areas expected to undergo visual change. This step included a review of the neighbouring area to determine the public areas where people are most likely to congregate, combined with areas that have an above-average visual sensitivity (clear view) of the Terminal.
3. Conduct a field reconnaissance site investigation to finalize the selection of KOPs. The five selected KOPs are described in Table 2-1 and illustrated on Figure 2-1.
4. Take site photographs at each KOP. Landscape and panoramic photos were captured with an 18.2 megapixel Sony Cybershot to capture current conditions and collect inputs for photo modelling.
5. Produce blocking scenes and photorealistic views of select locations. A representation of the Terminal design is provided in photorealistic views for all KOPs. Photorealistic views use realistic textures to represent the future viewshed as accurately as possible. These visual representations are approximations of the current design. The actual view may differ from these representations due to simplifications made when developing these representations, and as a result of any refinements that have been made to the design of the proposed Project.
6. Construct an immersive three-dimensional (3D) model for creating extended visualization and fly-through.
7. Capture aerial perspective images from an unmanned aerial vehicle (UAV). This step was used to add additional perspective to the current layout by way of aerial oblique views. A UAV was used on-site to take static photos and video clips at five different locations in the study area. A DJI Inspire 1 UAV with a 4K high-definition camera was used after appropriate permitting and logistics were in place.
8. Review all KOP data outputs and characterise the impact of visual effects of the proposed Project by comparing pre- and post-construction viewscapes.

2.2 Views Study Area

The geographical boundaries for characterizing visual effects (View Study Area) are based on KOPs, which are public vantage points with above-average sensitivity to visual changes from the proposed Project (Figure 2-1). Views from these KOPs extend to the farthest extent of each viewshed, including the North Shore Mountains, Canada Place, and other industrial buildings to the east.
2.3 Existing Conditions and Potential Project Effects

The Terminal is visible from locations in downtown Vancouver to the south and west. This viewshed includes many residential and commercial properties, and areas used by the public, that have highly valued views across the harbour, the surrounding city, and the mountain landscape on the North Shore. The existing Centerm terminal and other port facilities, including those on the northern side of the harbour, are part of the existing visual landscape of this area. All views from places around the Site include lands that had already been extensively altered, including effects of residential, commercial, and industrial development.

Existing visual conditions are represented by the five KOPs described in Table 2-1. The images marked as “A” are of existing views from each KOP. All these images depict extensive human alteration of the landscape, including existing port facilities and urban development. KOPs 1 to 4 also include highly valued harbour and mountain components of the Vancouver landscape.

Table 2-1: Details Surrounding the Five KOPs Selected for Characterizing the Current Conditions and Visual Impact Potential

<table>
<thead>
<tr>
<th>KOP #.</th>
<th>KOP Site</th>
<th>Coordinates (UTM NAD83 Zone 10N)</th>
<th>Orientation and Details</th>
<th>Rationale for KOP Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Canada Place</td>
<td>492012E, 54595612N</td>
<td>Photo orientation is eastward, facing the proposed western expansion area. The current conditions photo was taken from the middle of the pier where the cruise ships dock.</td>
<td>The cruise ship terminal dock location with the Terminal is exposed to any view by the public from this location.</td>
</tr>
<tr>
<td>2</td>
<td>CRAB Park Pier</td>
<td>492497E, 5459303N</td>
<td>Photo orientation is northeastward, facing the proposed western expansion area. The current conditions photo was taken from the northernmost extent of CRAB Park on the headland pier at the water’s edge.</td>
<td>This pier represents the northern edge of the closest public park directly adjacent to the proposed western expansion area.</td>
</tr>
<tr>
<td>3</td>
<td>CRAB Park Beach</td>
<td>492556E, 5459140N</td>
<td>A second photo was taken from CRAB Park due to the importance of this KOP. Photo orientation is northward, facing the proposed western expansion area.</td>
<td>This is an area with high potential for people gathering, in close proximity to the terminal.</td>
</tr>
<tr>
<td>4</td>
<td>Eastward from Powell Street Lookout</td>
<td>493968E, 5458886N</td>
<td>Photo orientation is eastward to the Rogers Sugar building. The current conditions photo was taken from the Powell Street overpass.</td>
<td>The elevation of the Powell Street overpass is higher than its surroundings and there is a clear view of the proposed Centennial Road Overpass. The overpass is used by road traffic, with drivers and passengers able to see the Rogers Sugar building from the road. There is a much lower frequency of pedestrian use, but they are also able to see the Rogers Sugar building when they use this route. The Rogers Sugar building can be seen from other locations along the Powell Street overpass, but this KOP is from a lookout area that is positioned to enable pedestrians to stop and enjoy the view of the harbour, port facilities, and the Rogers Sugar building.</td>
</tr>
</tbody>
</table>
KOP Site | Coordinates (UTM NAD83 Zone 10N) | Orientation and Details | Rationale for KOP Selection
--- | --- | --- | ---
5 | Northward from Vernon Drive | 494233E, 5458903N | Photo orientation is northward, facing the proposed Centennial Road Overpass and Rogers Sugar building. The current conditions photo was taken from the intersection of Vernon Drive and Powell Street. | This KOP was chosen due to its position relative to the Rogers Sugar building and the proposed Centennial Road Overpass. Views for those driving along Powell Street at this point include a clear one of the Rogers Sugar building.

