



EXPERIENCE OF THE NE SIDEWALK, EXISTING CONDITION

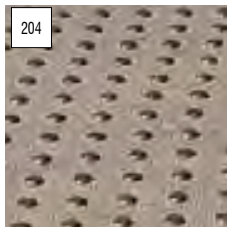
AREA 1 - NORTH OF BRIDGES

TRAFFIC, GRADING, FLAT WORK
ADDITIONAL PEDESTRIAN REALM IMPROVEMENTS
ACCESS FROM 9TH AVE - NE STAIR
ACCESS FROM 9TH AVE - NW STAIR

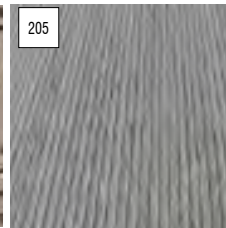


STREET TREES - AMER. EMS
BRUSHED CONCRETE
WEATHERING STEEL TACTILE STRIPS
TEXTURED CONCRETE

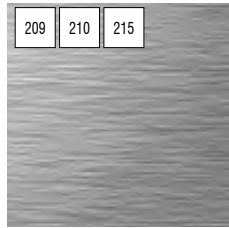
MATERIAL PALETTES - REFER TO APPENDIX 2.6 FOR PRODUCT INFORMATION SHEETS



PAINTED CONCRETE
SOFT LANDSCAPING

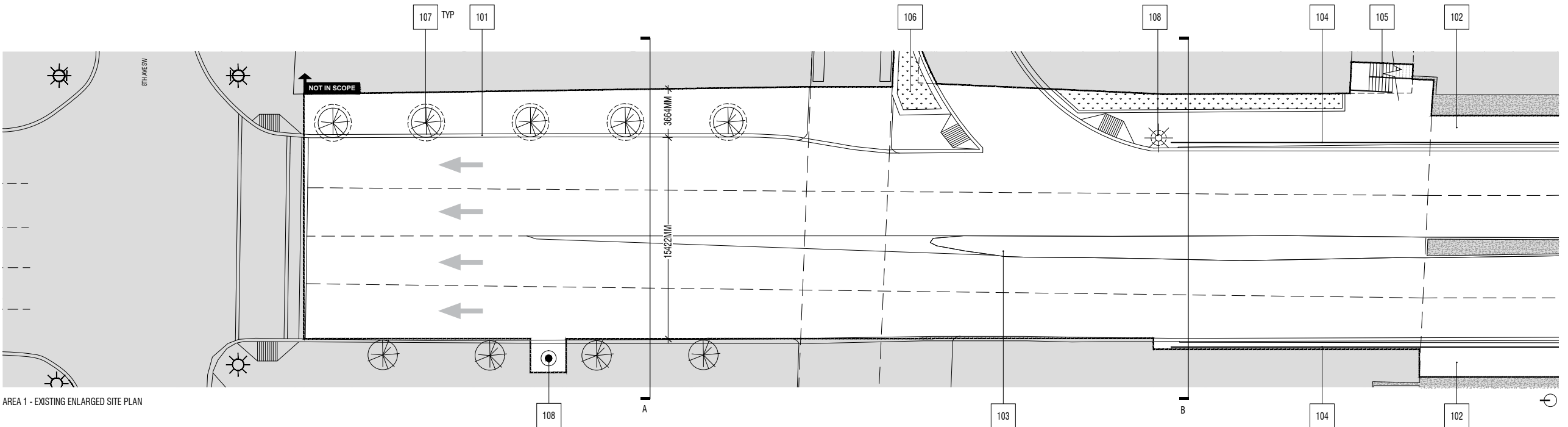


STAINLESS STEEL
BRUSHED ALUMINUM



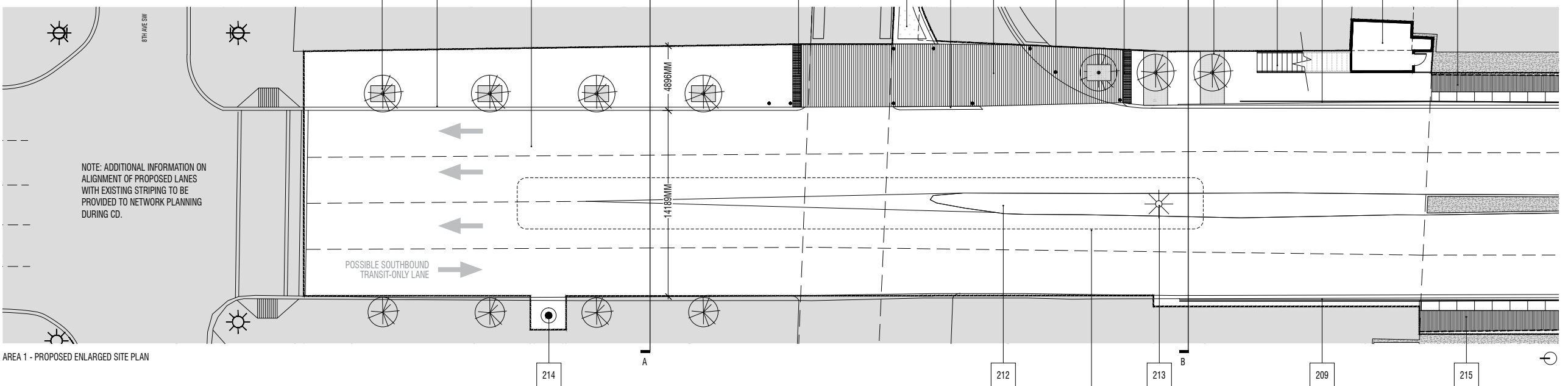
BRUSHED ALUMINUM

- EXISTING KEYNOTES**
- 101 EXISTING SIDEWALK, RAMPS, CURB & GUTTER
 - 102 EXISTING SIDEWALK, ABOVE RETAINING WALL
 - 103 EXISTING MEDIAN
 - 104 EXISTING GUARD RAIL
 - 105 EXISTING STAIR & GUARD RAIL, FROM 9TH AVENUE
 - 106 EXISTING PLANTER
 - 107 EXISTING STREET TREES, BASINS & GRATE
 - 108 EXISTING STREET LIGHT POLE C/W CONCRETE BASE



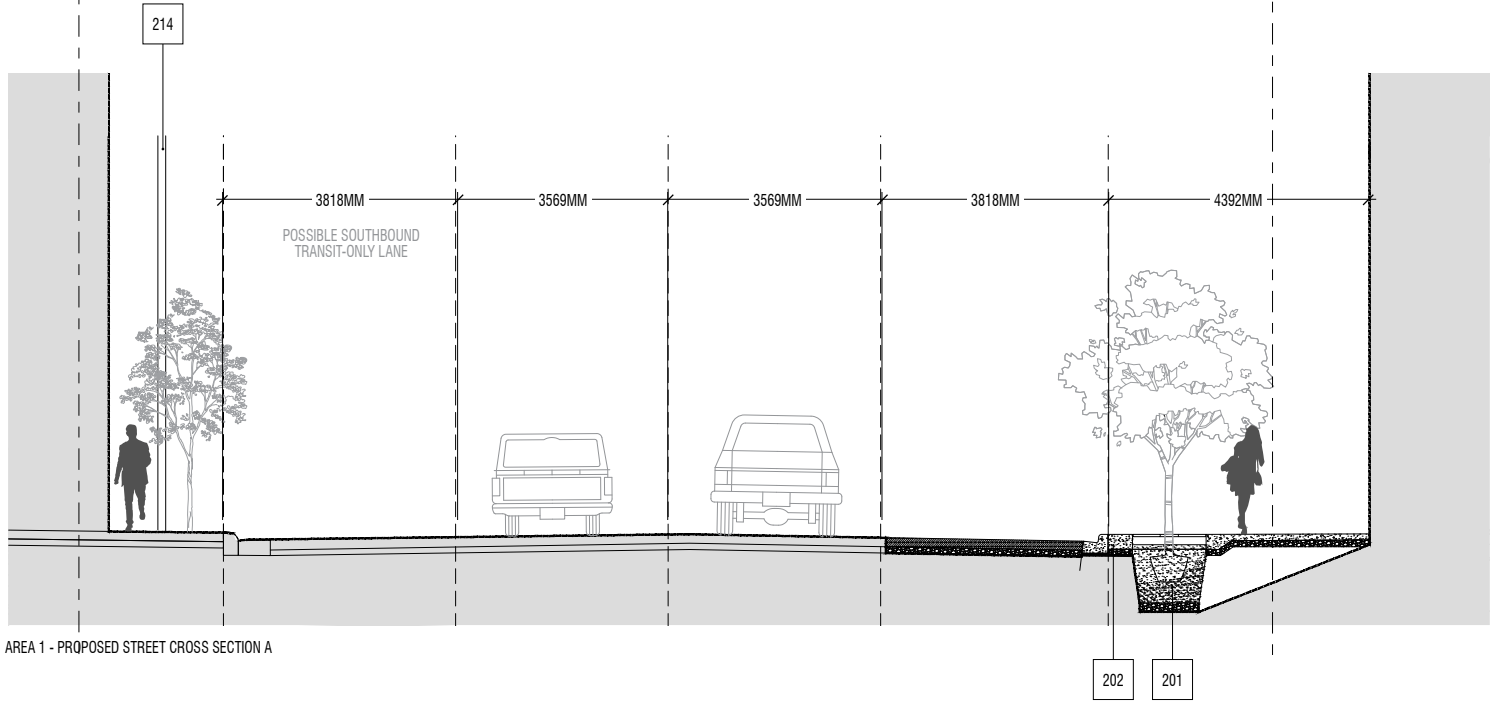
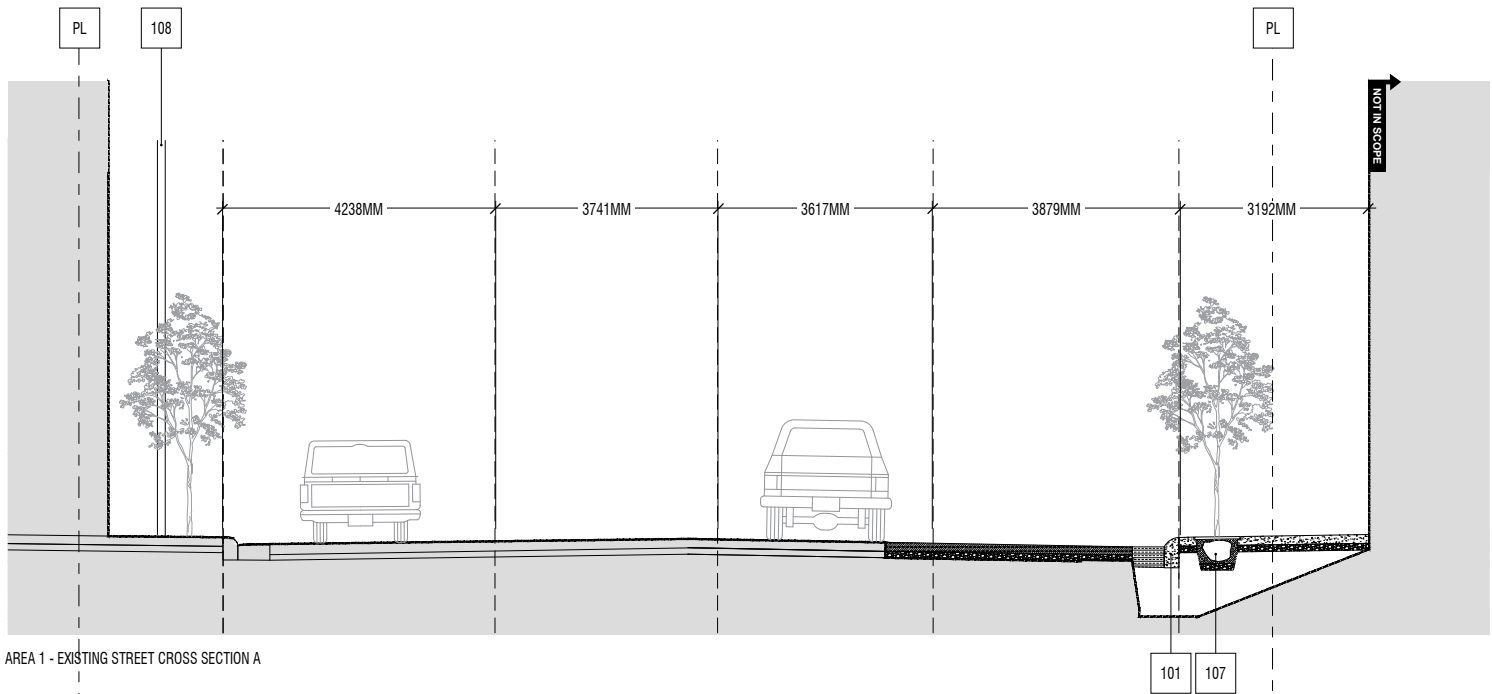
AREA 1 - EXISTING ENLARGED SITE PLAN

- PROPOSED KEYNOTES**
- 201 85MM PRAIRIE SPIRE GREEN ASH C/W TREE TRENCH, WELL FRAME & NON-SLIP ADA CAST ALUMINUM GRATE
 - 202 SIDEWALK, CURB & GUTTER, AS PER C OF C DOWNTOWN SPECS; PATCHING OF ADJACENT ASPHALT AS REQUIRED
 - 203 RE-STRIPING OF LANES, AS REQUIRED
 - 204 CAST IRON TACTILE STRIP
 - 205 CONCRETE WALKWAY, TEXTURED
 - 206 STAINLESS STEEL SAFETY BOLLARDS
 - 207 PROPOSED CURB
 - 208 REVISED PLANTER C/W SOFT LANDSCAPING
 - 209 ALUMINUM GUARD RAIL C/W STAINLESS STEEL CABLES; BRUSHED FINISHED
 - 210 ALUMINUM STAIR & GUARD RAIL - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'
 - 211 CONDITIONED CONTROLS ROOM - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'
 - 212 RE-MEDIATED MEDIAN
 - 213 PROPOSED STREET LIGHT POLE C/W CONCRETE BASE INTEGRATED INTO MEDIAN - REFER TO 'STREET LIGHTING'
 - 214 PROPOSED STREET LIGHT POLE, EXISTING BASE - REFER TO 'STREET LIGHTING'
 - 215 ELEVATED ALUMINUM WALKWAY/WALL ASSEMBLY



AREA 1 - PROPOSED ENLARGED SITE PLAN

NOTE: CONFIGURATION AND SIZE OF NORTH MEDIAN TO BE RECONSIDERED IN CONJUNCTION WITH LANE RE-STRIPING. ADDITIONAL INFORMATION TO BE PROVIDED TO NETWORK PLANNING DURING CD.



TRAFFIC, GRADING, FLAT WORK

A number of upgrades have been proposed with respect to the existing roadway surface, adjoining curbs, gutters and sidewalks between 8th Avenue SW and 10th Avenue. A high level overview of the scopes of work follows.

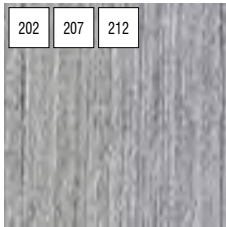
Existing variable curbs & grade changes at the 3rd Street Connector have been removed in favour of a level, universally accessible crossing that employs an alternative concrete paving strategy (not paint) to signify to pedestrians & vehicles that they are entering a multi-modal zone. Bollards provide security to pedestrians, provide valuable direction to traffic, and offer a potential opportunity to incorporate pedestrian scaled lighting. Tactile strips, consistent with urban braille good practices, mark the threshold from sidewalk to road crossing, signifying the inherent risk associated with this multi-modal interface.

North of the connector, new curb and gutter construction along with a revised curb alignment increases the effective width of sidewalk. An existing catch basin along this section will require relocation, and reconstruction of the curve return in the southeast quadrant of the 8th Avenue SW/4th Street SW intersection is necessary.

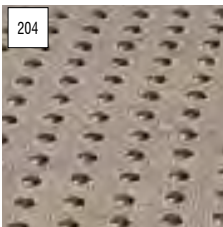
Mindful that 4th Street SW was recently resurfaced (in 2012), in order to match the existing roadway pavement surface to the newly constructed lip of gutter, the adjacent curb lane to the NE improvements will require cold mill and overlay. Restriping of the existing roadway to reflect changes in the curb alignment is also required. Proposed alterations to the lane widths will be explored with consideration of the existing lanes north of 8th Avenue SW. Any proposed changes will be submitted to The City for further review.

All proposed roadway improvements will be designed and constructed in accordance with the *City of Calgary's Road Construction 2015 Standard Specifications*, to the fullest extent possible. To accommodate some of the unique design characteristics of the project, reference may also be made to the *City of Calgary's Complete Streets Policy (TP021)* and *2014 Complete Streets Guide*, and the *Transportation Association of Canada's Geometric Design Guide for Canadian Roads (1999)* where required. In addition, a comprehensive list of critical assumptions driving the development of the civil scope of work can be found in Appendix 2.2.

For additional information on both median remediation & the street lighting scope, please refer to 'Additional Systems', towards the end of this document.



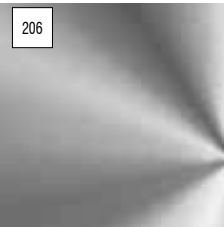
BRUSHED CONCRETE



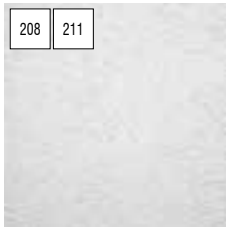
WEATHERING STEEL TACTILE STRIPS



SOFT LANDSCAPING



STAINLESS STEEL



PAINTED CONCRETE



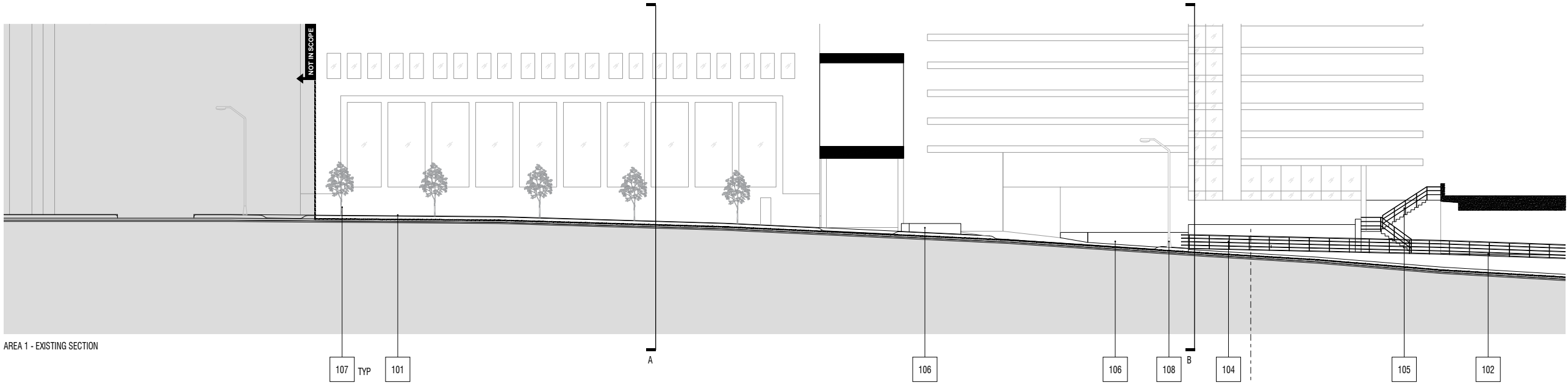
STREET TREES - AMER. EMS



BRUSHED ALUMINUM

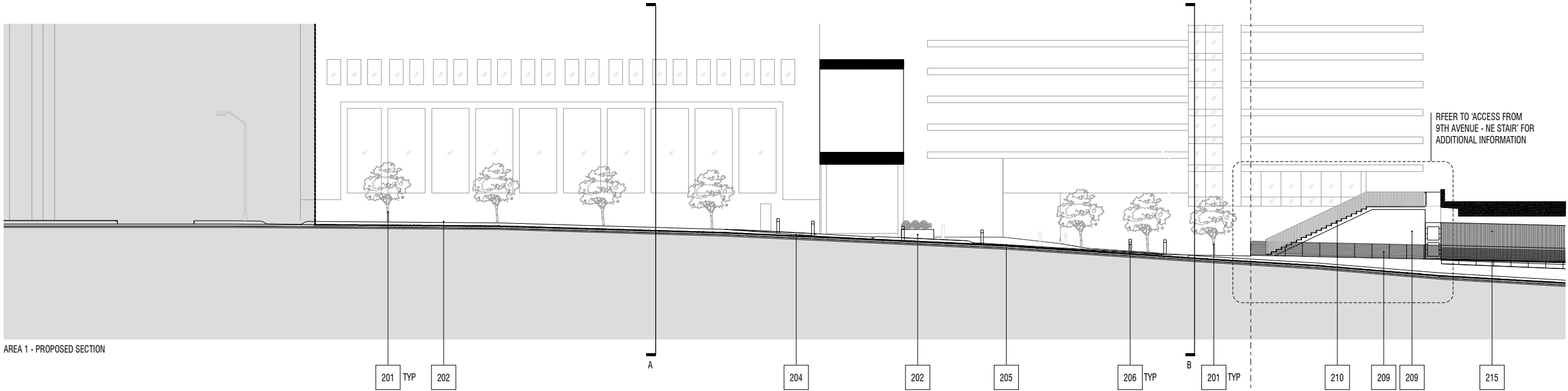
MATERIAL PALETTES
(REFER TO APPENDIX 2.6 FOR PRODUCT INFORMATION SHEETS)

