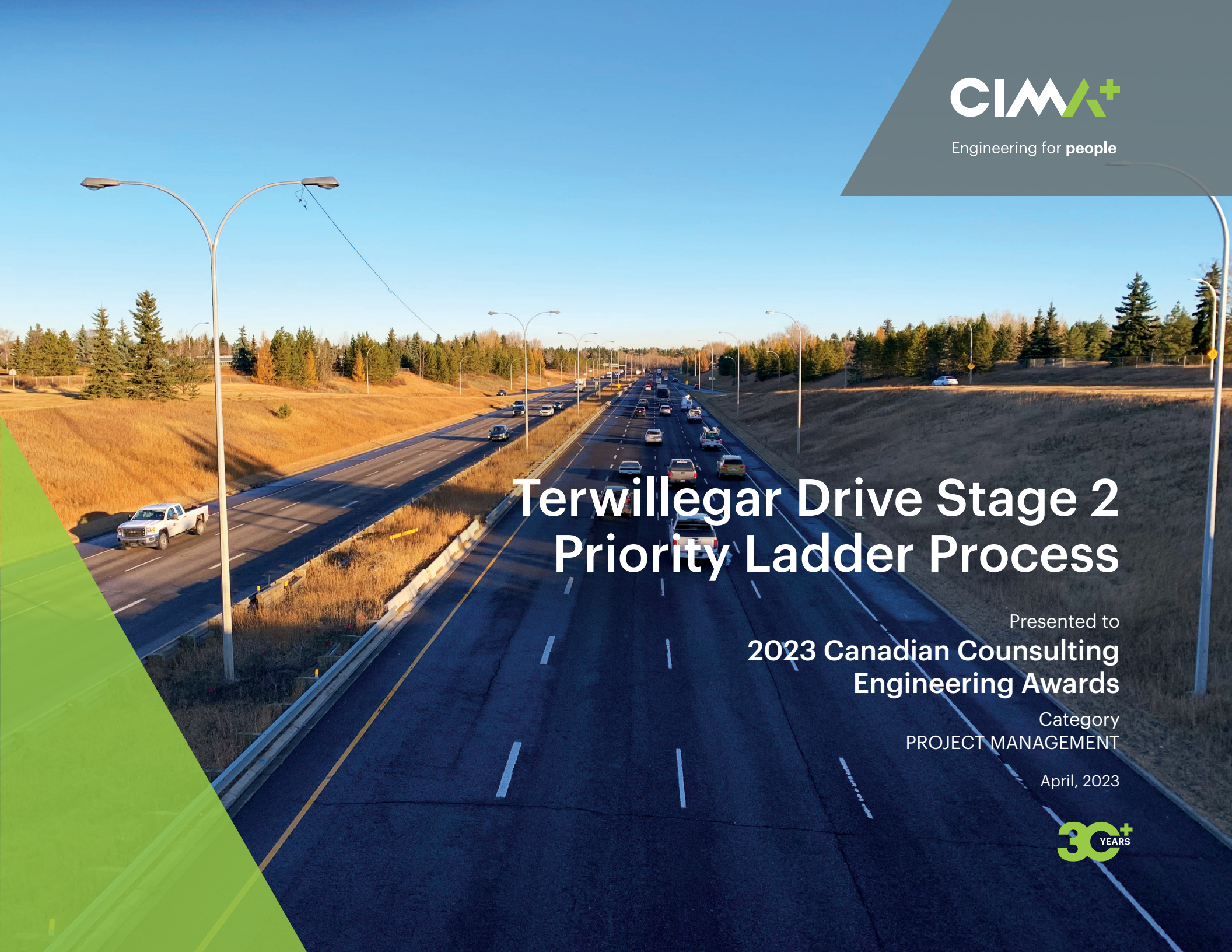

CIMA+

Engineering for **people**

Terwillegar Drive Stage 2 Priority Ladder Process

Presented to

2023 Canadian Counsulting Engineering Awards

Category