The images on the following pages depict current and future (with proposed Project) views from each KOP. Each KOP has two representations: existing conditions (#A) and future conditions (#B). The future conditions views are based on photorealistic representations of the terminal (KOPs 1 to 3) and of the Centennial Road Overpass (KOPs 4 and 5).

The visual effect of the proposed Project at each KOP is described below. These descriptions consider the magnitude of the visual change (representing the contrast in scale, form, and type of change to the location and context in which it occurs) and sensitivity to the change (a measure of the visual importance of the view that is affected).
KOP #1A – Current northeastward view from Canada Place

KOP #1B – Representation of future northeastward view from Canada Place (photo realistic)
KOP #2A – Current northeastward view from the CRAB Park pier

KOP #2B – Representation of future northeastward view from CRAB Park pier (photo realistic)
KOP #3A – Current northward view from the CRAB Park beach

Note: The container vessels has been added to the image

KOP #3B – Representation of future northward view from CRAB Park beach (photo realistic)
KOP #4A – Current eastward view from Powell Street Lookout

KOP #4B – Representation of future eastward view from Powell Street Lookout (photo realistic)
KOP #1: Canada Place

- **Sensitivity:** KOP #1 is from the Canada Place cruise ship terminal, which is used by tourists and other members of the public. Canada Place provides one of the first views of Vancouver for those arriving by cruise ship. The walkway around Canada Place is used by visitors and local people, in part because of the wide views offered across from Stanley Park, the harbour, the North Vancouver cityscape, and the North Shore Mountains. The KOP is provides views across open water toward the proposed Project.

- **Magnitude:** The western expansion area of the proposed Project is clearly visible from KOP #1. The angle of this view limits the level of impact, however, with limited incremental blocking of surrounding mountains. As such, the main effect of the proposed Project would be to block the view of the existing Terminal, with minimal change in the scale and form of the view.
KOP #2: CRAB Park Pier

- **Sensitivity:** CRAB Park is located in an urban/industrial area, with and KOP #2 provides a clear view of the present Terminal. The park is used by people who value its location as a green space close to downtown and its views of the North Vancouver cityscape, the North Shore Mountains, and ship movements in the working harbour.
- **Magnitude:** From KOP #2, the proposed Project would block the view of parts of North Vancouver, including the high-rise buildings around Lonsdale Quay. The view of surrounding mountains and the horizon would remain mostly intact, and there would be no effect on westward views. The alteration in the view would be caused by infrastructure that would be a continuation of the existing Terminal, and not a new form or style of alteration. The proposed Project would, however, affect a view that is valued by users of this park.