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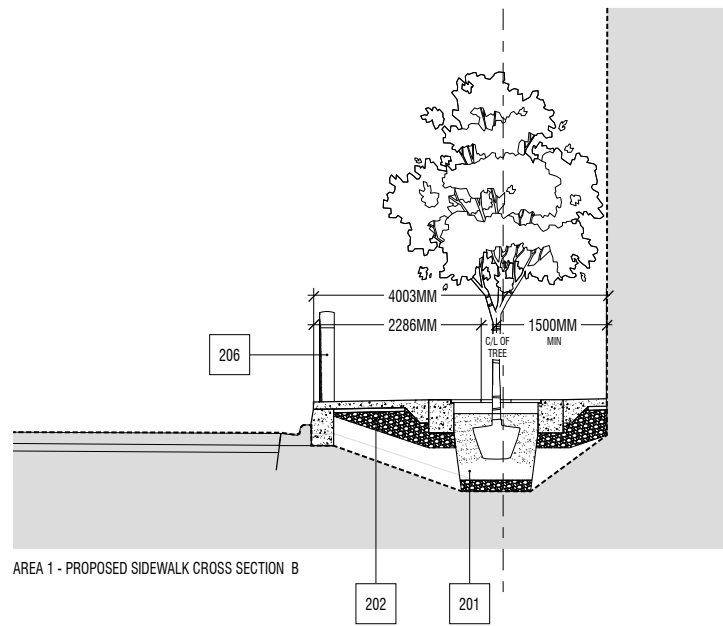
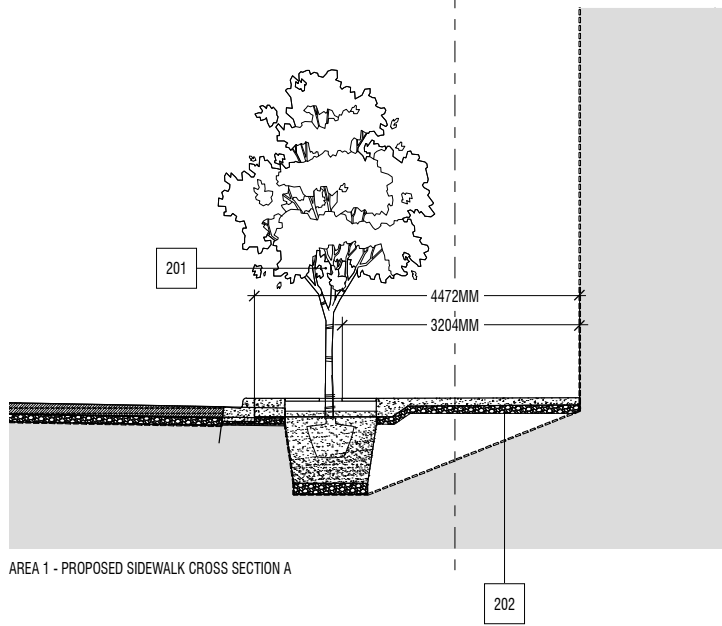
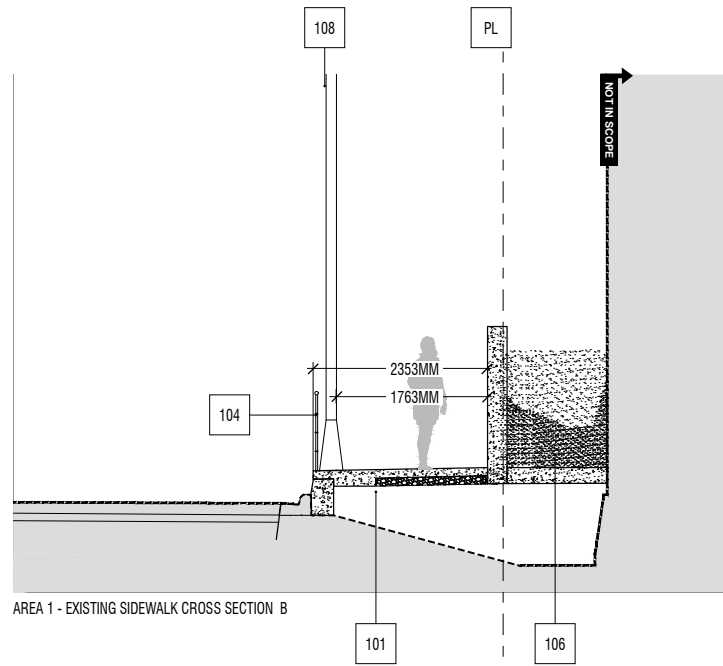
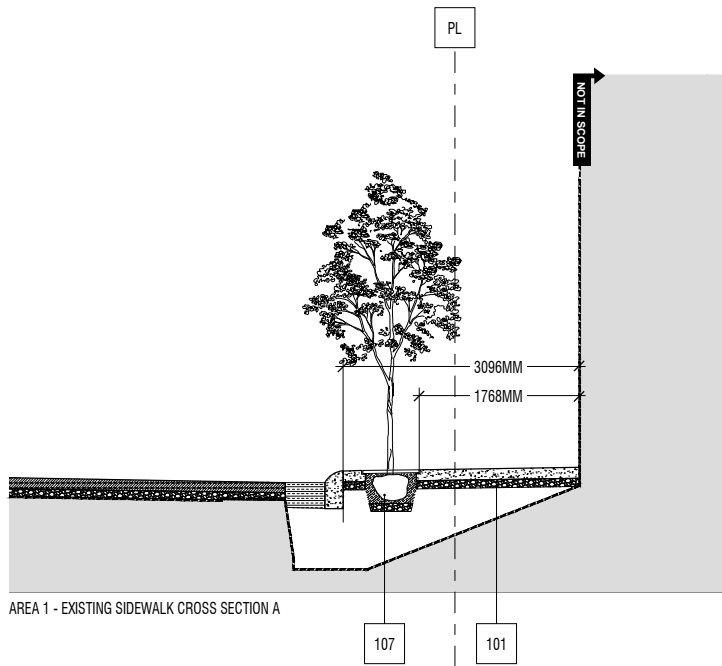
AREA 1 - EXISTING SECTION

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AREA 1 - PROPOSED SECTION

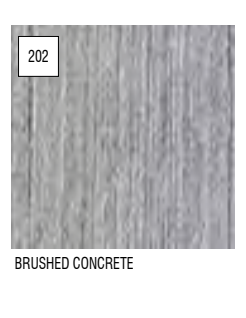
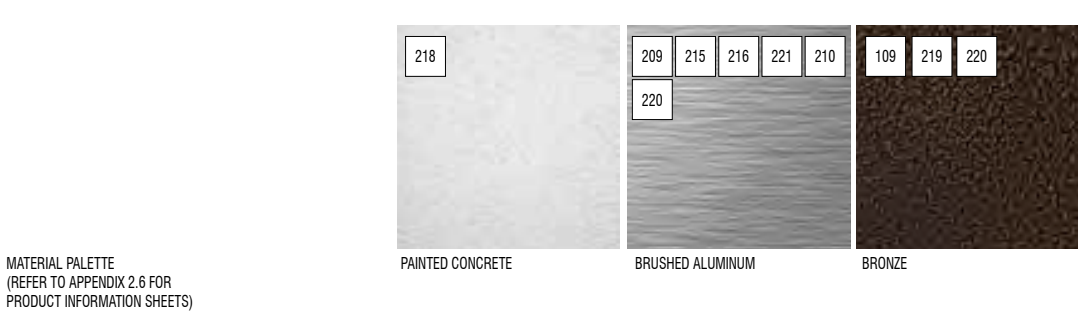
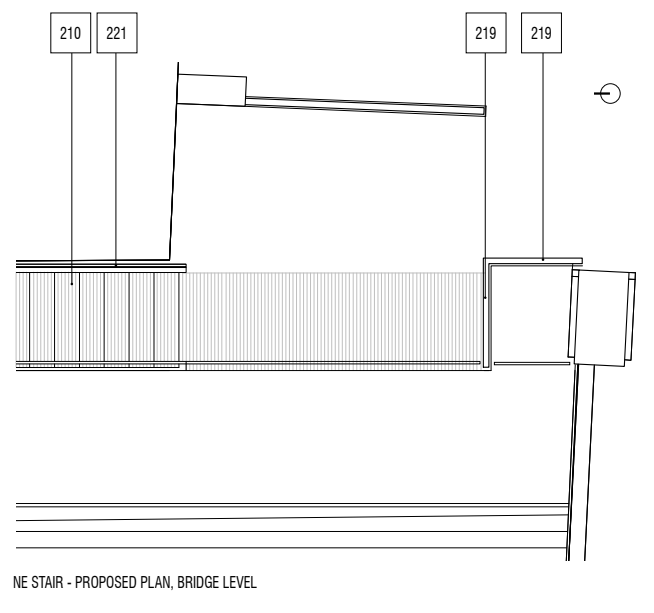
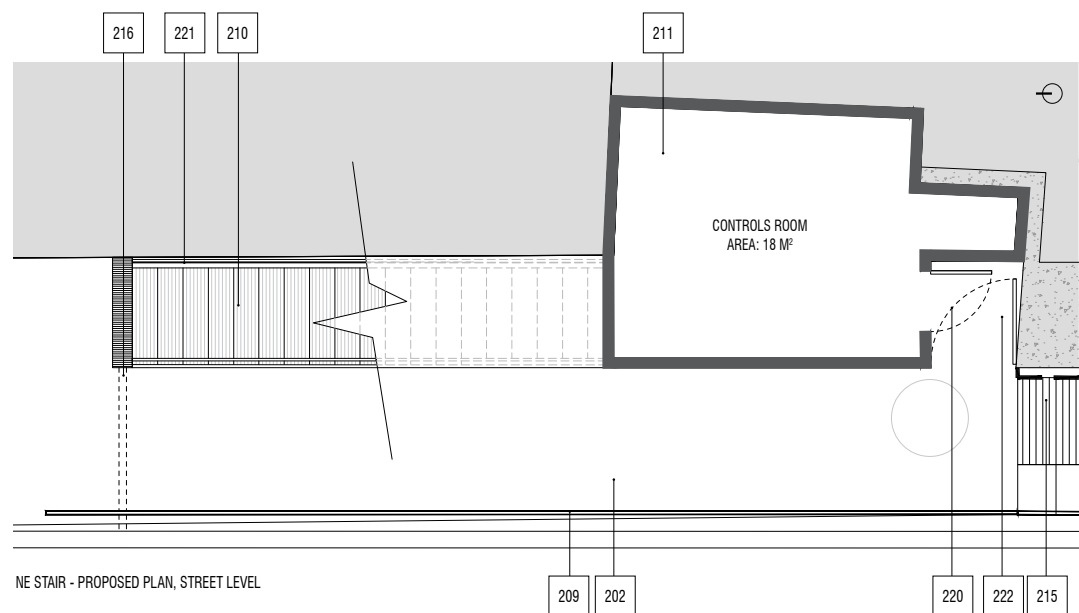
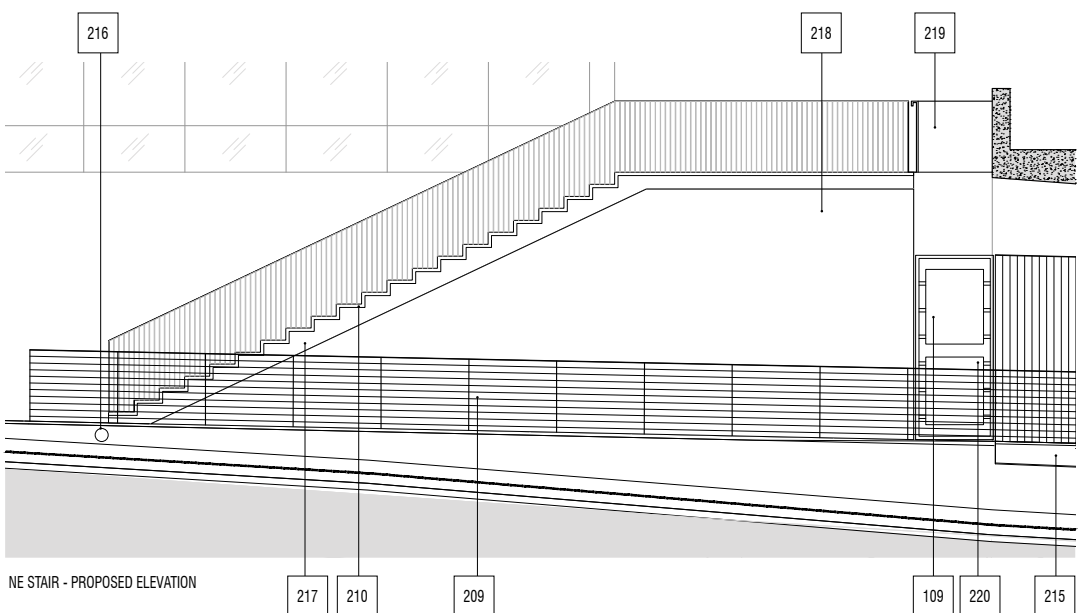
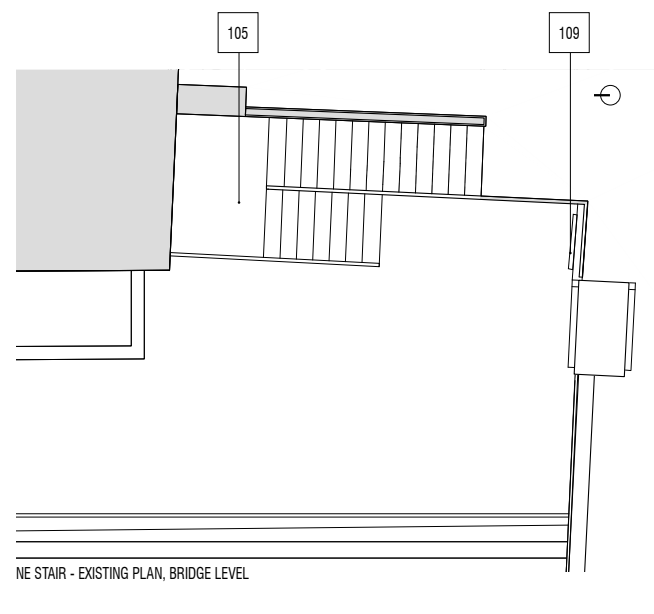
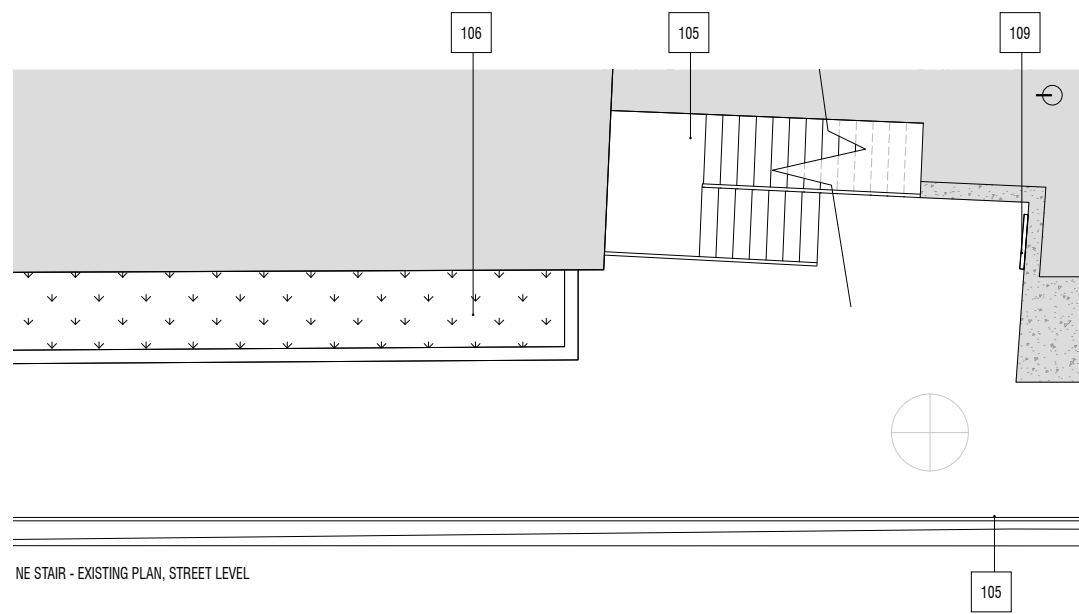
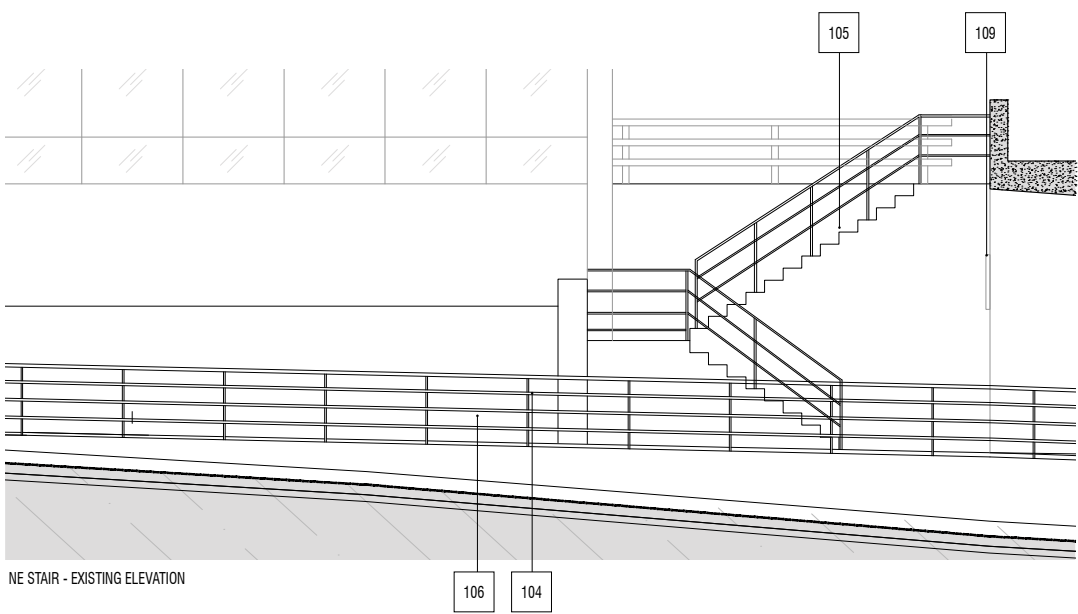
NOTE: NEW EXTENTS OF PROPOSED
GUARD (SIDEWALK <600MM
ABOVE ROADWAY)



ADDITIONAL PEDESTRIAN REALM IMPROVEMENTS

In addition to extending the physical extents of the NE sidewalk, the relocation of street light standards to the centre median and the reduction/removal of existing planters improves the overall effective width for pedestrians. Retaining walls, exposed by the demolition of the planter, will be patched and painted.

To balance the landscaping improvements recently completed as part of the Eighth Avenue Place development, seven American Elms, complete with tree trenches, are proposed for the NE sidewalk. Heel safe, ADA compliant and slip-resistant linear aluminum grates, compatible with the standard City of Calgary 4'x6' frames, have been specified throughout. Additional information on the product specifications & standards for the aforementioned elements can be found within Appendix 2.6.

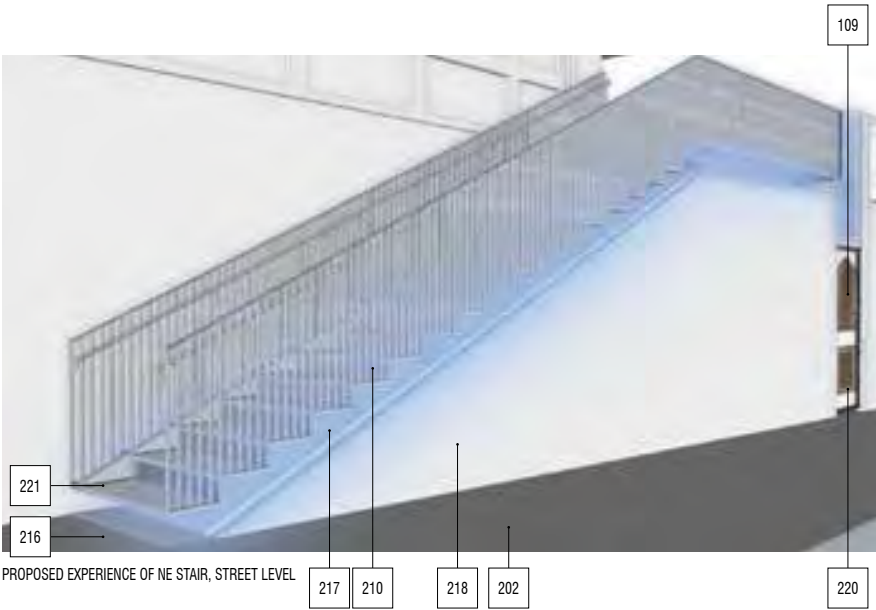




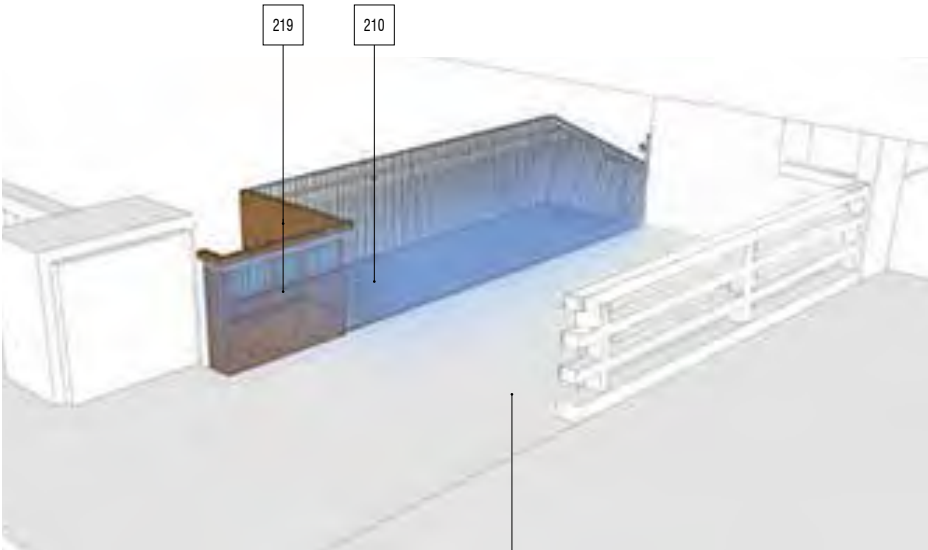
EXISTING EXPERIENCE OF NE STAIR, STREET LEVEL



EXISTING EXPERIENCE OF NE STAIR, BRIDGE LEVEL



PROPOSED EXPERIENCE OF NE STAIR, STREET LEVEL



PROPOSED EXPERIENCE OF NE STAIR, BRIDGE LEVEL

ACCESS FROM 9TH AVENUE - NE STAIR

The existing north east stair, leading from 9th Avenue to 4th Street, is plagued by poor accessibility, widespread material degradation and limited visibility into and out of the space.

The proposed stair, an illuminated aluminum insertion, rectifies these existing safety and comfort concerns while complementing the broader public art narrative. Rich and animated, the proposed civic stair creates a sense of theatre by framing the body as citizens approach & exit 4th Street SW. Through massing and material, the stair celebrates the heritage of the underpass while elegantly complementing the broader public art insertion.

- Features of the new stair include:
- Improved connectivity for both pedestrians & cyclist (runnel for bike tires);
 - Way finding visible when entering & leaving 4th Street SW;
 - Incorporation of historic and proposed commemorative plaques into new gate;
 - Highlights existing bridge structure through massing & lighting;
 - Provides hidden infrastructure: houses lighting controls & security system equipment within a secure, conditioned room below stairs;
 - Incorporates CPTED principle of eliminating hidden corners & dead space;
 - Creates a generous upper landing;
 - Connects to existing west landscaping through planting at top;
 - Serves as an extension of the public art narrative.