PROJECT MANAGEMENT

April, 2023

30+ YEARS

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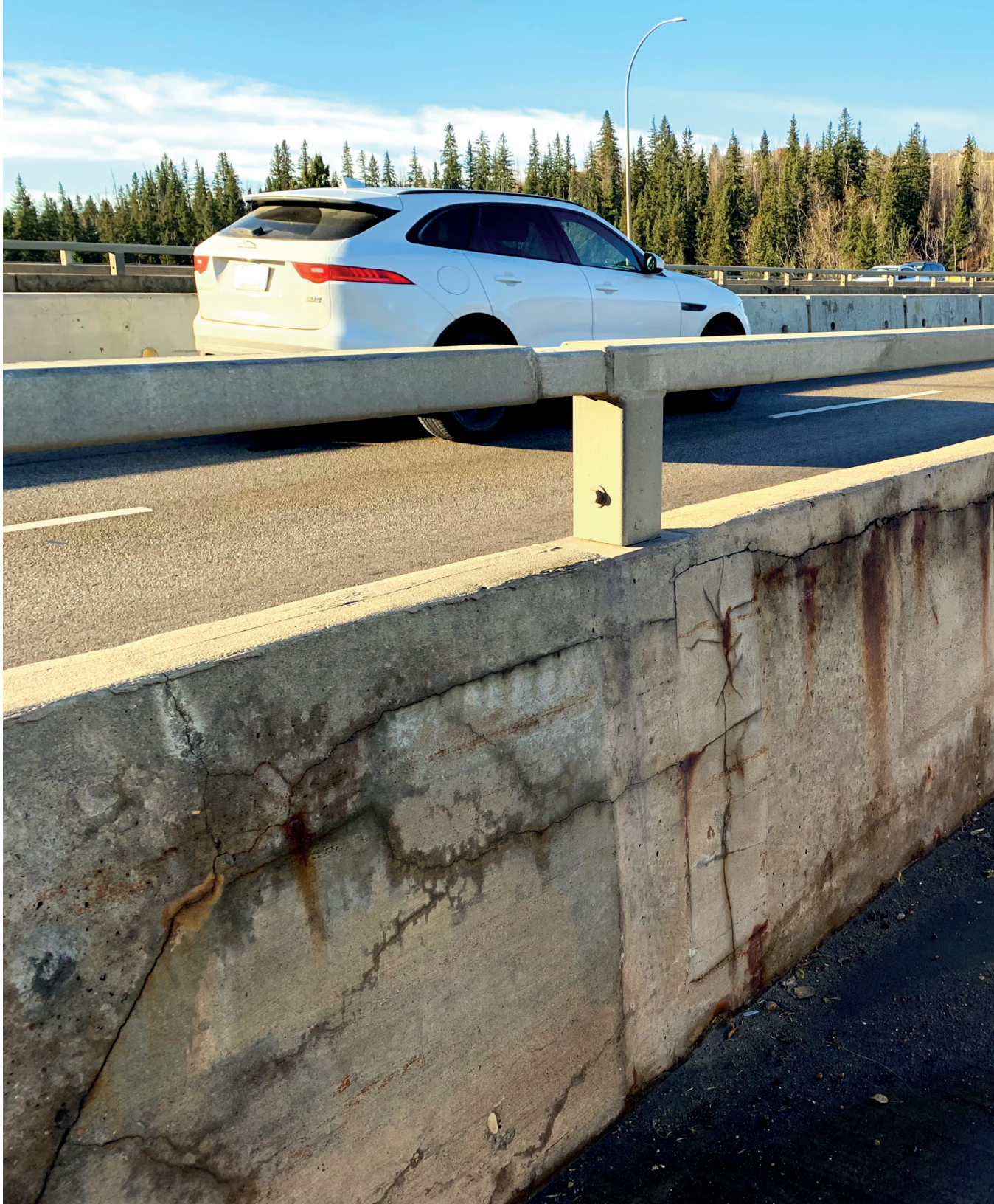
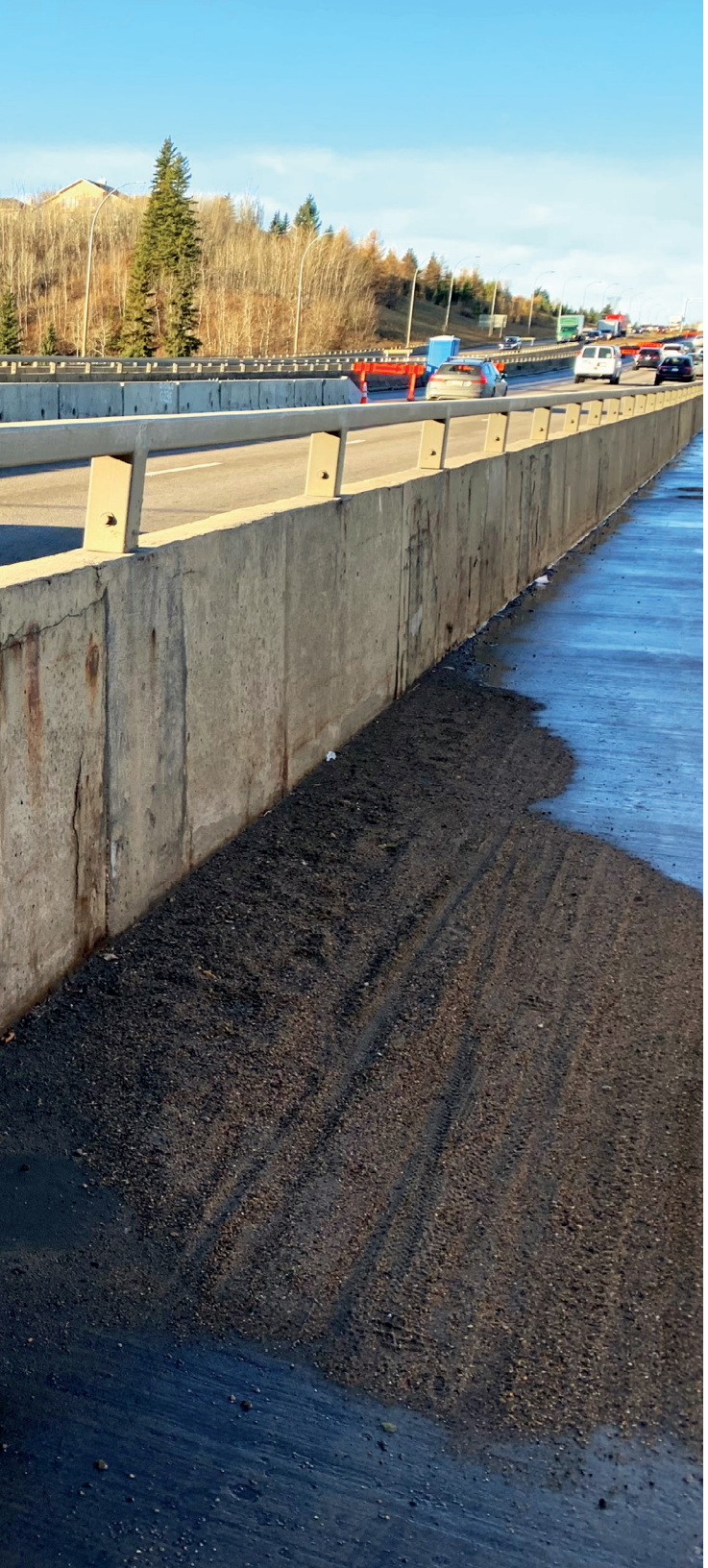
Project summary