KOP #3: CRAB Park Beach

- **Sensitivity:** As with KOP #2, KOP #3 is valued as a green space close to downtown and for its views of the North Vancouver cityscape, the North Shore Mountains, and ship movements in the working harbour. The Lonsdale Quay area is already partially blocked from KOP #3.
- **Magnitude:** The proposed Project would block parts of the shoreline of the North Shore, but would have only a minor effect on the view of the horizon and a negligible incremental impact on the already-obscured views of the cityscape around Lonsdale Quay. As with KOP #2, the alteration in the view would be caused by infrastructure that would be a continuation of the existing Terminal, and not a new form or style of alteration. The proposed Project would, however, affect a view that is valued by users of this park.

KOP #4: Powell Street Overpass

- **Sensitivity:** KOP #4 represents the view from vehicle traffic using the Powell Street Overpass, as well as that for pedestrians who use the overpass much less frequently. This location has views towards downtown Vancouver, the Terminal, the harbour, North Vancouver, the North Shore Mountains, and, in the foreground to the east, the Rogers Sugar building. The quality and geographic range of the view from this location is reflected in the presence of a lookout area that can be used by pedestrians. KOP #4 is directed towards the Rogers Sugar building, the entire façade of which can be seen. This view is important as it is one of the highest used and closest publicly accessible areas from which this historic building can be seen. The view of the Rogers Sugar building includes rail and road infrastructure in the foreground, but this existing infrastructure does not obscure the view of the building.
- **Magnitude:** The Centennial Road Overpass would be clearly visible from KOP #4 and would obscure the view of the lower floors of the Rogers Sugar building. Some of the lower parts of the building would still be visible beneath the bridge deck. The overpass structure would be consistent with the Powell Street overpass and the railroads, but would substantially alter the view of the Rogers Sugar building.

KOP #5: Vernon Drive

- **Sensitivity:** The Vernon Drive area is primarily used by passing vehicle traffic and is not an area used specifically for any visual values. The foreground view from KOP #5 is of the road and rail. The view of the Rogers Sugar building is partially blocked by railcars when they are present at this location.
- **Magnitude:** The Centennial Road Overpass would further block views from KOP #5 above the height of the rail cars. The overpass would also obscure the view of the lower floors of the Rogers Sugar building when the railcars are not present, meaning that views of these floors would be affected continuously rather than periodically as they are pre-project. Some of the lower parts of the building would still be visible beneath the bridge deck. The Centennial Road Overpass would also somewhat reduce the view of the mountains in the background, though not expected to noticeably affect the aesthetic value of the view for those passing along the road.
3. Shade Analysis

3.1 Study Methods

Methods used to conduct the shade analysis consisted of the following steps:

1. Develop a 3D representation to extend the analysis of visual impact beyond the use of 2D representations, and specifically to create a representation of shading that will arise from the proposed Project.

2. Use 3D modelling software (Trimble Sketchup and LumenRT) to create a realistic and immersive 3D environment and to develop shading profiles. The 3D scene was developed by using 3D building layouts from the City of Vancouver GIS department, and other models from the Trimble Sketchup 3D warehouse.

3. Alter the shade parameters to create representations of scenes at 9 a.m., 12 noon, and 3 p.m. on each key date required in VFPA’s View and Shade Guidelines: spring equinox, summer solstice, fall equinox, and winter solstice. These 12 representations are provided in Section 3.3.

These scenes are approximations of the current design based on the anticipated height and design of the western expansion area. The actual shading from the proposed Project may differ from these representations due to the simplifications made in developing these representations, and as a result of any refinements that are made to the design of the proposed Project. Hourly and daily changes in the positioning of quay cranes, containers and other movable structures will also lead to changes to the actual shading that is produced at any given time.

3.2 Shade Study Area

The geographical scope for the shade analysis (Shade Study Area) is based on the footprint of the proposed Project (Figure 3-1) and shadows cast from structures on that footprint. The study area for modelling and visualisation of shading from the western expansion area is based on the farthest extent of shading at the date and time scenarios included in the analysis.
3.3 Existing Conditions and Potential Project Effects

Figure 3-2 to Figure 3-13 provide 12 unique scenes that depict the modelled shading profiles from the proposed western expansion area for the specified time scenarios of 9 a.m., 12 noon, and 3 p.m. for the dates of the spring equinox, summer solstice, fall equinox, and winter solstice. The profiles show the direction and extent of shading from existing buildings in this area and new proposed structures.