ACCESS FROM 9TH AVE - NW STAIR

On the NW corner of the site, a smaller existing stair serves the 9th Avenue sidewalk, leading to the adjacent west surface parking lot. As part of the 4UE directive to improve accessibility, the existing concrete stairs at this location are scheduled for remediation.

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	107 EXISTING STREET TREES, BASINS & GRATE
	108 EXISTING STREET LIGHT POLE C/W CONCRETE BASE
	109 EXISTING HISTORICAL PLAQUE, BRONZE

PROPOSED KEYNOTES	
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215	ELEVATED ALUMINUM WALKWAY/WALL ASSEMBLY
216	TRENCH DRAIN C/W BAFFLE; ALUMINUM, NON-SLIP

217	WALL-MOUNTED ACCENT LIGHTING
218	PROPOSED CONCRETE WALL; PAINTED
219	SOLID METAL GUARDRAIL C/W WAY FINDING SIGNAGE & ACCENT LIGHTING
220	CUSTOM ACCESS GATE C/W PROPOSED COMMEMORATIVE PLAQUE
221	BIKE RUNNEL
222	IN-GRADE UP LIGHT FOR BRIDGE STRUCTURE
223	PROPOSED PLANTER C/W SOFT LANDSCAPING





EXISTING EXPERIENCE, BETWEEN BRIDGES

AREA 2 - UNDER & BETWEEN BRIDGES

DESIGN ENVELOPE
TWO CONDITIONS
UNDER THE BRIDGES - SPACE OF REFLECTION
BETWEEN THE BRIDGES - SPACE OF CONVERSATION
THE VEIL
STRUCTURAL SYSTEM
OPERATIONS & MAINTENANCE

- TAG

PROPOSED KEYNOTES

201

85MM PRAIRIE SPIRE GREEN ASH C/W TREE TRENCH, WELL FRAME & NON-SLIP ADA CAST ALUMINUM GRATE

202

SIDEWALK, CURB & GUTTER, AS PER C OF C DOWNTOWN SPECS; PATCHING OF ADJACENT ASPHALT AS REQUIRED

203

RE-STRIPING OF LANES, AS REQUIRED

204

CAST IRON TACTILE STRIP

205

CONCRETE WALKWAY, TEXTURED

206

STAINLESS STEEL SAFETY BOLLARDS

207

PROPOSED CURB

208

REVISED PLANTER C/W SOFT LANDSCAPING

209

ALUMINUM GUARD RAIL C/W STAINLESS STEEL CABLES; BRUSHED FINISHED

210

ALUMINUM GUARD RAIL & TREAD ASSEMBLY C/W SLIP-RESISTANT FINISH, BRUSHED - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'

211

CONDITIONED CONTROLS ROOM - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'

212

RE-MEDIATED MEDIAN

213

PROPOSED STREET LIGHT POLE C/W CONCRETE BASE INTEGRATED INTO MEDIAN - REFER TO 'STREET LIGHTING'

214

PROPOSED STREET LIGHT POLE, EXISTING BASE - REFER TO 'STREET LIGHTING'

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ELEVATED ALUMINUM WALKWAY/WALL ASSEMBLY

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TRENCH DRAIN C/W BAFFLE; ALUMINUM, NON-SLIP

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WALL-MOUNTED ACCENT LIGHTING

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PROPOSED CONCRETE WALL; PAINTED

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SOLID METAL GUARDRAIL C/W WAY FINDING SIGNAGE & ACCENT LIGHTING

220

CUSTOM ACCESS GATE C/W PROPOSED COMMEMORATIVE PLAQUE

221

BIKE RUNNEL

222

IN-GRADE UP LIGHT FOR BRIDGE STRUCTURE

223

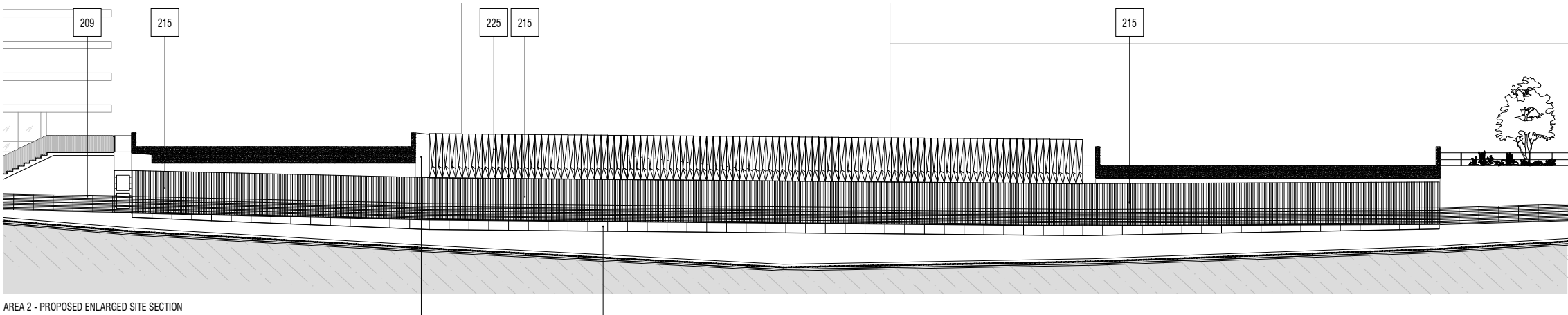
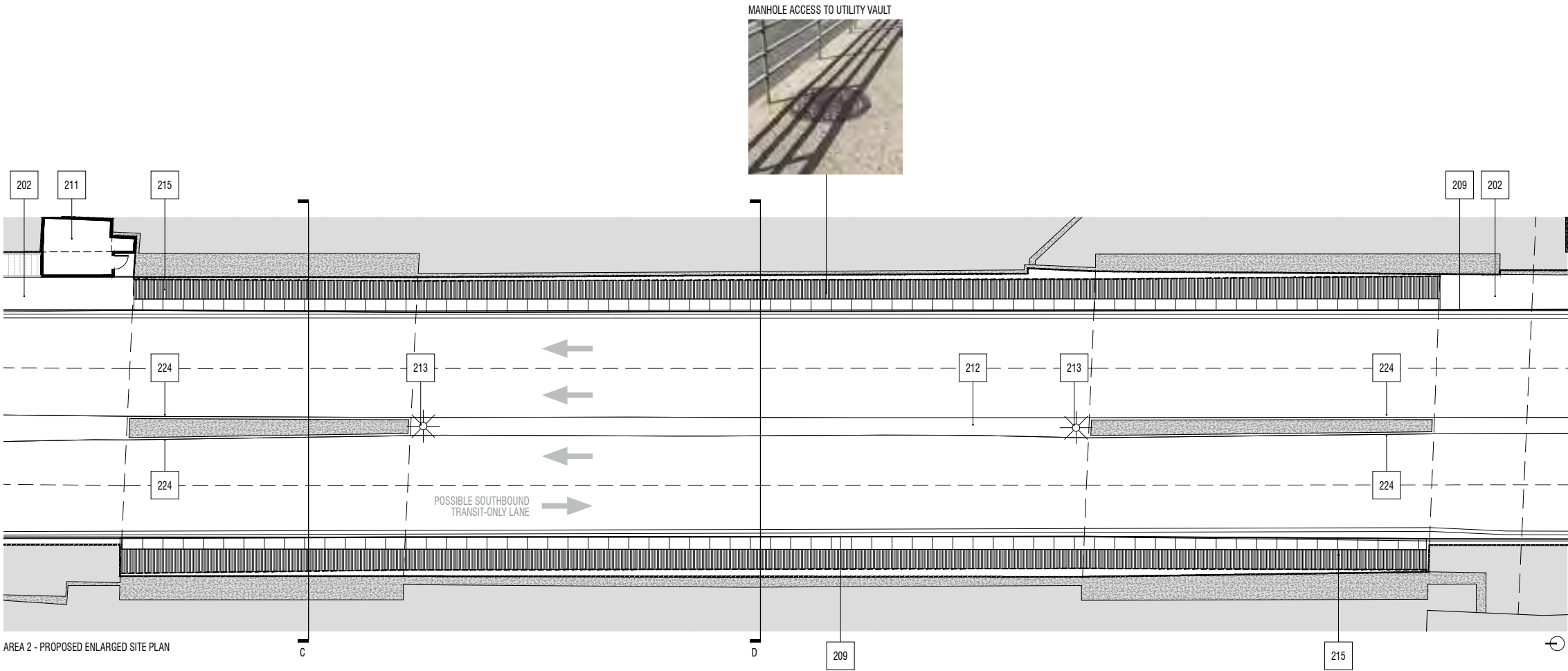
PROPOSED PLANTED C/W SOFT LANDSCAPING

224

REFLECTIVE ALUMINUM PLATE; POLISHED

225

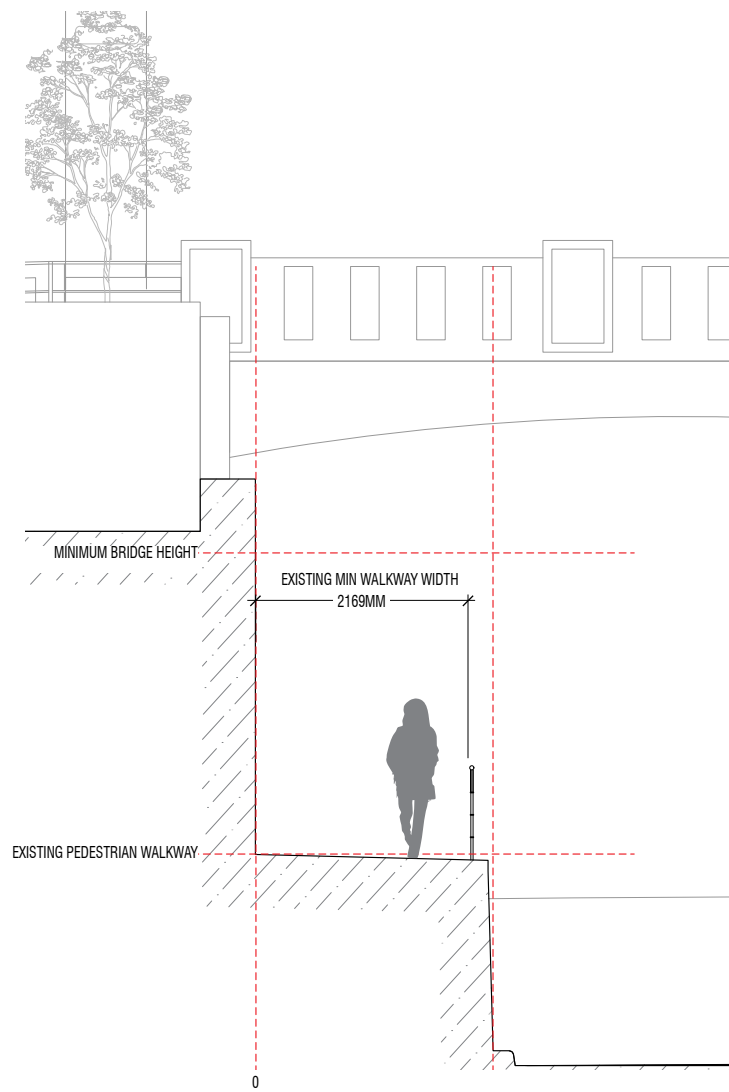
POLYCARBONATE VEIL



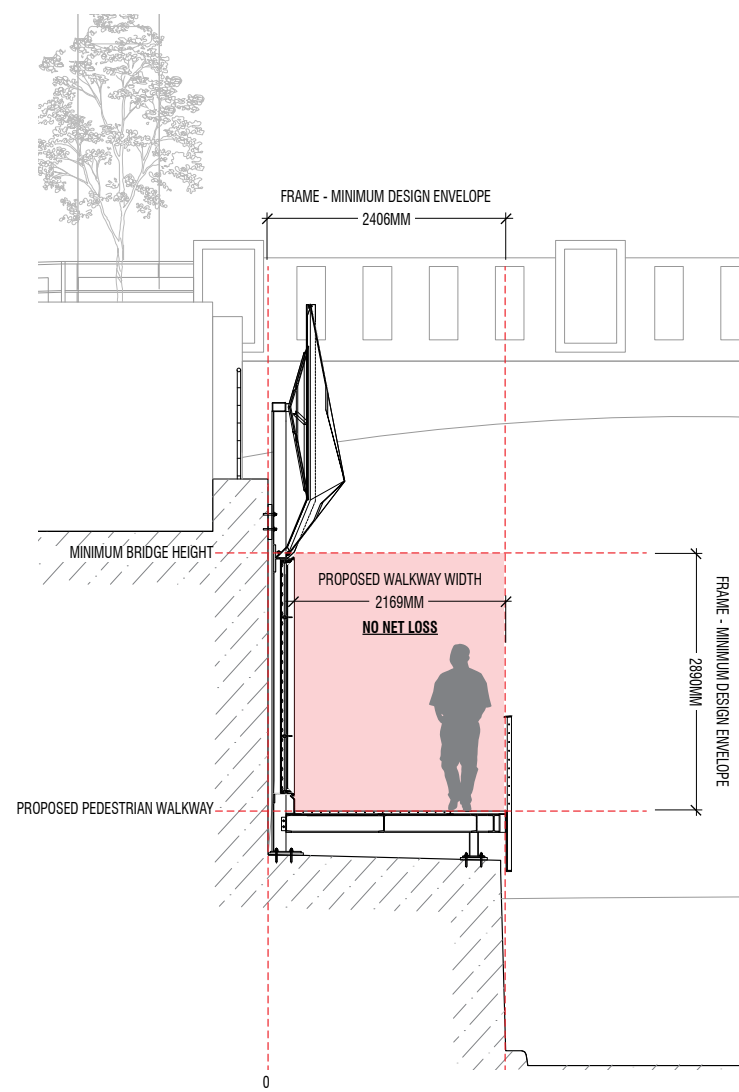
9TH AVE BRIDGE, SOUTH EAST TURNOFF



UNEVEN GRADING OF EXISTING SIDEWALK;
SHIFTING PROFILE OF RETAINING WALLS



MAPPING THE DESIGN ENVELOPE: MINIMUM & MAXIMUM EXTENTS



DESIGN ENVELOPE

To create a world-class pedestrian experience, a longstanding directive has been to ensure any changes to the sidewalk results in **no net loss** of effective width across the length of the project.

At the outset of the design process, in order to define this critical context as early as possible, City of Calgary Digital Aerial Surveys were used in conjunction with on site measurements to generate as-built information. Accounting for the introduction of the wall assembly, the Schematic Design was predicted to increase the effective width by offsetting assembly thickness through a relocation of the guardrail, appropriating the space above the existing curb.

Following the circulation of the Schematic Design Report, feedback received from Transit highlighted the requirement to abstain from projecting into this space above the curb. To accommodate buses, the minimum required lane width was noted as 3.3m plus the additional capacity for mirrors to encroach over the curb & gutter. A potential conversion of the westernmost lane into a transit-only southbound lane further reduces any margin for error; hence, any encroachment (particularly on the west side of the underpass) must be reduced.

As part of the Design Development of the project, a more precise understanding of the existing context was offered in a 3D model generated from LIDAR point cloud data. From that information, the Design Team was able to comprehensively map the maximum and minimum extents of the existing effective widths in the space. The **minimum effective sidewalk width** in the existing condition (from retaining wall face to inside of guardrail) **is 2169mm**, less than previously predicted. At locations where existing street light poles sit within the sidewalk, this effective width is further reduced.

In response to narrower-than-anticipated sidewalk widths and constraints associated with curb impediment, the Design Team has introduced several strategies to reduce the overall thickness of the wall assembly towards maintaining the existing sidewalk width:

- Minimizing primary structural sections, by moving from aluminum to steel;
- Shifting the location of diffusing surface (balancing performance with pragmatics);
- Reducing the vertical aluminum fin depth; and
- Altering guardrail profile.

In its current configuration, **the proposed sidewalk meets the aforementioned requirement for no net loss of effective width (2169mm).**

For additional information on the detailed mapping exercise, refer to Appendix 1.2.

In addition to the constraint of sidewalk width, other contextual anomalies such as the 9th Avenue turnoff overhang, significant variance in the height of the retaining walls, and the location of manholes in the sidewalk have been mapped and accounted for in the current design.

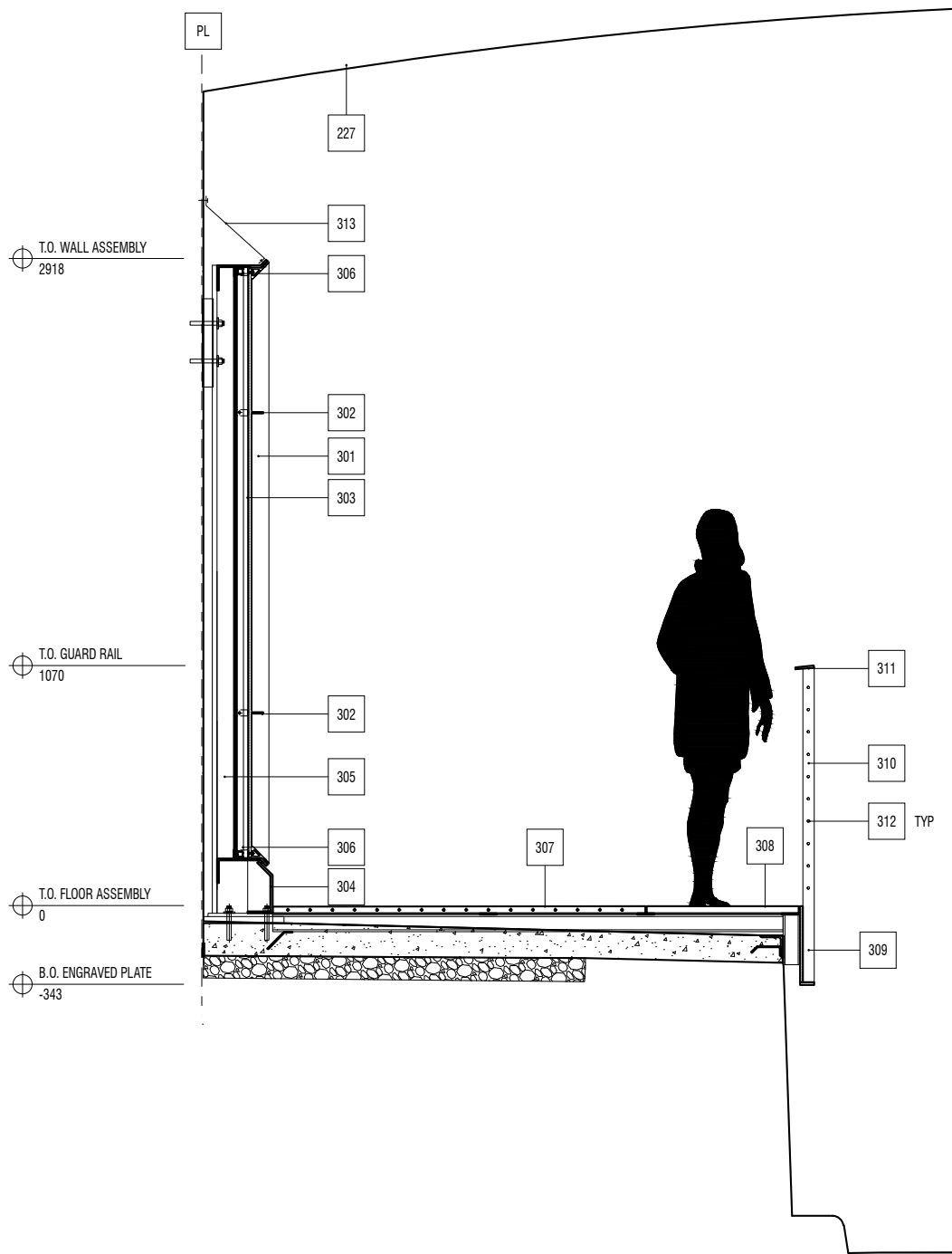
TWO CONDITIONS

Within Area 2, two infrastructure conditions reflect the two different spaces within the public art narrative:

1. Under the bridges - Space of Reflection
2. Between the Bridges - Space of Conversation



the marc boutin architectural collaborative inc. with Krzysztof Wodiczko



PROPOSED BRIDGE CROSS SECTION C

TAG		
301	FRAME	VERTICAL ALUMINUM FINS (PROTECTIVE GRILL); BRUSHED FINISH
302		HORIZONTAL ALUMINUM STIFFENING BARS; MILL FINISH
303		TRANSLUCENT DIFFUSING SURFACE
304		ALUMINUM KICK PLATE/CONDUIT HOUSING; BRUSHED FINISH
305		GALVANIZED STEEL PRIMARY STRUCTURE - REFER TO STRUCTURAL
306		LINEAR LED FIXTURE; TRAXON NANO LINEAR ALLEGRO - REFER TO PUBLIC ART
307	WALKWAY	ALUMINUM NON-SLIP METAL GRATING; HEEL SAFE, ADA COMPLIANT
308		ALUMINUM NON-SLIP METAL PLATE, ADA COMPLIANT
309		ENGRAVED ALUMINUM SIGNAGE PLATE; BRUSHED FINISH
310	GUARD	ALUMINUM GUARDRAIL POSTS; BRUSHED FINISH
311		ALUMINUM TOP RAIL; BRUSHED FINISH
312		STAINLESS STEEL CABLES, 100MM O/C
313		ANTI-ROOSTING FLASHING



SPACE OF REFLECTION

UNDER THE BRIDGES - SPACE OF REFLECTION

Descending beneath the first bridge, a material shift from concrete to metal underscores the transition into an 'other' space. The existing bridge abutment is transformed from obstruction to active surface; polished metal cladding draws a visitor's gaze from ahead to across, and abstractly reflects one's own body within the context of the frame.

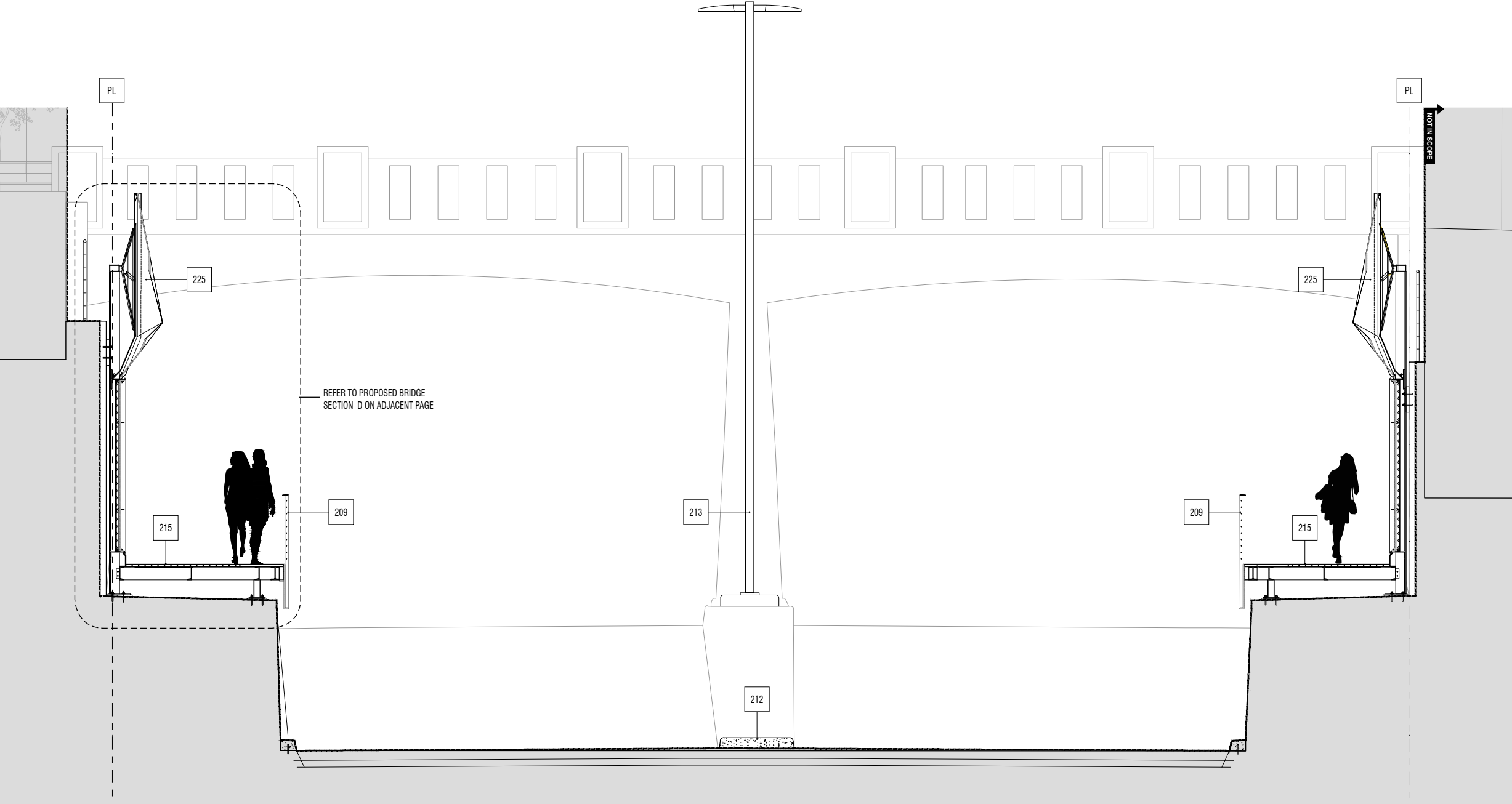
A significant design element, the frame simultaneously operates within multiple roles:

- As a safe grade separation;
- As an accessible walkway;
- As a water mitigation strategy;
- As an urban-scale gesture (reinforcing legibility of the space);
- As a conditioner of natural lighting;
- As a source of artificial lighting;

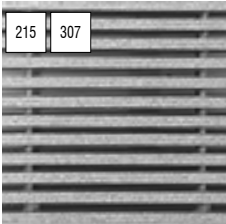
Vertical aluminum fins line the front of the screen. As an exoskeleton, they provide a first line of defense against impact from vandals. As a conditioner of light, the fins conceal the legibility of the screen from an oblique angle. For pedestrians, this offers the opportunity to discover the content as it's revealed immediately next to you or when looking directly across the underpass; for vehicles, this obscures the high-resolution messaging reducing the risk of distraction. The location of the screen, elevated significantly above the sight line of drivers, further mitigating risk.

Aluminum grating and solid plate constitute the elevated walking surface. The materials are corrosion resistant, lightweight and panelized for easy access the interstitial space below. A maximum gap spacing of 3/16" and grooved texture ensures the grate is ADA compliant and heel-safe. Additional slip-resistant treatments for the walking surface (SlipNOT Grade 2 Aluminum) are currently under investigation. Refer to the 'Operations & Maintenance' section and Appendix 2.6 and 2.7 for additional information.

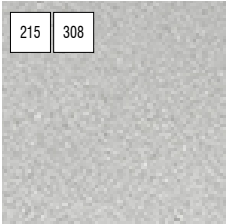
The guardrail assembly, with a 100mm centre-to-centre spacing of horizontal cables, is designed in conformance with the *Design Guidelines for Bridges and Structures*, and is consistent with the profile employed at the 4th Street SE underpass.



PROPOSED BRIDGE CROSS SECTION D



ALUMINUM SLIPNOT GRATE
MATERIAL PALETTES - REFER TO APPENDIX 2.6 FOR PRODUCT INFORMATION



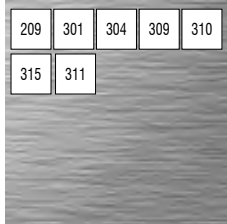
ALUMINUM SLIPNOT PLATE
MATERIAL PALETTES - REFER TO APPENDIX 2.6 FOR PRODUCT INFORMATION



TRANSLUCENT DIFFUSING SURFACE

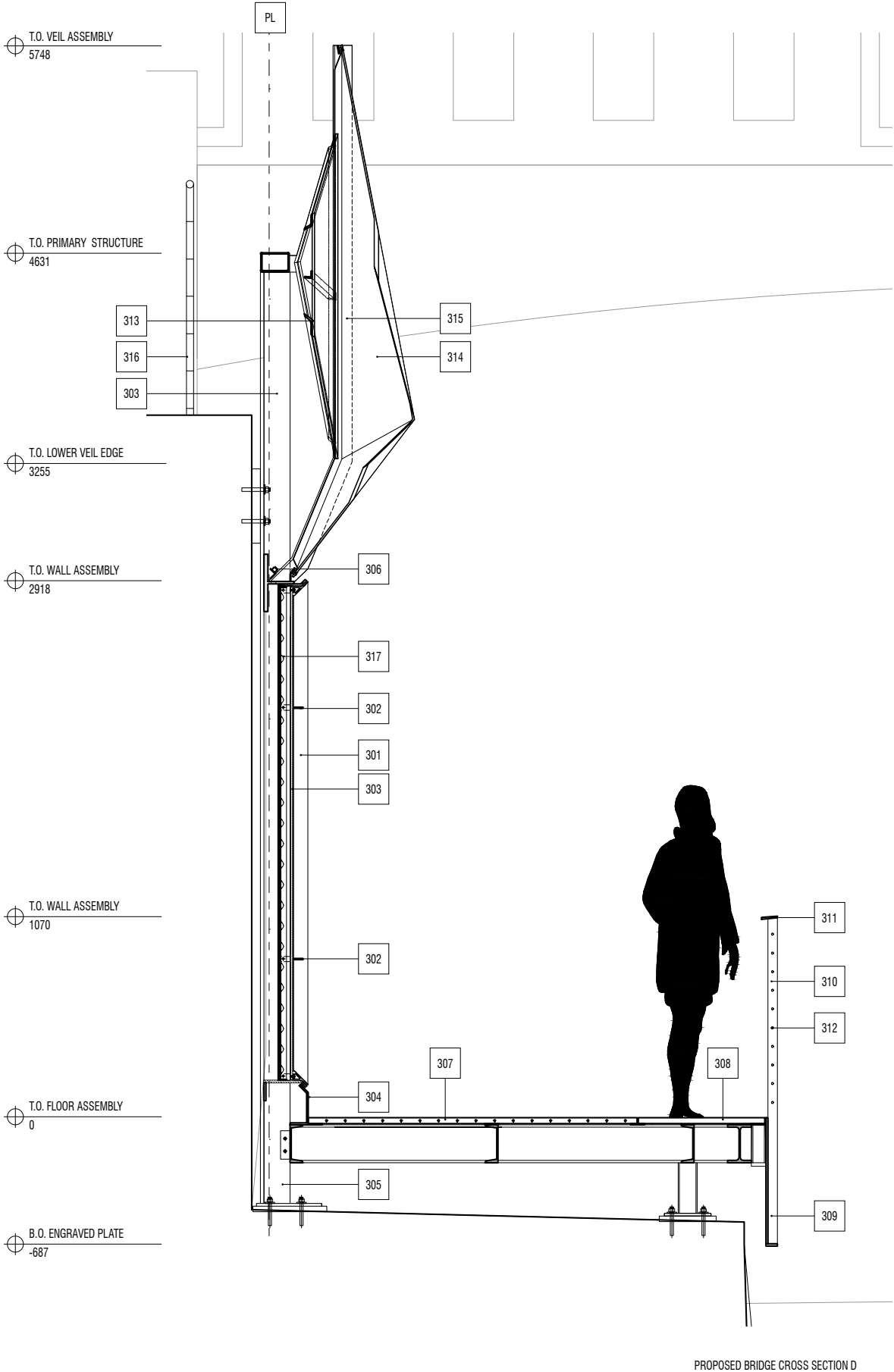


TRANSLUCENT POLYCARBONATE



BRUSHED ALUMINUM

TAG	PROPOSED KEYNOTES		
201	85MM PRAIRIE SPIRE GREEN ASH C/W TREE TRENCH, WELL FRAME & NON-SLIP ADA CAST ALUMINUM GRATE	214	PROPOSED STREET LIGHT POLE, EXISTING BASE - REFER TO 'STREET LIGHTING'
202	SIDEWALK, CURB & GUTTER, AS PER C OF C DOWNTOWN SPECS; PATCHING OF ADJACENT ASPHALT AS REQUIRED	215	ELEVATED ALUMINUM WALKWAY/WALL ASSEMBLY
203	RE-STRIPING OF LANES, AS REQUIRED	216	TRENCH DRAIN C/W BAFFLE; ALUMINUM, NON-SLIP
204	CAST IRON TACTILE STRIP	217	WALL-MOUNTED ACCENT LIGHTING
205	CONCRETE WALKWAY, TEXTURED	218	PROPOSED CONCRETE WALL; PAINTED
206	STAINLESS STEEL SAFETY BOLLARDS	219	SOLID METAL GUARDRAIL C/W WAY FINDING SIGNAGE & ACCENT LIGHTING
207	PROPOSED CURB	220	CUSTOM ACCESS GATE C/W PROPOSED COMMEMORATIVE PLAQUE
208	REVISED PLANTER C/W SOFT LANDSCAPING	221	BIKE RUNNEL
209	ALUMINUM GUARD RAIL C/W STAINLESS STEEL CABLES; BRUSHED FINISHED	222	IN-GRADE UP LIGHT FOR BRIDGE STRUCTURE
210	ALUMINUM GUARD RAIL & TREAD ASSEMBLY C/W SLIP-RESISTANT FINISH, BRUSHED - REFER TO ACCESS FROM 9TH AVE - NE STAIR'	223	PROPOSED PLANTER C/W SOFT LANDSCAPING
211	CONDITIONED CONTROLS ROOM - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'	224	REFLECTIVE ALUMINUM PLATE; POLISHED
212	RE-MEDIATED MEDIAN	225	POLYCARBONATE VEIL
213	PROPOSED STREET LIGHT POLE C/W CONCRETE BASE INTEGRATED INTO MEDIAN - REFER TO 'STREET LIGHTING'	226	LINEAR LED STREET LIGHTING FIXTURE; GVA STR9 MONOCHROMATIC
		227	CONCRETE REFINISHING; SURFACE PREPARATION & COATING WITH POROUS CONCRETE PAINT; PRODUCT SELECTION TO BE REVIEWED WITH CP; COLOUR WHITE



- | TAG | DESCRIPTION |
|----------------|---|
| 301 | VERTICAL ALUMINUM FINS (PROTECTIVE GRILL); BRUSHED FINISH |
| 302 | HORIZONTAL ALUMINUM STIFFENING BARS; MILL FINISH |
| 303 | TRANSLUCENT DIFFUSING SURFACE |
| 304 | ALUMINUM KICK PLATE/CONDUIT HOUSING; BRUSHED FINISH |
| 305 | GALVANIZED STEEL PRIMARY STRUCTURE - REFER TO STRUCTURAL |
| 306 | LINEAR LED FIXTURE; TRAXON NANO LINEAR ALLEGRO - REFER TO PUBLIC ART |
| WALKWAY | |
| 307 | ALUMINUM NON-SLIP METAL GRATING, HEEL SAFE, ADA COMPLIANT |
| 308 | ALUMINUM NON-SLIP METAL PLATE, ADA COMPLIANT |
| 309 | ENGRAVED ALUMINUM SIGNAGE PLATE; BRUSHED FINISH |
| GUARD | |
| 310 | ALUMINUM GUARDRAIL POSTS; BRUSHED FINISH |
| 311 | ALUMINUM TOP RAIL; BRUSHED FINISH |
| 312 | STAINLESS STEEL CABLES, 100MM O/C |
| VEIL | |
| 313 | STRUCTURAL BAFFLE C/W STEEL ANGLE FRAMING & TRANSLUCENT 9.5MM POLYCARBONATE DIFFUSING SURFACE (3-FORM 'KODA' OR EQUIVALENT) |
| 314 | TRANSLUCENT 9.5MM POLYCARBONATE VEIL, THERMOFORMED (3-FORM 'KODA' OR EQUIVALENT); C/W OVERSIZED HOLES FOR THERMAL EXPANSION |
| 315 | CRANKED ALUMINUM FRAMING ANGLE; BRUSHED FINISH - REFER TO STRUCTURAL |
| 316 | GALVANIZED CHAIN LINK FENCING |
| 317 | PIXEL LED FIXTURE; TRAXON STRING RGB - REFER TO PUBLIC ART |



SPACE OF CONVERSATION

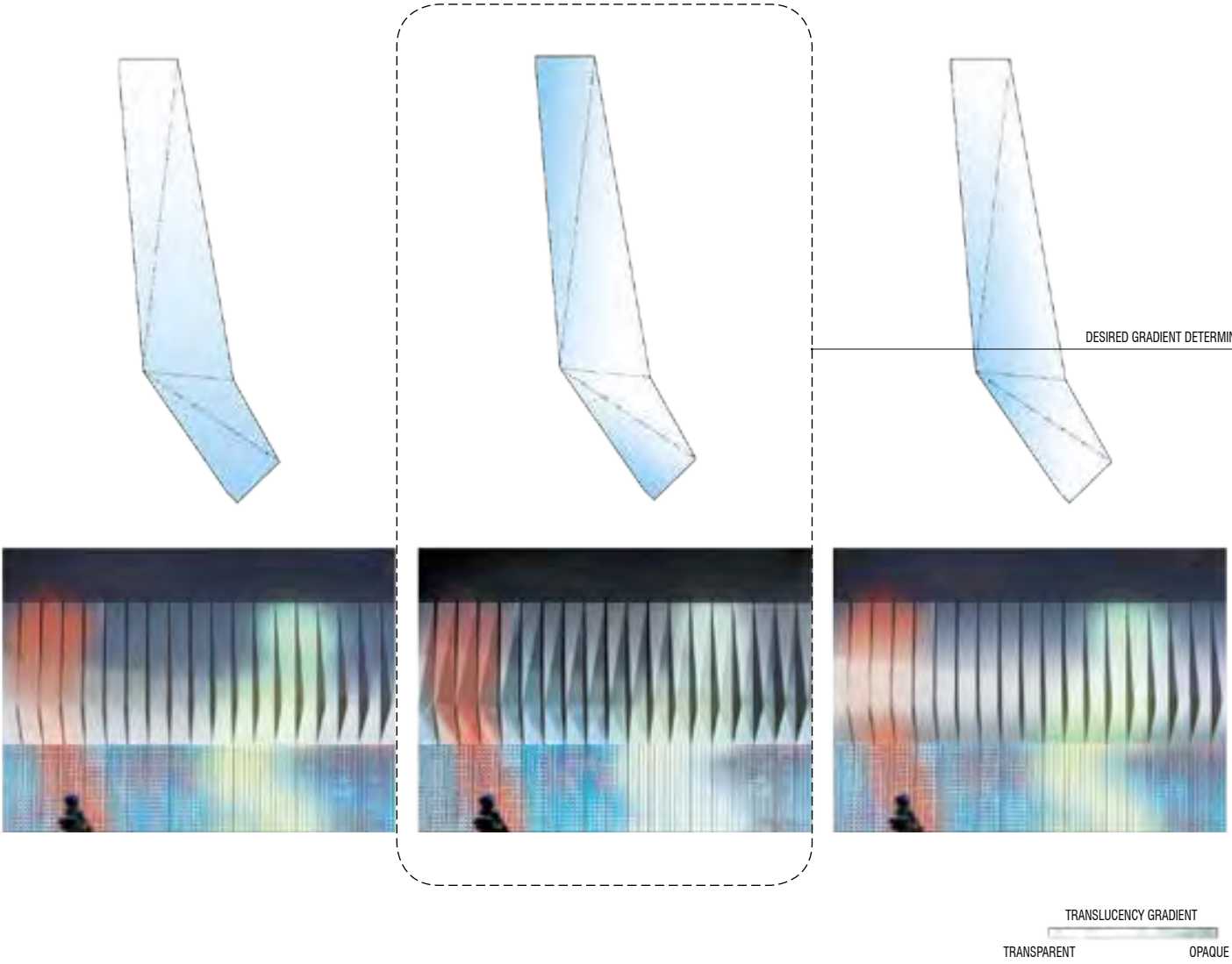
BETWEEN THE BRIDGES - SPACE OF CONVERSATION

Emerging into the centre of the space, the view across is an unobstructed view to others. The frame visually supports bodies in space while offering a contiguous material palette which figuratively bridges between the east and west sides. These identical frames democratize the experience in the space; positioned within the frame, there is a familiarity between the visitor and others inciting a visual dialogue that did not exist previously. Here the frame also serves as a medium for interaction.

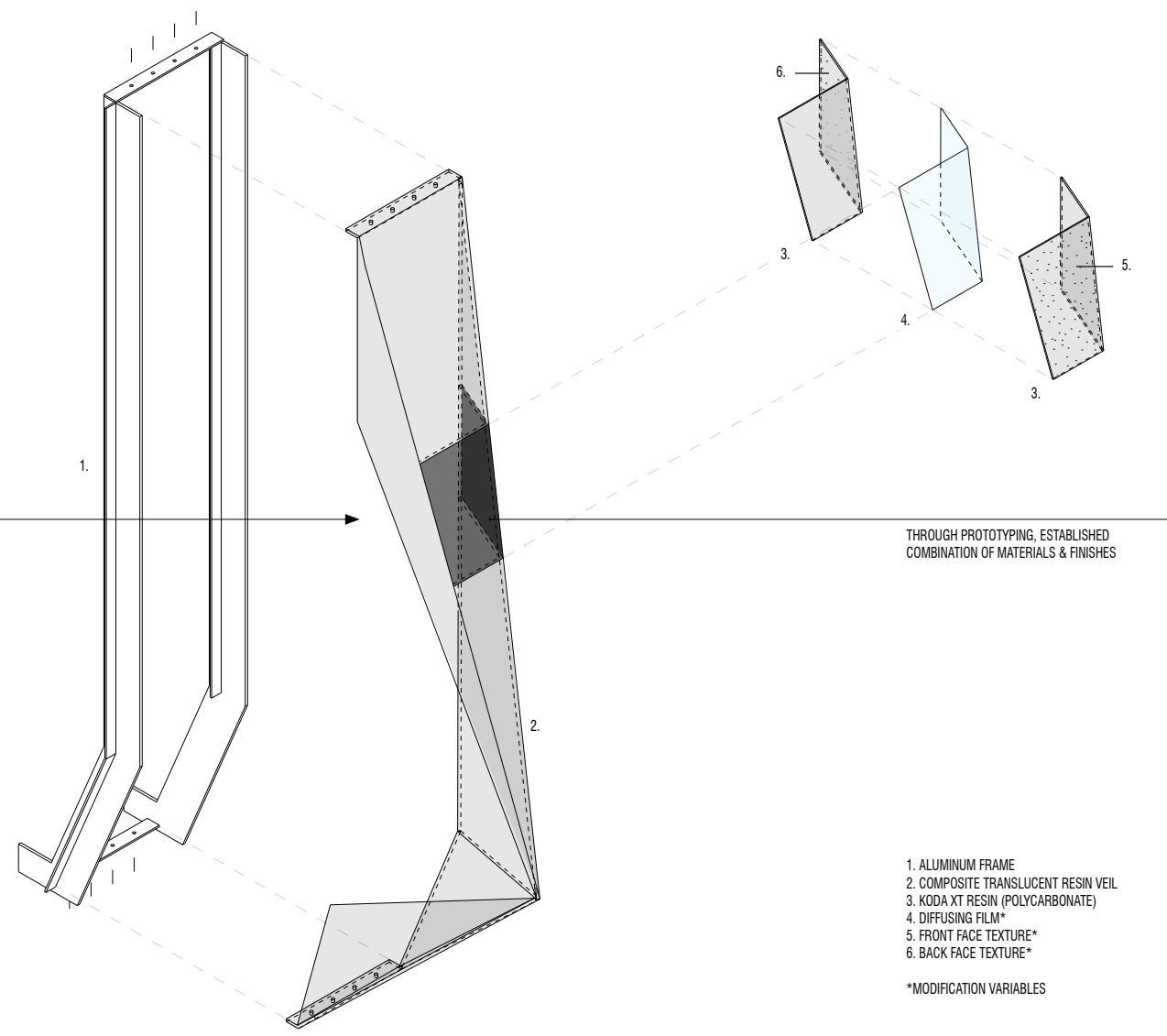
Between the bridges, the design language of the frame and it's constituent parts continues. Unlike the linear fixtures in the space of reflection, here the light source within the wall assembly is a responsive, high resolution media screen on conjunction with lower resolution linear fixtures - addressed in further detail in 'Public Art' section of this document.

The most significant change in section is the addition of the veil: a figured extension of the diffusing surface, which captures, transmits and reflects both natural and artificial light.

The geometry of veil address concerns of climbability by ensuring any potential hand hold is 3255mm above the walkway surface, exceeding the 3048mm (10') range recommended by Public Art.