The representations of the western expansion area depict the building footprints and shading profiles for surrounding buildings that were included in the modelling, and also for the seven quay cranes that will result from the proposed Project. For simplicity and to help emphasise the shading profile, the shoreline and other non-modelled features are not shown in the representations.

No shading profiles were developed for the eastern expansion area and overpass development. Any effects of shading from these components are expected to be limited, due to the limited heights of these components, and their locations within areas already used for industrial and transportation purposes.

Any incremental shade effect from the western terminal expansion is predicted to be very low throughout the year, owing to the limited size and height of the western expansion area and the long distances to the closest land, residential, and public use areas. Due to the similar position and size of the quay cranes, the shading profile from the full set of seven quay cranes is only marginally larger than that shown for the five quay cranes shown in the representations.

The farthest reaching shade scenarios (by area) occur at 9 a.m. during spring equinox, fall equinox, and winter solstice. During winter solstice at 9 a.m., the maximum amount of shade is cast off of the edge of the terminal boundaries to the west. For this and the other scenarios, the shadows from the proposed Project would be limited to the water. As such, the shading from the proposed Project would not affect the surrounding properties and public use areas on land. Due to the limited geographic extent of changes in shading, it is expected that secondary effects arising from shade (on marine habitat, or land, air, or water temperatures) would also be negligible.
Figure 3-2: Representation of shading effect from proposed Project for spring equinox 9 a.m. scenario
Figure 3-3: Representation of shading effect from proposed Project for spring equinox 12 noon scenario
Figure 3-4: Representation of shading effect from proposed Project for spring equinox 3 p.m. scenario
Figure 3-5: Representation of shading effect from proposed Project for summer solstice 9 a.m. scenario
Figure 3-6: Representation of shading effect from proposed Project for summer solstice 12 noon scenario
Figure 3-7: Representation of shading effect from proposed Project for summer solstice 3 p.m. scenario
Figure 3-8: Representation of shading effect from proposed Project for fall equinox 9 a.m. scenario
Figure 3-9: Representation of shading effect from proposed Project for fall equinox 12 noon scenario
Figure 3-10: Representation of shading effect from proposed Project for fall equinox 3 p.m. scenario
Figure 3-11: Representation of shading effect from proposed Project for winter solstice 9 a.m. scenario
Figure 3-12: Representation of shading effect from proposed Project for winter solstice 12 noon scenario
Figure 3-13: Representation of shading effect from proposed Project for winter solstice 3 p.m. scenario
4. Conclusions

The decision to expand the existing Centerm site rather than develop a new terminal was based on a number of considerations, including the potential for visual and shading effects. The expansion of the existing Centerm site will deliver capacity and efficiency improvements without creating the geographic scale of visual and shading effects that would be created from a new terminal. The footprint of the Site has been designed to fulfil operational requirements while minimising project effects related to the footprint, including those on views and shading. Beyond the decision to expand the existing Centerm site rather than building a new terminal, and minimizing the footprint, no other mitigation measures are warranted to reduce visual and shade effects.

The western expansion part of the CEP would create noticeable changes to views at KOPs, particularly from CRAB Park. While this and other KOPs have valued views of the North Shore cityscape and surrounding mountains, the changes would be to a small proportion of views that are currently wide (across the North Shore) and deep (from the harbour to the mountains), and already include greatly altered landscapes. The changes created by the proposed Project would be of the same character as that of existing industrial use of the area, including the current Centerm facility. By contrast, the eastern expansion and road alterations would change views somewhat, but only within industrial areas where viewers would have very low sensitivity to such changes.

The Centennial Road Overpass portion of the SSAP would obscure views of the lower floors and windows of the Rogers Sugar building façade. This effect is more related to the historical values of the Rogers Sugar building, than it is to an altered viewscape, and is addressed as an effect on the Heritage Resources Environmental Component, in the Environmental Study Report.

Shading effects have been characterized as having a very limited geographic extent, and so have a low magnitude effect on surrounding areas. Shadows from the proposed Project would be limited to the water and would not affect areas on land or used by the public.
5. References

About AECOM

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