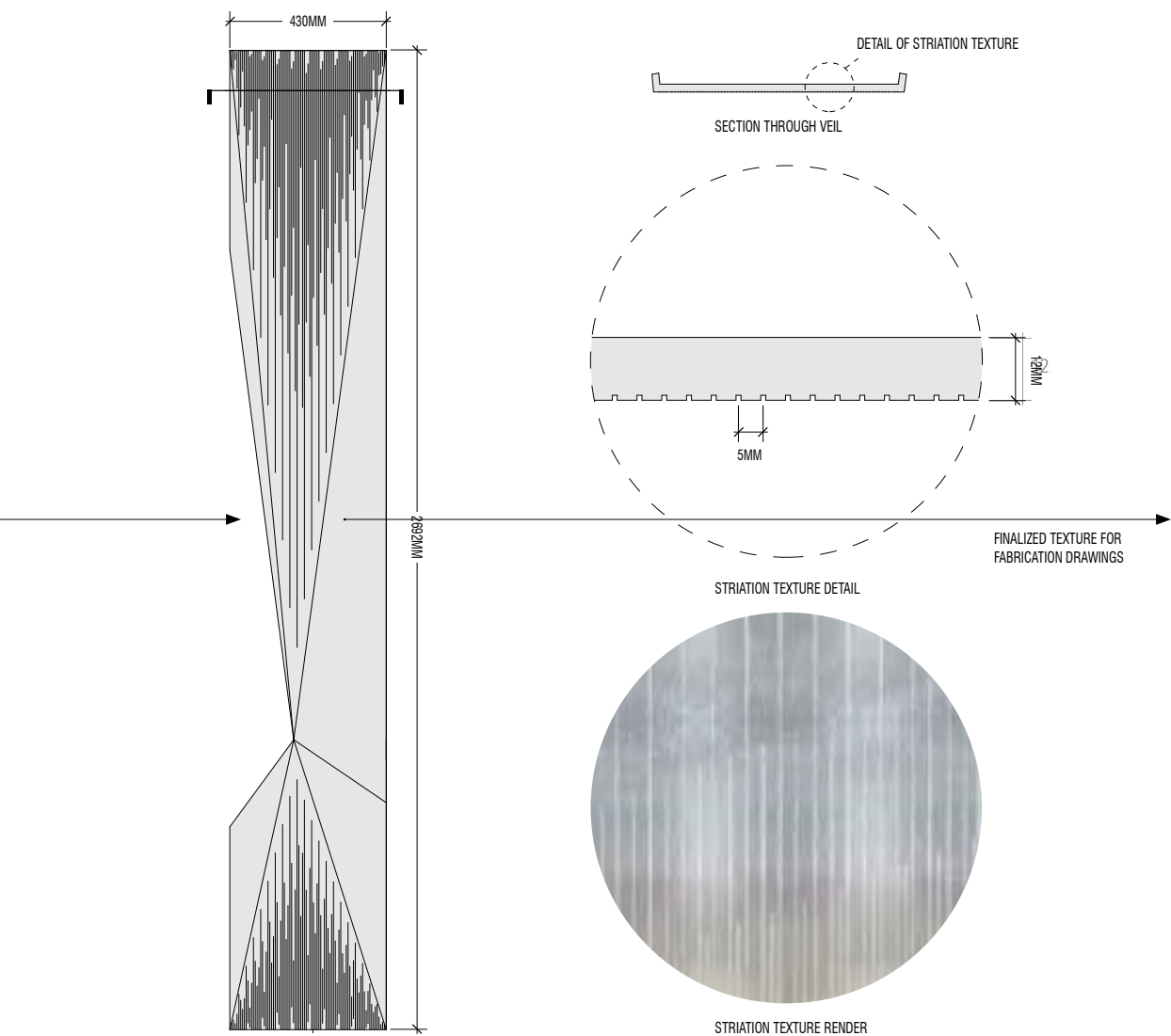


STEP 1: MAPPING TARGETED PERFORMANCES (LIGHT & TRANSLUCENCY)



STEP 2: IDENTIFYING FINISH OPTIONS

VELLUM AND PATINA FINISHES, CUSTOM BACK TEXTURE



KODA XT, VELLUM FINISH WITH CUSTOM BACK TEXTURE
STEP 3: CALIBRATING TEXTURE TO DESIRED OPACITY



MATERIAL PRECEDENT: THERMOFORMED RESIN BY 3-FORM

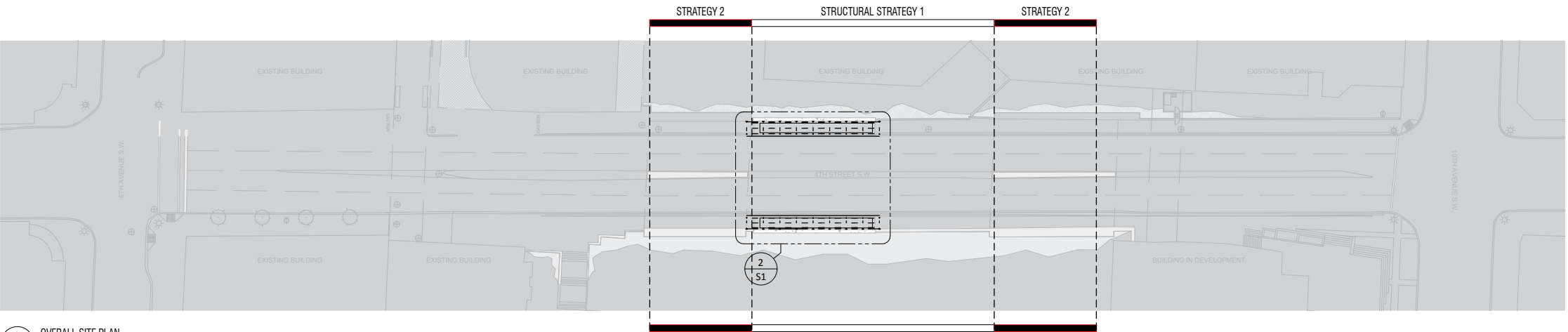
THE VEIL

A significant development within the public art assembly is that of the veil. Once a benign screen above the active media surface, the veil is reconfigured as an equally active element within the space of conversation. Designed through strict performance criteria to offer lighting effects throughout the day and night, the veil re-projects the public art illumination. Where the media wall below provides a human-scale gesture, the veil provides an urban-scale gesture visible from a variety of adjacent public sites and angles.

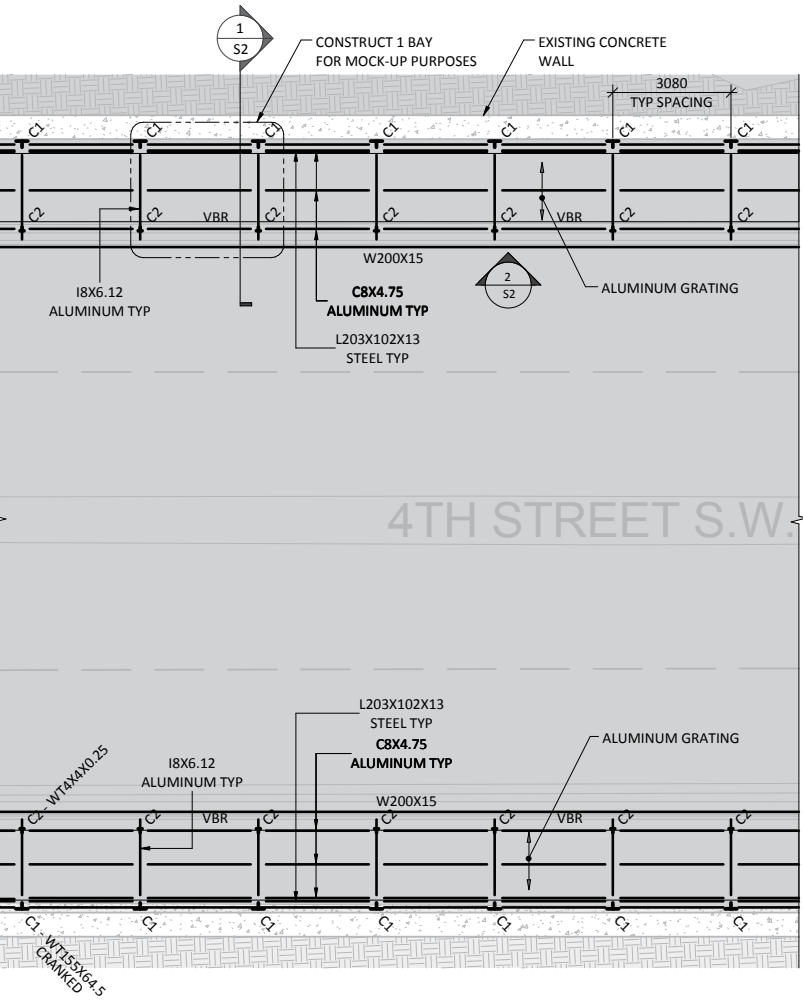
Formally, the veil offers shifting perspectives as one moves through the site while providing a sense of enclosure. Depending on the visitor's position and the light source views towards the sculptural form shift from transparent to opaque.

Working closely in conjunction with 3-Form, a company specializing in translucent resins, a variety of samples were developed to test a range of materials against specific performance criteria. In addition to being a robust, UV and vandal-resistant material, the veil's geometry and surface treatment catches light in an interesting way, both day and night. The polycarbonate veil has a subtle finish on the front surface combined with a custom striated texture on the back to achieve the desired lighting effects.

Case studies which speak to the durability of the material can be found in the 'Operations & Maintenance' section. The development of a full-scale mock-up, described in greater detail at the end of this report, provides another opportunity to further calibrate the light conditioning prior to final production.

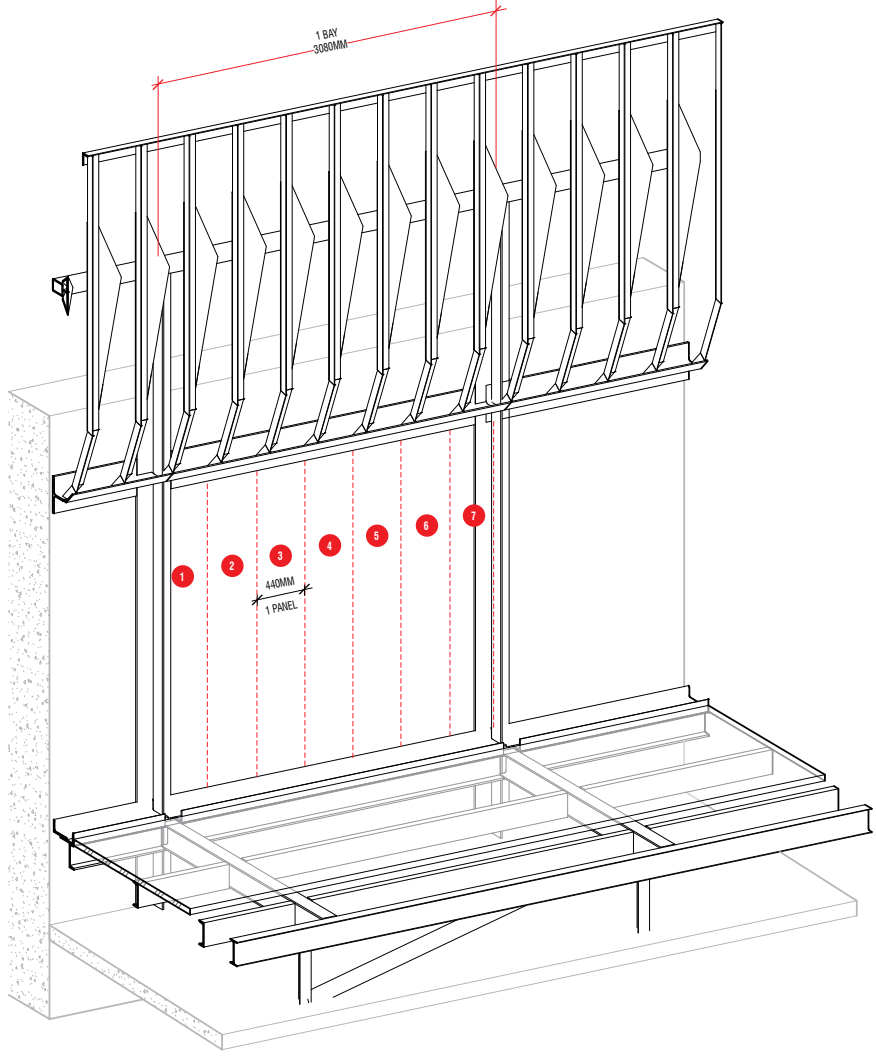


1 OVERALL SITE PLAN

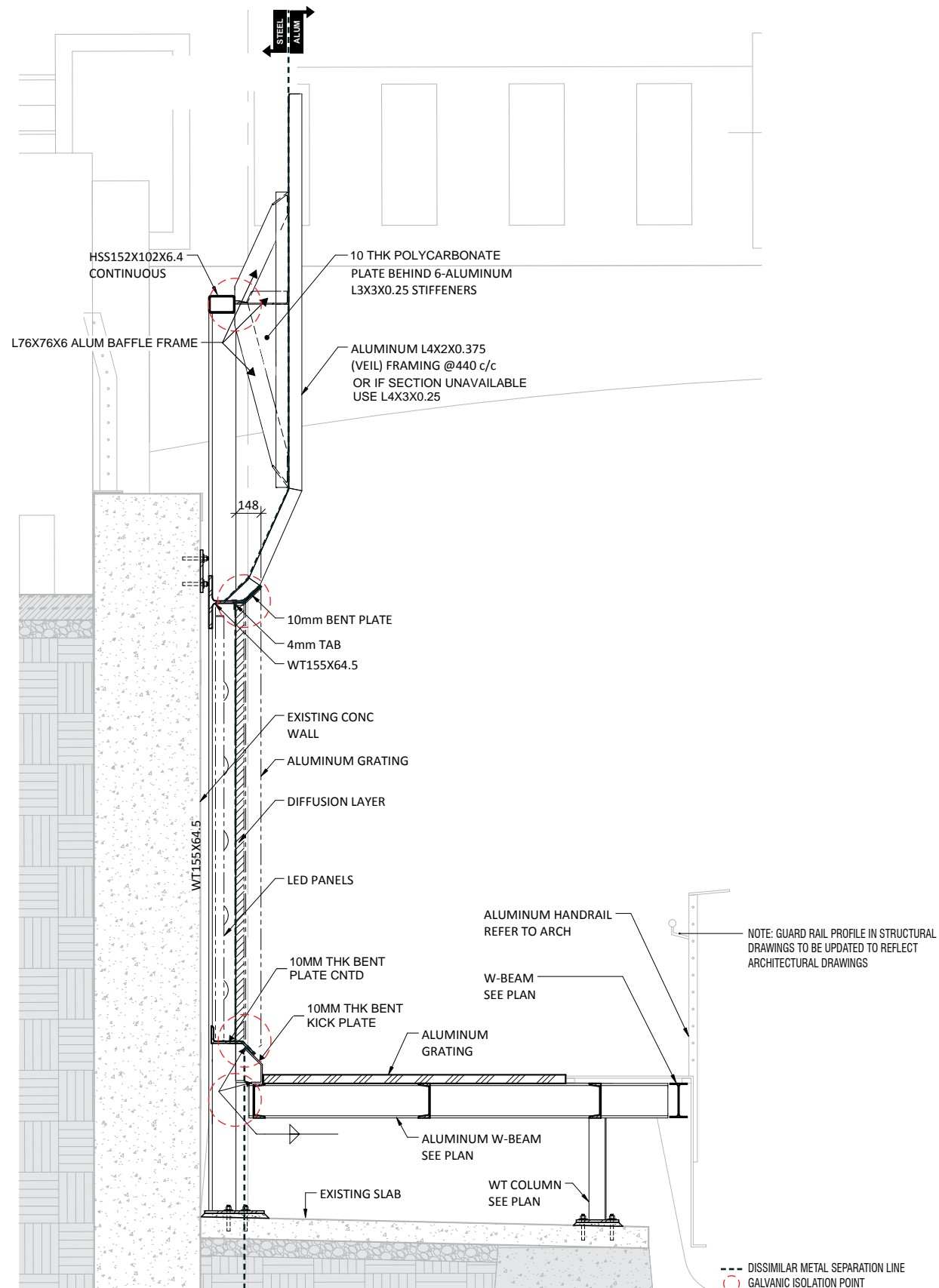


2 PARTIAL PLAN

NOTES
1. ALUMINUM TO BE T6061-T6
2. STEEL TO BE G40.21, 350W



STRUCTURAL STRATEGY 1 - 3D ISOMETRIC - FRAMING AT ONE BAY



STRUCTURAL STRATEGY 1

STRUCTURAL SYSTEM

Two main drivers have informed the frame's structural system:

1. A desire to mitigate the numerous retaining wall and sidewalk deflections of the existing site, without demolition of existing context; and
2. A priority given to minimize the depth of the media wall assembly, in order to maximize the effective width of the pedestrian walkway.

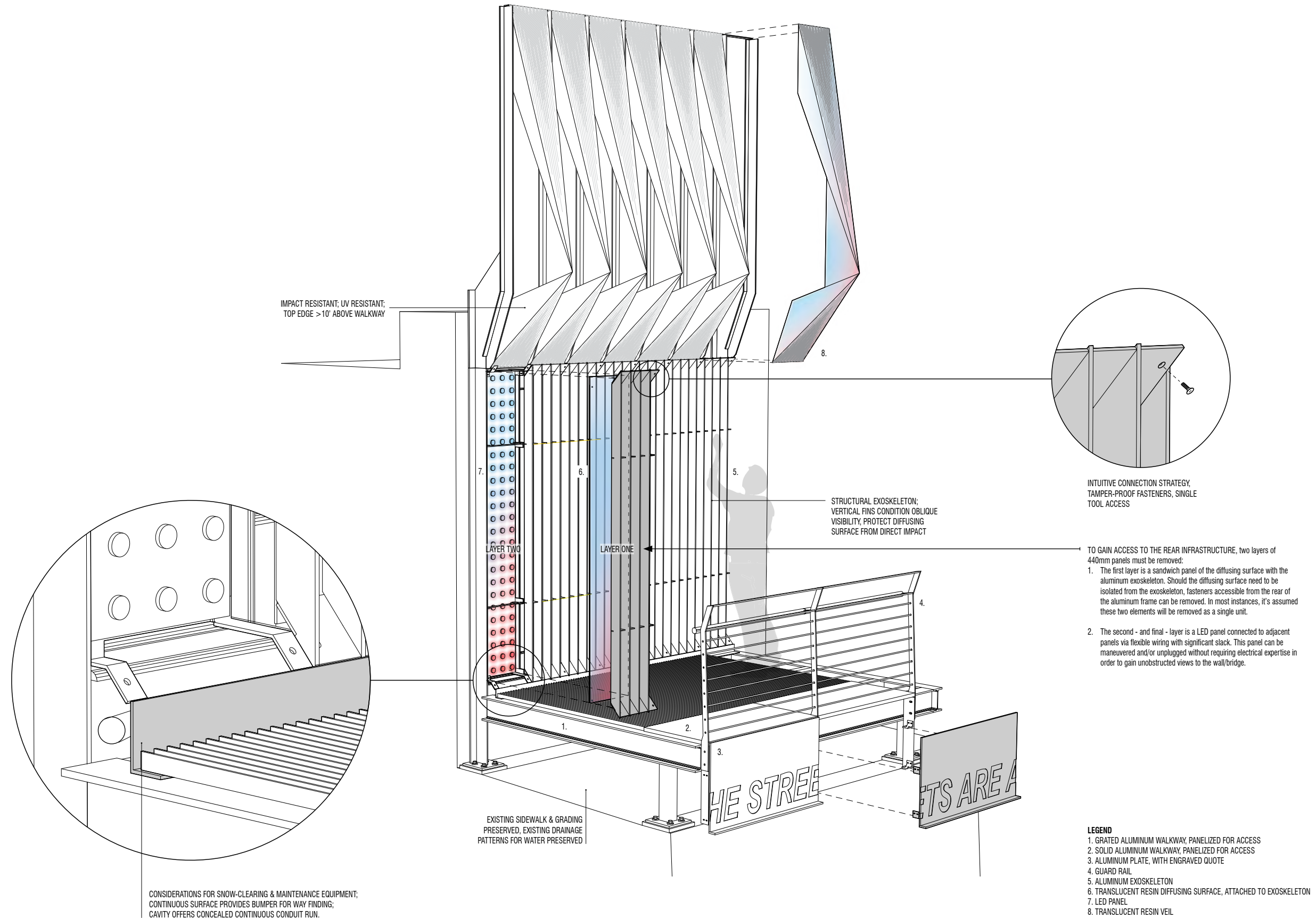
An L-shaped frame which offers a plumb vertical plane and level horizontal datum to span between the bridge extents. To achieve maximum efficiency in structural depth, the structure is comprised of two materials: galvanized steel and aluminum. Connection points between these dissimilar materials have been galvanically isolated.

The primary structural bay size, 3080mm o.c., is a function of both the assembly's anticipated loading and panelization of the exoskeleton; between the structural T-sections, seven 440mm wide wall panels are nested.

The differences in loading associated with the conditions underneath the bridges as opposed to between the bridges, affords slight variation between structural strategies:

1. Between the bridges: as shown in Proposed Enlarged Cross Section D.
2. Underneath the bridges: structural system is truncated and the base structure reduced to support the smaller assembly within a more confined space, as shown in Proposed Enlarged Cross Section C.

Structural drawings for the construction of a full-scale mock-up have been completed as part of the Design Development deliverables, and can be found within Appendix 2.5.



PRECEDENT CASE STUDY: METAL GRATING IN WINTER CITIES & PUBLIC SPACES - refer to Appendix 2.7



EXAMPLE 1: THE HIGH LINE
NEW YORK CITY, NY



EXAMPLE 2: BEARGRASS CREEK NATURE
RESERVE, ST. MATTHEWS, KY



EXAMPLE 3: PROGRESSIVE FIELD
CLEVELAND, OH

The High Line provides an example of where a SlipNot product is used along a public pedestrian walkway where ADA compliance and slip resistance is critical. The Beargrass Reserve project is an example where a SlipNot coating is applied to a steel grate from another manufacturer. The Progressive Field project is an application of the SlipNot aluminum plate where durability under high pedestrian traffic is important.

PRECEDENT CASE STUDIES: UV RESISTANCE OF 3-FORM KODA XT POLYCARBONATE (VEIL) - refer to Appendix 2.7



EXAMPLE 1: EL PASO CIVIC CENTER
EL PASO, TX
YEAR: 2009



EXAMPLE 2: MANDARIN ORIENTAL
BOSTON, MA
YEAR: 2008

The El Paso Civic Center provides an example of where Koda XT is installed in a high UV environment. The Mandarin Hotel uses a clear Koda XT product where the high impact resistance qualities are required. The Reiss Headquarters project provides an example of where a translucent resin - in this case acrylic - is used and modified for its ability to reflect and diffuse light.

PERFORMATIVE CASE STUDY



EXAMPLE 3: REISS HEADQUARTERS
LONDON, UK

OPERATIONS & MAINTENANCE

PANELIZED WALL ASSEMBLY: All public realm projects must provide easy and efficient access to the systems within, behind, and beneath. As a continuous skin, the 4UE wall & floor assembly incorporates an intuitive, panelized system with minimal number of parts and/or layers.

Assuming a typical two-person Roads maintenance crew, the panels are sized appropriately for easy detachment and reassembly, using one simple universal tool for access.

PRIORITIZING ANTICIPATED ACCESS: Through consultation with stakeholders, the Design Team anticipates a need for regular, scheduled access to the public art assembly. As the life cycle of the media equipment is long-term, and materials embedded within selected for durability, the most common purpose for access will be related to routine inspections of existing infrastructure in behind (i.e. CP bridge bearings and City-owned retaining walls). The 2-part layering of the assembly elements, as described on the adjacent page, accounts for ease and efficiency of access to this rear structure.

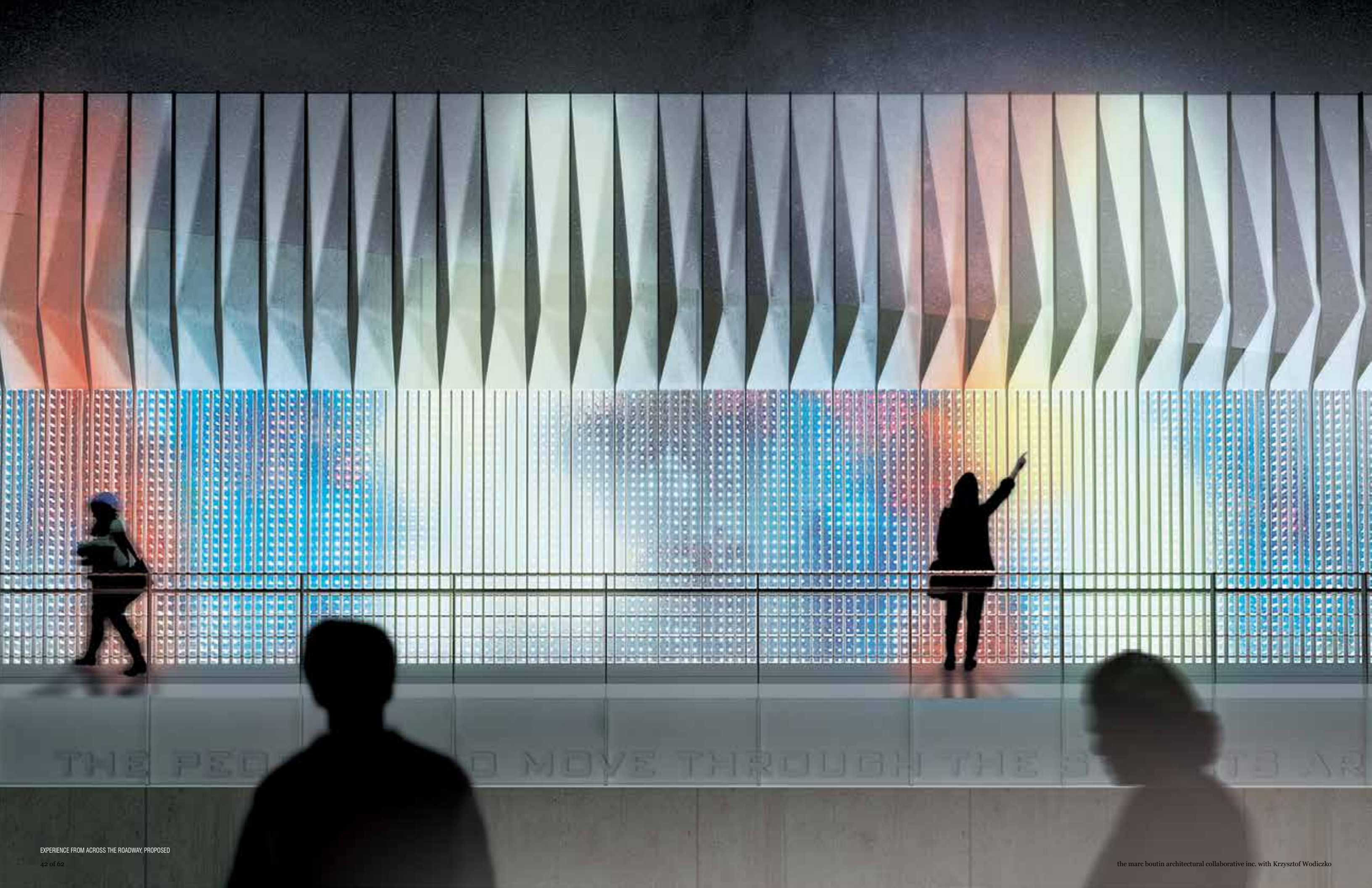
GAP ABOVE WALL ASSEMBLY: Beneath the bridges, the gap between the top of the wall assembly and underside of bridge structure is driven by an attempt to maximize the height of the frame. A minimum gap of 300mm has been requested by CP to facilitate visual inspections without requiring panel removal. The Design Team will continue to work with CP and The City towards establishing a gap size that balances requirements for ongoing visual inspections with the performance of other elements.

GAP BEHIND WALL ASSEMBLY: A primary design driver is the requirement for no net loss of effective sidewalk width. To minimize the wall thickness, the primary structure is anchored directly to the retaining wall every 3000mm; as such, the removal of any given panel will, at most, offer visibility of a 3 metre length of the infrastructure.

SNOW CLEARING EQUIPMENT: Given its prerogative to remain a robust and serviceable element of urban infrastructure, the wall assembly is proactive in its approach to withstanding impact from snow-clearing equipment. A continuous bumper plate along the base of the assembly not only offers a curb for way finding, but serves as a sacrificial surface to take the brunt of potential impacts. The aluminum fins above are interchangeable, and in effect sacrificial, should the assembly be severely damaged.

WALKING SURFACE: Aluminum grating and solid plate constitute the elevated walking surface. The materials are corrosion resistant, lightweight and panelized for easy access the interstitial space below. A maximum gap spacing of 3/16” and grooved texture ensures the grate is ADA compliant and heel-safe. Additional slip-resistant treatments for the walking surface are currently under investigation. Exceeding all requirements for an ASTM / ANSI slip-resistant surface, the proposed treatment (trademarked as SlipNOT) is registered with the Underwriters Laboratories per the UL 410 standard with a coefficient of friction is greater than or equal to 0.85. The bond strength of the treatment is 2,000 psi. Refer to Appendix 2.6 and 2.7 for additional information.

UV RESISTANCE: Information to substantiate the UV-resistance of the polycarbonate veils has been included. Specific performance of the material in comparable winter and sun-exposure environments have been added to Appendix 2.7, and listed to the left.



THE PEOPLE WHO MOVE THROUGH THE SPACE ARE

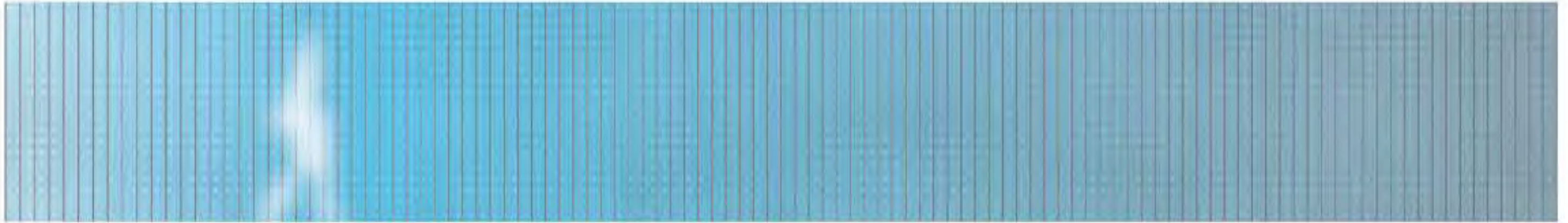


EXPERIENCE FROM ACROSS THE ROADWAY, EXISTING

PUBLIC ART: MEDIA CONCEPT & CONTENT

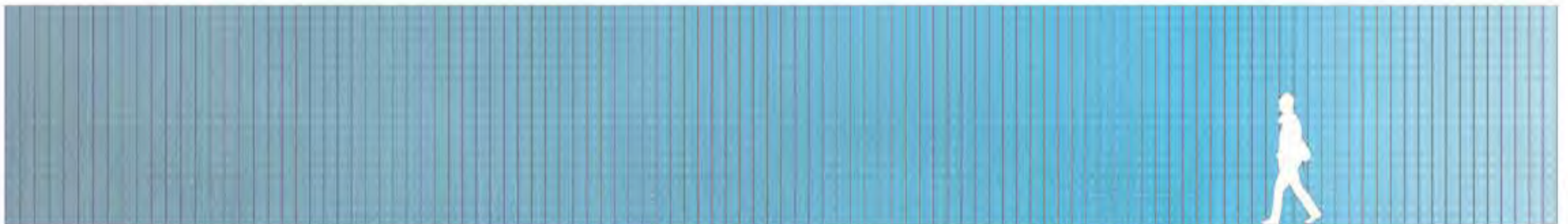
In parallel to the development of the spatial depth to the frame, the Public Art team (led by Krzysztof Wodiczko) has worked towards articulating the media depth of the project. An interactive animated light scape, activated by the presence of visitors in the space, will augment the underpass’ capacity to serve as a space of verbal and visual conversation.

- NARRATIVE
- TECHNOLOGY
- NETWORK ARCHITECTURE SCHEMATIC
- TEAM MEMBERS & PROCESS
- CONTENT/CURATION
- OPERATIONS/MAINTENANCE
- OBSOLESCENCE PLAN

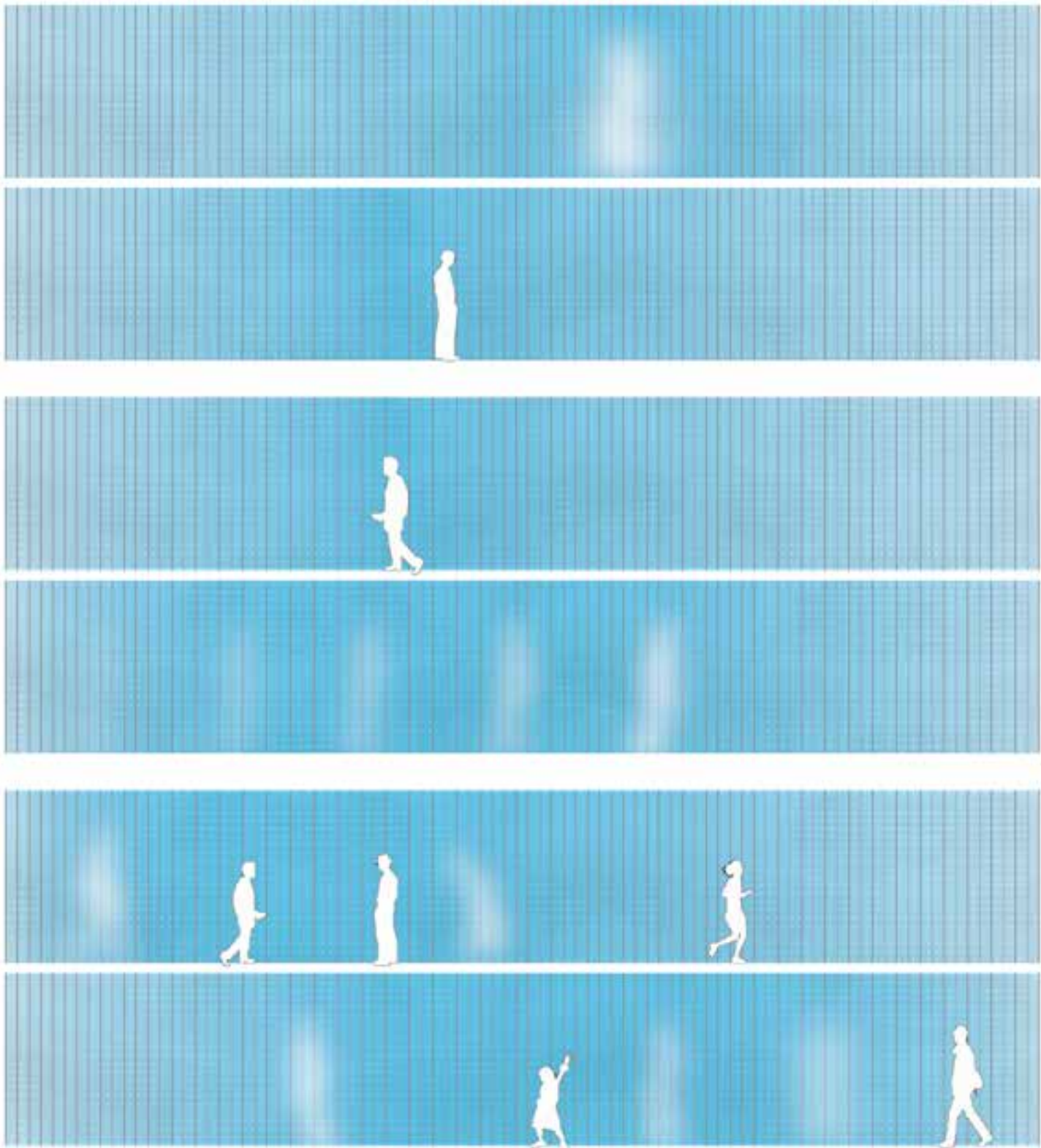


At first, when you begin to walk through the underpass, you will gradually recognize, on the diagonally opposite end of the wall across the street, your own echoed silhouette.

As you continue through the underpass, your silhouette too continues toward you, and the distance between you and your image shrinks until you are directly across the street from yourself in reverse. Then you begin to see with greater clarity the manner and rhythm of your own walk, moving in the opposite direction as if the other you were a passerby – another urban stranger.



*SHOWN GRAPHICS ARE NOT TO SCALE; THESE ARE REPRESENTATIONS OF THE INITIAL CONCEPT OF THE ACTIVE AREA OF THE SCREEN.



*SHOWN GRAPHICS ARE NOT TO SCALE; THESE ARE REPRESENTATIONS OF THE INITIAL CONCEPT OF THE ACTIVE AREA OF THE SCREEN.

NARRATIVE

From the Artist:
‘See yourself as if you were the other person. Imagine others seeing themselves how they are seen by you.’

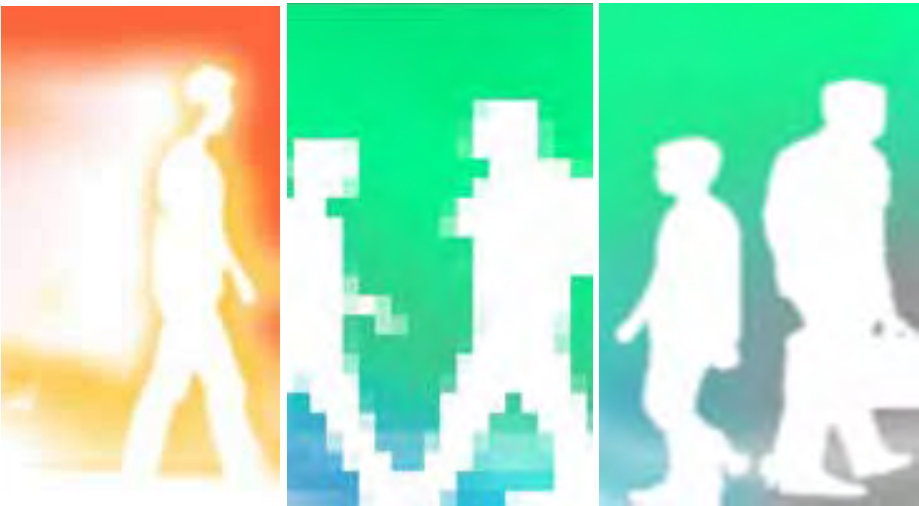
The project provides a new visual experience by building a sense of perceptual self-awareness and interconnectedness between and among the individuals and groups in the underpass.

When one walks along the narrow sidewalk, he or she does not see other pedestrians nor have a sense of being seen by other pedestrians. The interaction counters this sense of isolation and disconnect by showing a reverse-mirrored avatar-like silhouette of oneself on the opposite wall across the street, creating the impression of seeing oneself in the way one is seen through the eyes of others. The project appropriates the sidewalks’ uncanny condition: two separate sites, of the same social loneliness, mirroring each other across the street. It then bridges the experience of pedestrians along the same sidewalk with the experience of those from the other side to evoke a feeling of commonality and solidarity in sharing each other’s presence and perception.

This bridging of mirroring experiences explores our psychosocial nature by offering the possibility of recognizing one’s own “familiar strangeness” (seeing someone the way they see you) and of realizing that one shares this recognition in public through the playful interaction with images of oneself and others.

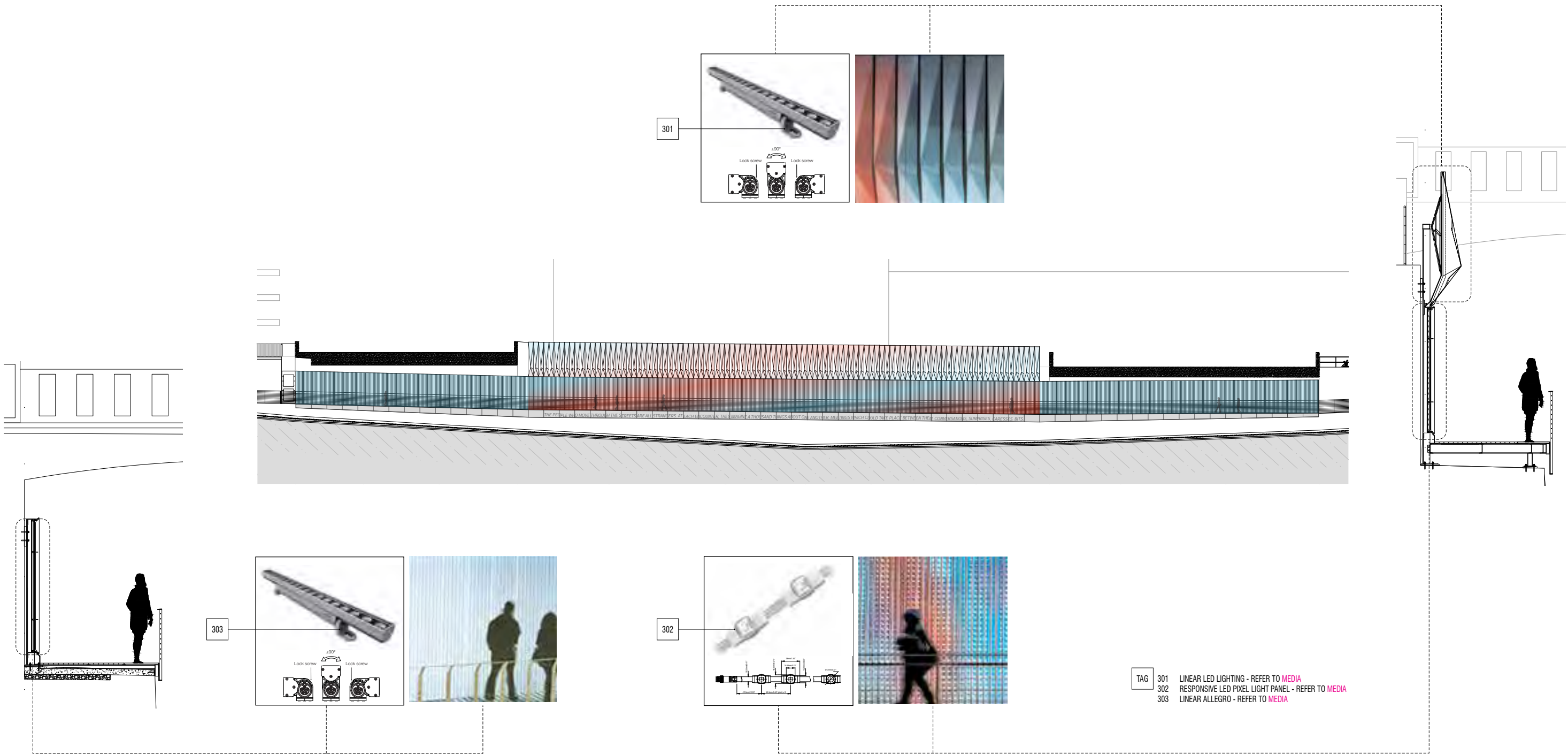
To the other pedestrians, one’s own silhouette will be seen as “having passed by” or “passing by” besides them on the display wall. It is indeed a strange encounter.

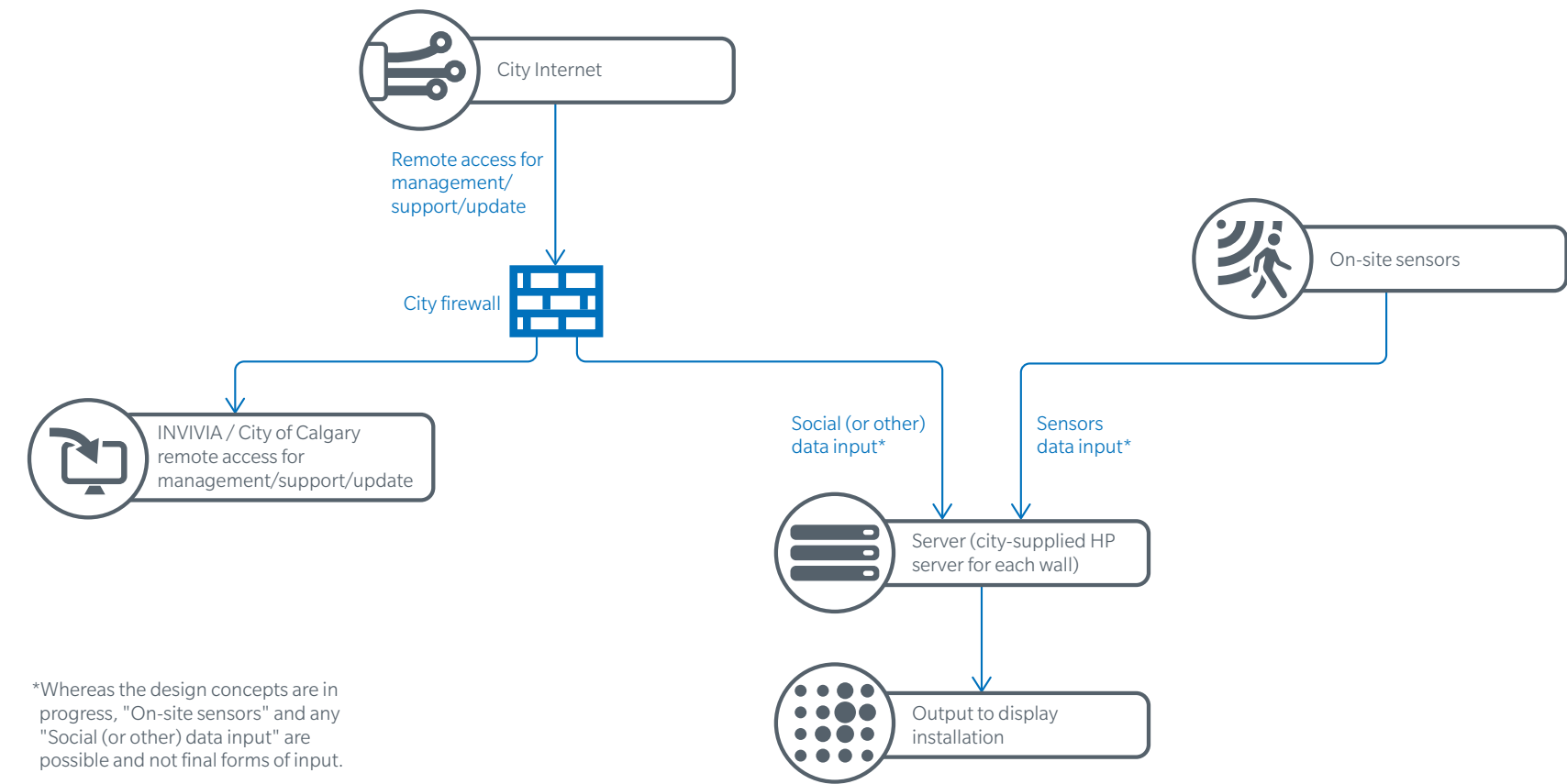
- Krzysztof Wodiczko



WARM COLOUR SCHEME (WINTER) LOW RESOLUTION LEGIBILITY TEST HIGH RESOLUTION LEGIBILITY TEST

ANIMATION SCREEN CAPTURES: SEVERAL COLOR SCHEMES, EFFECTS AND RESOLUTIONS ARE UNDER BEING TESTED BY THE PUBLIC ARTIST TOWARDS ESTABLISHING THE FINAL EFFECTS FOR THE SCREEN. IN ADDITION TO EFFECTS ACROSS, IMPACTS TO THE SCREEN DIRECTLY ADJACENT TO THE PEDESTRIAN ARE BEING EXPLORED THROUGH THE 1:1 MOCK-UP.





SCHEMATIC OF NETWORK ARCHITECTURE

In support of the proposed network architecture, the following assumptions have been made by the Public Art team:

1. Hosting: if necessary, hosting will be provided by The City either on city servers or via a city account with a service such as AWS.
2. If specialized hardware standards (for example: Open Compute Server) are required by the municipality then said hardware will be provided by the city.
3. The on-site media server will have INTERNET access for remote management, support and any updates.
4. If the Windows Server or other fee-based operating system is to be used then it will be via an instance of the City's Microsoft license. We will make the best attempt to use open source but it may be more overall cost effective to use a for-fee OS.
5. The anticipated hardware within this budget includes sensors and media server with the anticipation that it fits within the budget. If hardware will be beyond the Equipment/Prototyping budget then a notification will be made of the anticipated additional project costs.
6. Equipment within the build aspects of the project are limited to any applicable sensors, a basic media server or integration of a city supplied server and the associated cabling to connect sensors to the server and the server video output to any screen input via DVI, HDMI, VGA as well as any custom crafted electronic assemblies which might be specified and designed by Wodiczko/Invivia. This does not include screen elements, lighting, cabling for the overall location or physical assembly beyond the hardware supplied.

TECHNOLOGY

Integrated into the frame, the animated surface introduces a capacity for multiple readings and emergent experiences which amplify the city as a space for interaction. Activation of the wall surface is triggered by the presence of the body; in live time, animated light escorts visitors they move through the underpass. The capacity of sensors to detect movement and proximity enables visitors to deliberately augment the response of the light as they move through the space.

The public art lighting strategy can be understood as three interrelated lighting components:

1. Screen Lighting: Responsive, high-resolution, pixel-based fixtures; hosts the lighting narrative (between bridges);
2. Veil Lighting: Responsive, low-resolution, linear-based fixtures; extends the public art lighting strategy as an urban gesture (through the veil); and
3. Frame Lighting: Non-responsive, low-resolution, linear-based; conditions the experience of the pedestrian through light (under bridges).

The space beneath the bridges conditions visitors ahead of the central experience, creating a canvas of light onto which the body is projected.

Both the veil and the screen lighting are conditioned to respond to the presence of people in the space: the screen is high-resolution expression of the public art narrative (projecting inward), while the veil is a low-resolution extension of that expression at an urban scale (projecting outward). The overall effect is complementary – the veil becomes active in extending the messaging through a sculptural gesture.

Several key documents have been referenced by the Public Art Team in the identification of appropriate technology for the public art lighting & controls system: the *Public Art Materials and Design Guidelines*, the *Animated Public Art Report*, and *The City of Calgary's IT Infrastructure Standards* (refer to Appendix 2.3). These documents, in conjunction with feedback obtained from stakeholder review at the end of Design Development, and during 50% and 90% Detailed Design submission will ensure this scope meet the requirements of all future asset owners & operators.

At this time, several suppliers have been engaged in both the development of prototypes and in establishing performance specifications for the media scope. Although Traxon, Colour Kinetics and Phillips are in contention, for the purposes of the cost estimate, Traxon's String RGB (100mm pitch) in conjunction with Traxon's Nano Linear Allegro system have been assumed. Additional information on this system can be found in Appendix 2.6.

NETWORK ARCHITECTURE SCHEMATIC

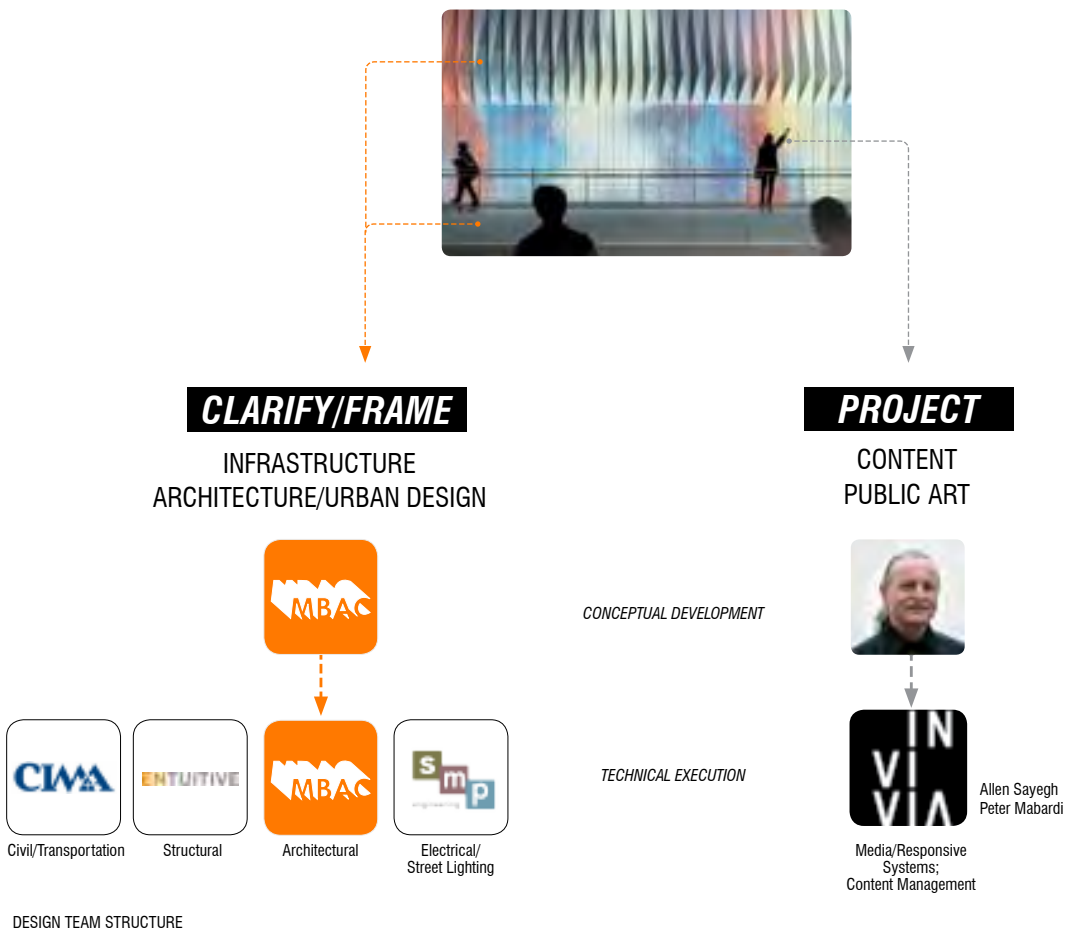
The proposed controls and management equipment includes a media server with remote administration/management capabilities. Internet access, safeguarded through a firewall, will allow for remote patching, updating, rebooting and troubleshooting as required.

As suggested by the Public Art Board, for any proposed open source programs, a confirmation of IP address compatibility within Calgary's local context will be conducted.

SUMMARY OF PUBLIC ART TEAM WORK PLAN

MILESTONE	SERVICE		DESCRIPTION
PHASE 1: ASSESSMENT, GOAL SETTING & PROJECT ARTICULATION	1.1	PEDESTRIAN PERSPECTIVES	Understand the different desirable pedestrian perspectives via the digital architectural site model. For example: <ul style="list-style-type: none">• Main access• Eyesight, sightline and perspectives• Nearby radius (not adjacent)• Distant perspectives (if desirable/feasible)
	1.2	DETAILED PERSPECTIVE MODELING	Quantify impacts of the various desirable/feasible circulation radii including the façade and all planned treatments in a detailed modeled built out of the installation from the various perspectives/distances.
	1.3	DRAFT OF GENERAL MODEL OF VISUALS AND POSSIBLE INTERACTIONS	Assess angles of pedestrian viewing for content types being considered, provide a test style/content piece (image or brief animation) for testing purposes. This content will not necessarily reflect the final content but will serve as a good test of possibilities and luminosity in a sample setting mock up.
	1.4	STUDY OF SENSORS	Assess which sensors could be best for the environment and the issues it will encounter as well as which sensors will provide usable/desirable data for the desired interaction events. Sensors can range from camera to sonar to infrared to laser. Our goal will be to understand which will benefit the environment and variability anticipated as well as which ones could best provide event data for the interactivity.
	1.5	MEETINGS/INTERVIEWS	Conduct any overall team meetings with MBAC as well as the City of Calgary as necessary. Conduct any necessary meeting with the public as previously discussed by Krzysztof Wodiczko.
	1.6	LIGHTING/PIXEL RESEARCH AND RECOMMENDATIONS	For both low and higher resolution aspects of the installation, research and test candidates with MBAC. Likewise for any diffusion layers. Understand the best uses of the lighting within the context of the designed façade.
	1.7	DELIVERABLES	<ul style="list-style-type: none">• Based on the above 3 studies, develop recommendation, stylistic wireframe of content (nature of/style abstraction) and the nature of likely/possible interactions.• All-hands review both through the process as well as at conclusion of phase• Draft design style and language• A test visual for on-location (the MBAC test with materials) testing• Research on lighting/pixel technology candidates

MILESTONE	SERVICE		DESCRIPTION
PHASE 2A: CONCEPT IDEATION	2.1	MEDIA DEVELOPMENT	Based on the conclusions of phase 1 and initial design concepts, content will undergo ideation to develop the best direction for the installation media. This includes finalizing a stylistic direction, content direction and selected modes of interaction. This phase will also include any rendering or processing required in the media production.
PHASE 2B: TECHNOLOGY ASSESSMENT (INTERACTION, BACK-END MANAGEMENT, HOSTING, INTERFACE)	2.2	SENSOR AND INTERACTION TECHNOLOGY	For any possible modes of interaction, we will assess the best sensor technology out of the sensor study as well as the best sensor data analytics for signaling changes to the graphics operations system. The selection is based on the desired interactivity and conclusion of sensor behavior in the environment.
	2.3	SOFTWARE CUSTOMIZATION	Assess customization specifications for the following software components based on the assessments, decisions, media production and desired interactive directions previously selected: <ol style="list-style-type: none">1. Sensor mediator - assesses and processes data from sensors into a usable format for the interactive. Factor in a wide range of variables and minimize errant data to produce accurate interaction events.2. Media services – serve media to output device while integrating actions and media variations from the sensor mediator.3. Configuration interface – allows for the configuration of various settings. The Features of the above 3 services will be finalized based on the nature of the media, interaction, display interface and any other assessed factors within the project.
	2.4	DELIVERABLES	<ul style="list-style-type: none">• Media for launch of installation• Specification and customization of the software functionality described above• Platform integration of the above in a test environment
PHASE 3: ON-SITE/REMOTE TESTING & IMPLEMENTATION	3.1	FINALIZATION OF MEDIA AND SOFTWARE AND ON-SITE INSTALLATION SUPPORT	Based on the integration test, Finalize any edits to the media and software Installation: Instruction and support for systems, software, media. To be conducted both on-site and remotely.
PHASE 4: ONGOING UPDATES & MAINTENANCE	4.1	MEDIA, SOFTWARE, SENSOR TECHNOLOGY AND ANY MAINTENANCE/UPDATES.	TBD based on selected directions



TEAM MEMBERS & PROCESS

A key member of the 4th Street SW Underpass Enhancement design team is the public artist, Krzysztof Wodiczko, who works in the medium of projected light. Because of his artistic medium of light and integrated digital animation, he frequently partners with Invivia, a multi-media design/build firm, on public art projects around the world. The Detailed Design of the 4UE media content - an integration between public art, the projection of light as the vehicle for artistic intentions, and a digital platform as the material infrastructure for the art - necessitates that Krzysztof and Invivia work together throughout the process as a design/build initiative. As the Public Art team, they ensure the necessary technical specifications, network architecture and soft/hardware will be in place to support Krzysztof's vision. A detailed work plan outlining key milestones within the Public Art scope has been included on the adjacent page.

CONTENT/CURATION

As an asset, the 4UE infrastructure is understood as a long-standing contribution to Calgary's urban fabric; however, the asset's ongoing capacity for expression (and subsequent content) will be explored by Krzysztof through Detailed Design: intentionality will come into focus as the technology/interaction/content direction is settled upon.

Although the artistic nature of the content and variability of experience is a primary contributor to the notion of endurance, based on the long-term nature of this installation, a customized content scheduling module to facilitate updating the content in the system is recommended. A user-friendly interface will enable someone with modest training to monitor and update content as required.

That said, contingent on the preferred management model from The City, a post-construction contract for content management services would support Krzysztof/Invivia's interest in project participation beyond the initial launch. An online platform, as identified in the network architecture plan, would allow regular remote access (and management) by the Public Art team.

A detailed model for long-term content management will be developed in conjunction with additional input from Public Art, IT and Roads, and summarized within a forthcoming Project Operations and Maintenance Plan.

OPERATIONS/MAINTENANCE

The goal is to use technology which, once installed, will require minimal (if any) future calibration, rebooting or maintenance. That said, a post-construction contract with Invivia could include provisions for ongoing updates and support towards ensuring seamless operation of the installation.

The technology under consideration by the Design Team is a series of simple LEDs, with a history of success in exterior installations. Longevity & ease of maintenance are a high priority. The Public Art team is investigating workflows should something go wrong (for example a 'default' animation loop, network support protocol, etc).

A pool of funds will be established by The City of Calgary will financially support ongoing special maintenance of the project. As part of the final deliverables, the Project Team will articulate and deliver a Maintenance Plan to facilitate long-term planning for this fund.

OBSOLESCENCE PLAN

As described above, The City will look to the Design Team for guidance as whether the technology should be updated with new content over the years. The Operations & Maintenance Plan will offer a vision for the project in 2, 5, 10 and 20 years - whether it remains true to the original content, is updated by Krzysztof at certain increments, if the technology/system becomes a canvas for similar ideas to be explored by other artists, or other permutations.



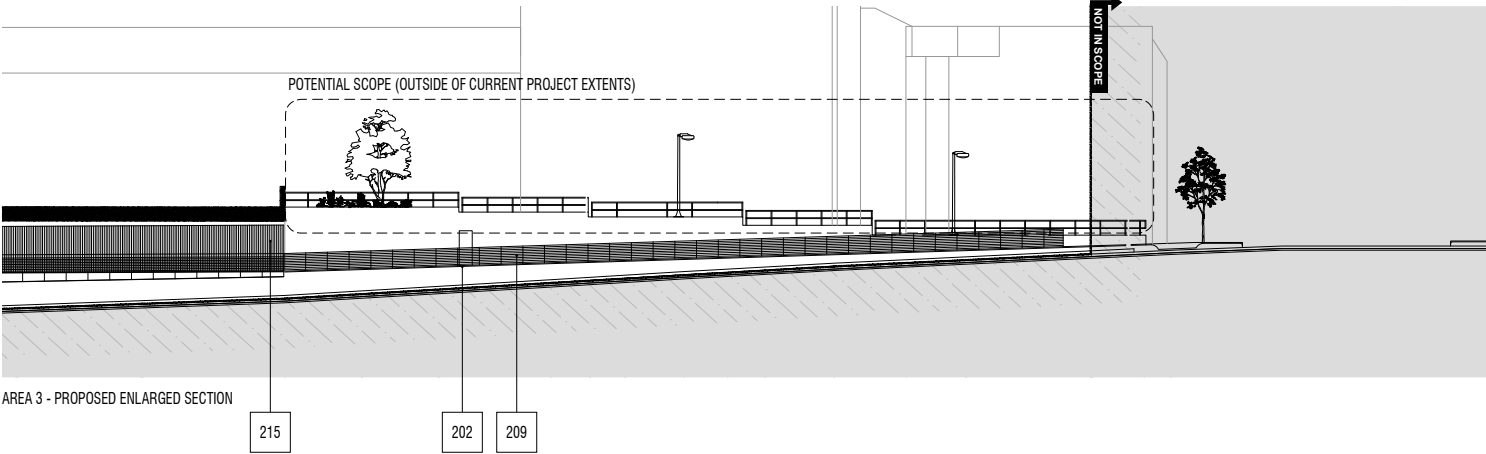
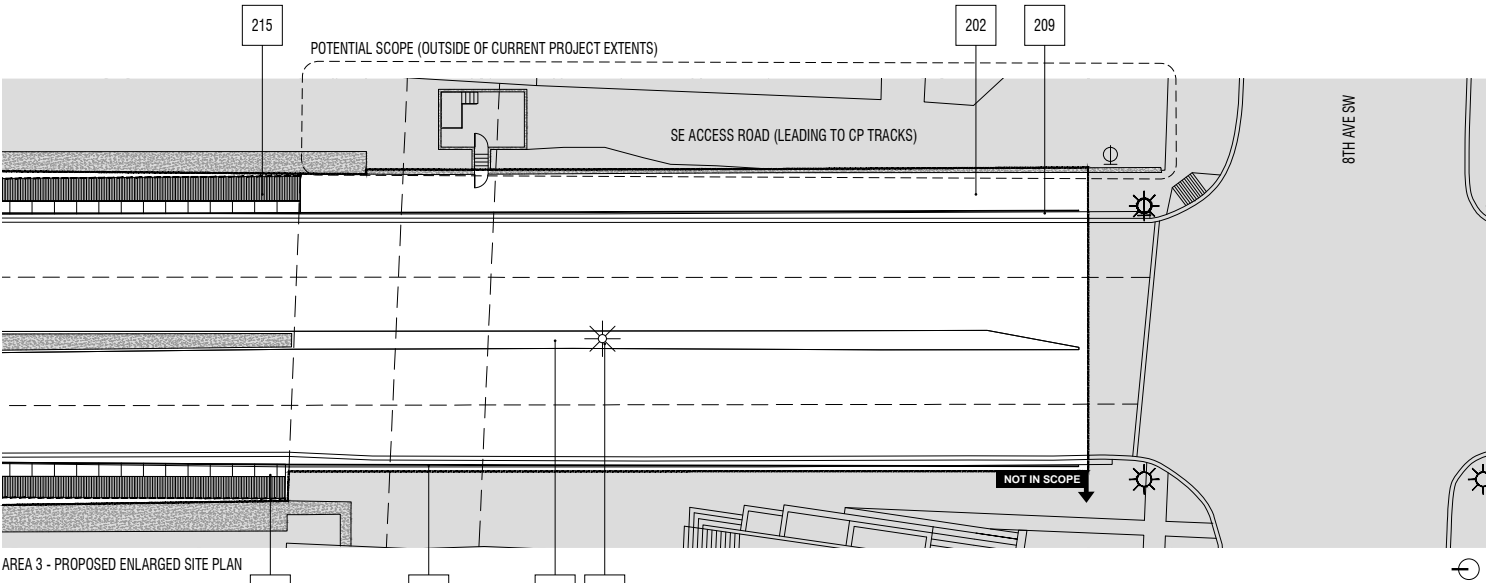
SOUTH OF BRIDGES - PAST (2011)



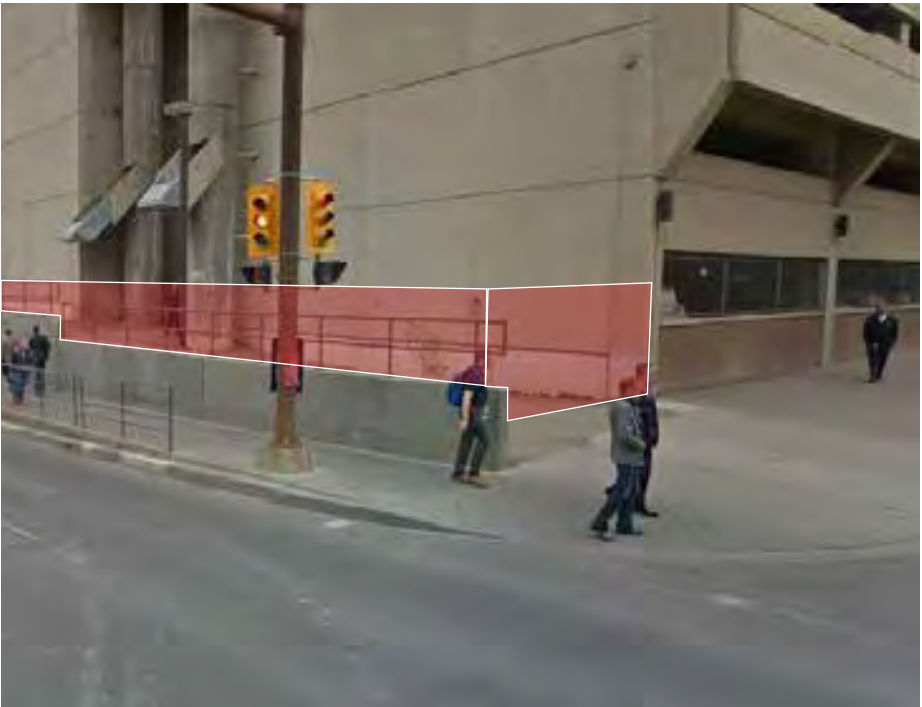
SOUTH OF BRIDGES - CURRENT (2016)



SOUTH OF BRIDGES - PROPOSED (2018)



PROPOSED KEYNOTES	
TAG	201 85MM PRAIRIE SPIRE GREEN ASH C/W TREE TRENCH, WELL FRAME & NON-SLIP ADA CAST ALUMINUM GRATE
	202 SIDEWALK, CURB & GUTTER, AS PER C OF C DOWNTOWN SPECS; PATCHING OF ADJACENT ASPHALT AS REQUIRED
	203 RE-STRIPING OF LANES, AS REQUIRED
	204 CAST IRON TACTILE STRIP
	205 CONCRETE WALKWAY, TEXTURED
	206 STAINLESS STEEL SAFETY BOLLARDS
	207 PROPOSED CURB
	208 REVISED PLANTER C/W SOFT LANDSCAPING
	209 ALUMINUM GUARD RAIL C/W STAINLESS STEEL CABLES; BRUSHED FINISHED
	210 ALUMINUM STAIR & GUARD RAIL - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'
	211 CONDITIONED CONTROLS ROOM - REFER TO 'ACCESS FROM 9TH AVE - NE STAIR'
	212 RE-MEDIATED MEDIAN
	213 PROPOSED STREET LIGHT POLE C/W CONCRETE BASE - REFER TO 'STREET LIGHTING'
	214 PROPOSED STREET LIGHT POLE, EXISTING BASE INTEGRATED INTO MEDIAN - REFER TO 'STREET LIGHTING'
	215 ELEVATED ALUMINUM WALKWAY/WALL ASSEMBLY



EXISTING SE CORNER

AREA 3 - SOUTH OF BRIDGES

SE & SW REDEVELOPMENT

The proposed Place 10 development on the SW corner of the project site (currently under construction) will improve the permeability and illumination of the SW corner. A new sidewalk, enhanced lighting strategies and an activated building frontage will soon be in stark contrast to the existing context south of the bridges. As part of the 4UE improvements, the proposed guardrail assembly will replace the existing guard structure on both the east and west sidewalks. New flat work along the east sidewalk will replace the existing deteriorated concrete.

CPA FACADE & CP ACCESS ROAD

Although currently outside of the project scope, Calgary Parking Authority and Canadian Pacific have been consulted on the status of the SE access road, parallel to the SE retaining wall. Poor lighting and uncontrolled access has led to ongoing security challenges along the length of the parkade facade.

To mitigate these existing security issues, in conjunction with balancing the Place 10 improvements, the Project Team has explored the integration of feature lighting and installation of new upper guardrails (and potential lower access gate). At this time, additional consultation with CPA, CP and The City is required prior to incorporating this extended scope into the project.

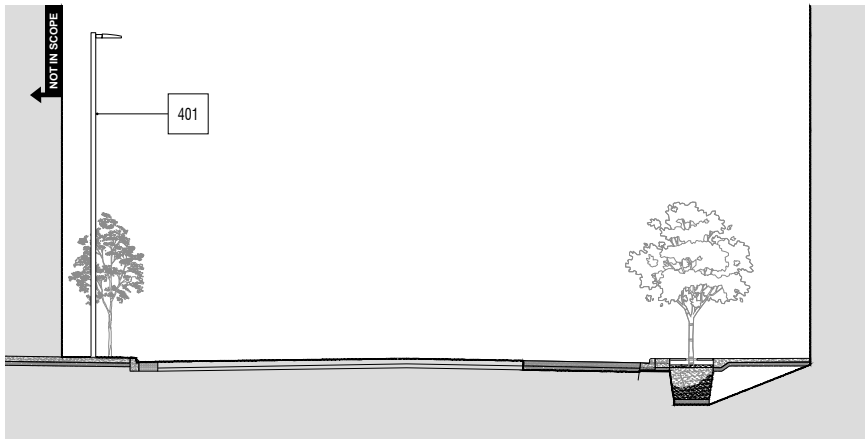




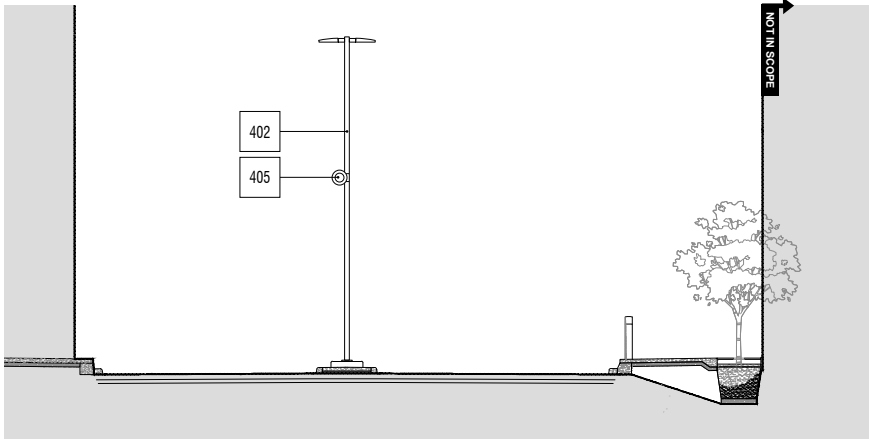
AERIAL OF EXISTING PROJECT SITE

ADDITIONAL SYSTEMS

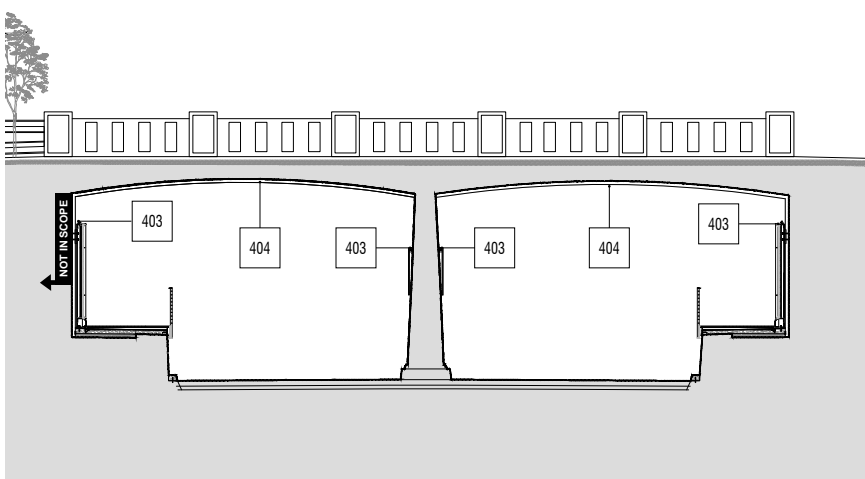
STREET LIGHTING
SECURITY SYSTEMS
MEDIAN REPAIR



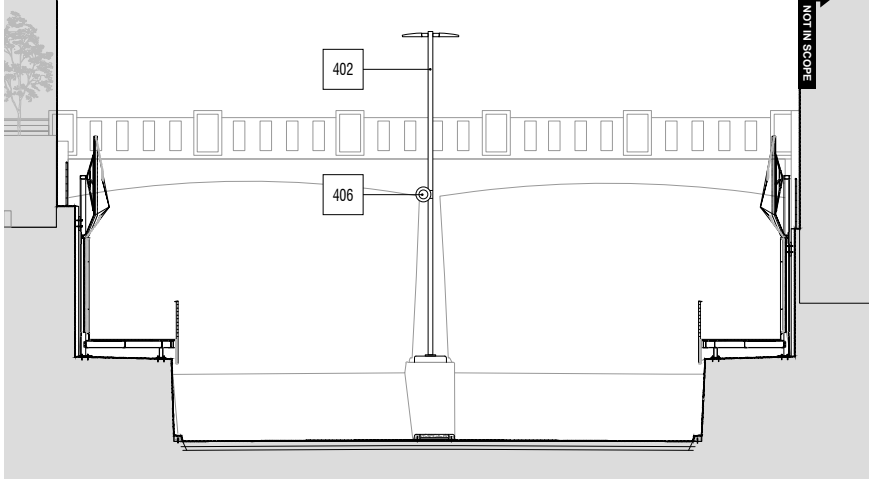
PROPOSED SITE CROSS SECTION A - STREET LIGHTING & SECURITY SYSTEM



PROPOSED SITE CROSS SECTION B - STREET LIGHTING & SECURITY SYSTEM



PROPOSED SITE CROSS SECTION C - STREET LIGHTING & SECURITY SYSTEM, TYPICAL @ BRIDGE LOCATIONS



PROPOSED SITE CROSS SECTION D - STREET LIGHTING & SECURITY SYSTEM, BETWEEN BRIDGES

STREET LIGHTING

The street lighting strategy is premised on employing pre-approved fixtures from related downtown underpass projects, in conformance with City of Calgary standards and specifications for illuminance levels. In instances where atypical mounting strategies are proposed (i.e. two luminaire heads per pole), engineered shop drawings will be submitted to The City for review and approval.

For the purposes of lighting level performance & long-terms operations/management, street lighting and public art have been delaminated as two separate systems. For additional information on public art lighting, please refer to ‘Public Art: Media Concept & Content’.

Additional information on the street lighting strategy & power servicing for the project can be found within Appendix 2.1.

SECURITY SYSTEM

Four City of Calgary standard spec cameras (two 180 degree and two degree) will be installed covering the pedestrian areas and public art installation. These cameras are currently proposed to be installed on the proposed city street lighting poles mounted in the median. This location provides the best viewing angle as well as keeps the cameras away from potential vandals. Approval of this mounting location is contingent on further review by Street Lighting.

Two City of Calgary standard spec emergency call boxes will be installed at either end of the corridor, one on the east side of 4th Street, and one on the west side. One City of Calgary standard spec public address horn will be installed as a general notification device for the corridor and underpass.

A fibre service will be brought to the proposed demarcation point in the services room beneath the proposed NE stair. This fibre service will provide internet access for the public art as well as communication for the security cameras and emergency call boxes installed in this project. The source point for this fibre will be a 10th Ave manhole. The specific manhole has not been selected, but it has been identified that there is no immediate manhole at the intersection of 4th Street and 10th Ave.

MEDIAN REPAIR & ASPHALT PATCHING

The existing slab-on-concrete median, which is severely deteriorated across the length of the project site, will be removed and replaced. During replacement, proposed concrete bases for street lights will be integrated into the median.

In 2012, the existing roadway was resurfaced; as such, there are no plans for full roadway remediation in the near future. Any resurfacing which may be required due to the relocation of street lights and/or the reconstruction of curbs will have to be feathered to match adjacent grades in conformance with the applicable *City of Calgary 2012 Roads Construction Standard Specifications*. Additional information on the civil scope can be found within Appendix 2.2.

SUMMARY OF PROJECT RISK MITIGATION STRATEGIES MOVING INTO DETAILED DESIGN

KNOWN-UNKNOWN			MITIGATION STRATEGY
1.0	STRUCTURAL CONDITION OF THE 9TH AVENUE BRIDGE	<p>During the review of the Schematic Design Report, the Bridges & Structures group identified that The City's 9th Ave SW bridge & adjacent retaining walls should be subject to a Structural Assessment as part of the project scope.</p> <p>Structural remediation work would require access to retaining walls & structure that is set to be covered as part of 4UE. Significant life cycle remediation work, if required in the short term, should be completed ahead of 4UE project scope.</p>	<p>Assessment is currently outside of project scope. Project Team to solicit copy of any existing Structural Assessments for the bridge. Historical status of bridge to inform possible degree of inspection and scope remediation required.</p> <p>Based on current status and costs, City to determine preferred course of action moving forward.</p>
2.0	PRESENCE OF HAZARDOUS MATERIALS WITHIN BRIDGE COATINGS	<p>As part of the improvements, underside of bridge structure is set to receive coating. Due to the age of the structure, possibility of LBP and other hazardous material exists. The presence of hazardous material has implications on the specifications for preparing and coating the surface.</p>	<p>Project Team to solicit information from 8th Street SW Underpass team on protocol for testing employed on the concrete underpass. 8UE to serve as a precedent project for 4UE risk assessment.</p>
3.0	PHASING OF WORK	<p>Existing development associated with the Place 10 development (SW corner of site) includes a closure of the west sidewalk. Scheduled for closure until 2018.</p> <p>When construction on the East sidewalk for 4UE begins, protocol must be in place to ensure pedestrian access through the corridor is maintained.</p> <p>Following construction of 4UE, concurrent both the East and West sidewalks must be accessible for the public art narrative to perform as designed.</p>	<p>Project Team has engaged Centron to review design. Additional dialogue required.</p>
4.0	STATUS OF UTILITY CORRIDORS	<p>Current status (age & condition) of existing utility corridors which run beneath the 4UE sidewalks is unknown at this time.</p> <p>Utility remediation work would require access to sidewalks that will be covered as part of the 4UE. Significant life cycle remediation work, if required in the short term should, be completed ahead of 4UE project scope.</p>	<p>Project Team to meet with Enmax on 16.04.25 to review status of current utility corridors. Project team circulate DD report to all other utilities for similar review and comment.</p>
5.0	REQUIRED ACCESS TO UTILITY MANHOLES	<p>Utility manholes under and between bridges will be covered by panelized, elevated walkway as part of the 4UE design. Protocol surrounding access to manholes by utility crews, and 4UE design response to be reviewed for conformance.</p>	<p>Project Team to meet with Enmax on 16.04.25 to review access to utility manholes. Project team circulate DD report to all other utilities for similar review and comment.</p>
6.0	LIFE CYCLE COSTING	<p>In order to establish a model for asset ownership and maintenance moving forward, City business units required additional information on operational and life cycle costing for design elements.</p>	<p>During Detailed Design, Project Team to solicit information on operational and life cycle costs associated with design elements.</p>
7.0	NE STAIR EASEMENT	<p>There remains ambiguity in the wording of the easement associated with the right-of-ways on the property owned by Brookfield Development to the NE of the project site.</p> <p>Specific to the proposed NE stair, The extent of encroachment of the proposed NE stair cannot be determined with any degree of certainty at this time.</p>	<p>Additional review with an Alberta Land Surveyor from The City's Information Services group is required. Additional dialogue with Brookfield Development is also required.</p> <p>Please refer to Appendix 1.1 for additional information.</p>

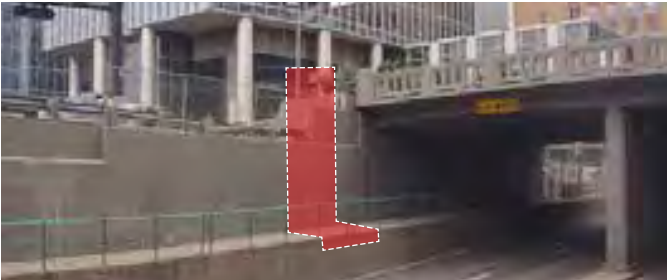
KNOWN-UNKNOWN PHOTO SURVEY





PHYSICAL MODEL, 1:20

Proposed mock-up to be installed on the west sidewalk. 1:1 Mock-up to measuring ~1500mm in width. Please refer to Appendix 2.4 & 2.5 for detailed design drawings of the mock-up.



PROPOSED LOCATION OF 1:1 IN SITU MOCK-UP

KNOWN UNKNOWNNS

Although much information has been solicited through Design Development, there remains several key known-unknowns to be addressed in the next phase. This section summarizes key items noted throughout the document and identifies strategies to mitigate risk to the project moving forward.

MOCK-UP

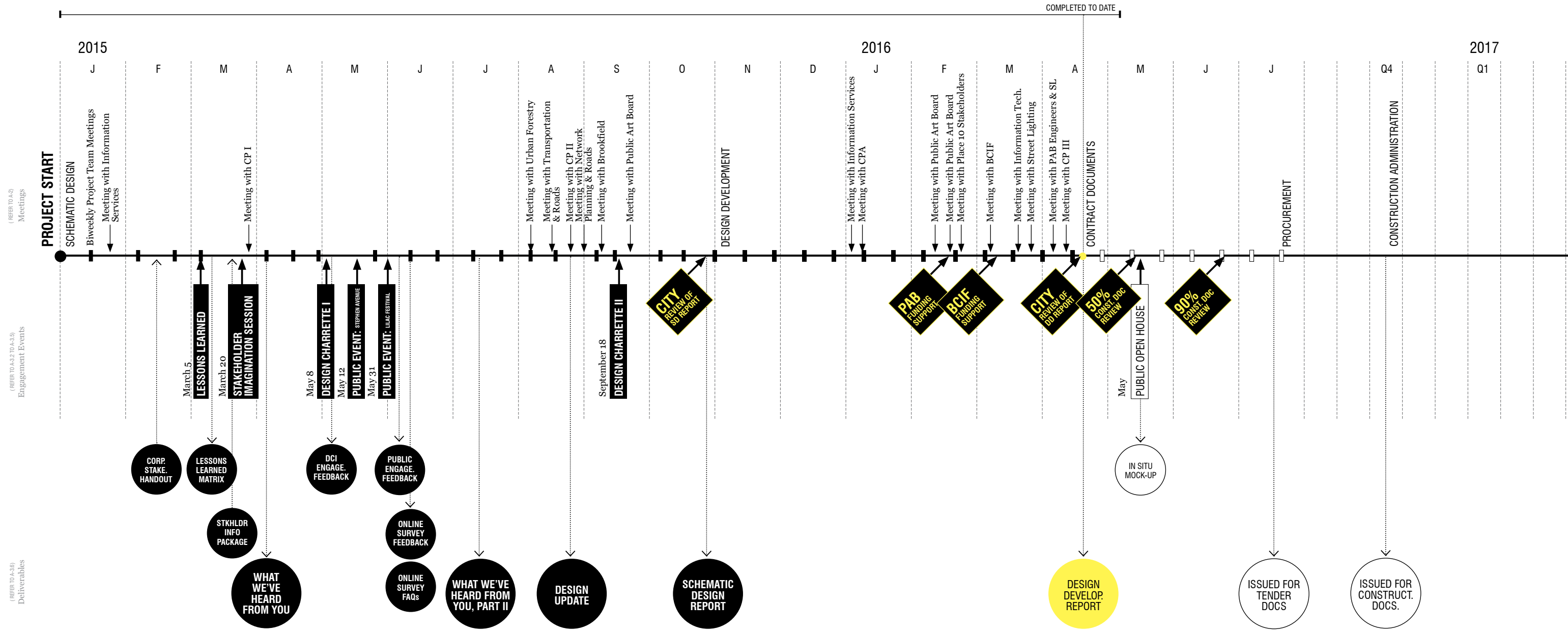
Within the delivery of a completed project, a mock-up can be strategically used to test design ideas and construction techniques that can only be reviewed, verified, and addressed at a full scale. Some key deliverables that can come from the use of a mock-up include:

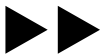
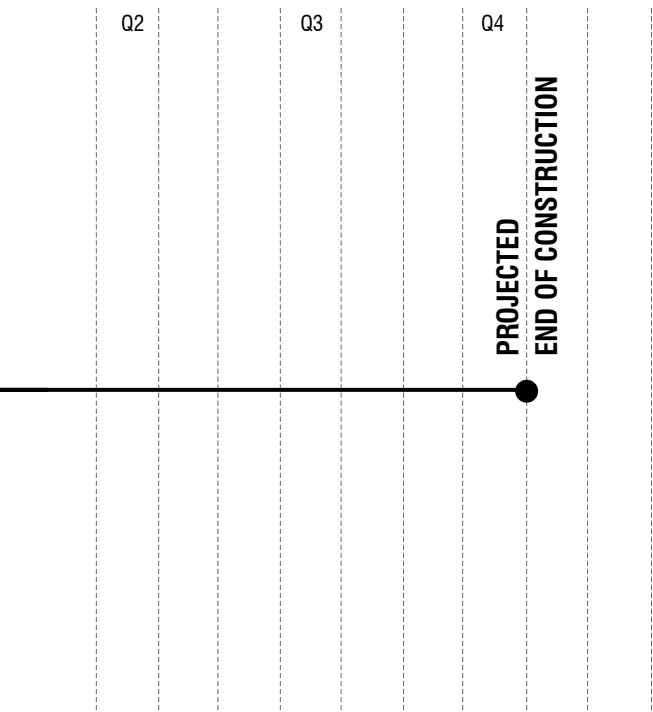
1. Confirmation of design and construction tolerances;
2. Confirmation of material and finishing strategies;
3. Confirmation of ergonomics and the design's relation to the body and its mechanics;
4. Confirmation of functional aspects;
5. Confirmation of operational needs; and
6. Confirmation of maintenance considerations.

Most often, mock-ups are defined and requested within the Contract Documents. Specifically, the mock-up is contained within the Specifications, where it is described in terms of its extent and quality. The fabrication and the construction of the mock-up becomes a responsibility of the successful Contractor. A drawback of this system is that the lessons learned from the mock-up need to be addressed through a series of change orders, which can be costly given the pricing for these changes is not competitively bid. Another drawback is that the changes that may emerge from the review of the mock-up require additional design time, impact to the schedule during construction, and may not be entirely and successfully addressed because the change is so late in the process and can negatively impact a great number of other scopes of work.

On the 4th Street SW Underpass Enhancement, the mock-up process has been moved into the Design Development and Contract Document Phases, allowing the stakeholders to fully engage and test the design elements while also allowing the Design Team to more fully address any potential changes that arise from this testing within the normal design process and schedule. The advantages of this include no impact to project and construction schedule, a more fully coordinated set of Contract Documents, full buy-in from the stakeholder group prior to construction, and firmer construction costs entering into the Tender Phase.

Measuring ~1.5 metres in length, the mock-up is scheduled for installation on the west sidewalk in mid-May. Stakeholders will be invited to an on site Open House to review the construction, with the Design Team on hand to answer any questions that may arise.





PROJECT SCHEDULE

The completion of this report marks the end of the Design Development phase of the project. Throughout the past several months, the project team has met with several key stakeholder groups to identify technical requirements, refine specifications, and formulate strategies for review and approvals moving forward.

In addition to the above, the Design Team has expedited the development of full construction drawings for a full-scale mock-up of the wall assembly, scheduled for installation mid May. The unveiling of the mock-up will be completed in conjunction with the final Public Open House. Additional information on the event will be circulated as the milestone nears.

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