In today's fiscal reality, public sector clients look to stretch their budget dollars to build only what is necessary. It can be a difficult process to determine which components of a project are more important than others to maximize the value of an investment in key infrastructure. The CIMA+ team created a priority ladder evaluation process for the Terwillegar Drive Stage 2 project to aid the City of Edmonton in scope decision making.





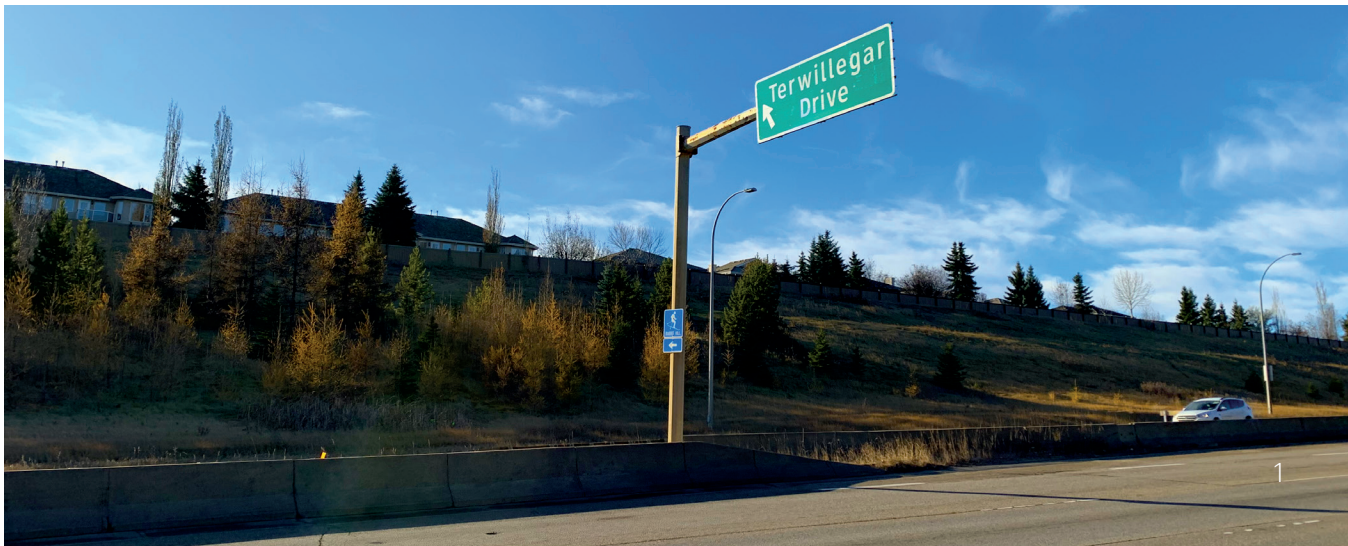
Innovation

Clients need a systematic defensible process in refining project scope to meet project goals. In our case it was to meet a specific budget, but goals may vary depending on the project. The process we created provided a systematic review of the project details and how each component could be constructed independently.

The process began with establishing packages of work and their costs.

Then a value engineering session was held to refine the details within each package. At the value engineering session, experts and City specialists and decision makers attended where they were introduced to the project goals, project details, and costs. Each work component or package was refined, changes discussed and if accepted by the group, the component was included for further examination.

The revised components were developed in more detail and costs estimates generated. At the following priority ladder workshop, the team worked through establishing the priorities for each component. The project was assembled in priority order until the budget was just exceeded, and the new interim scope defined.

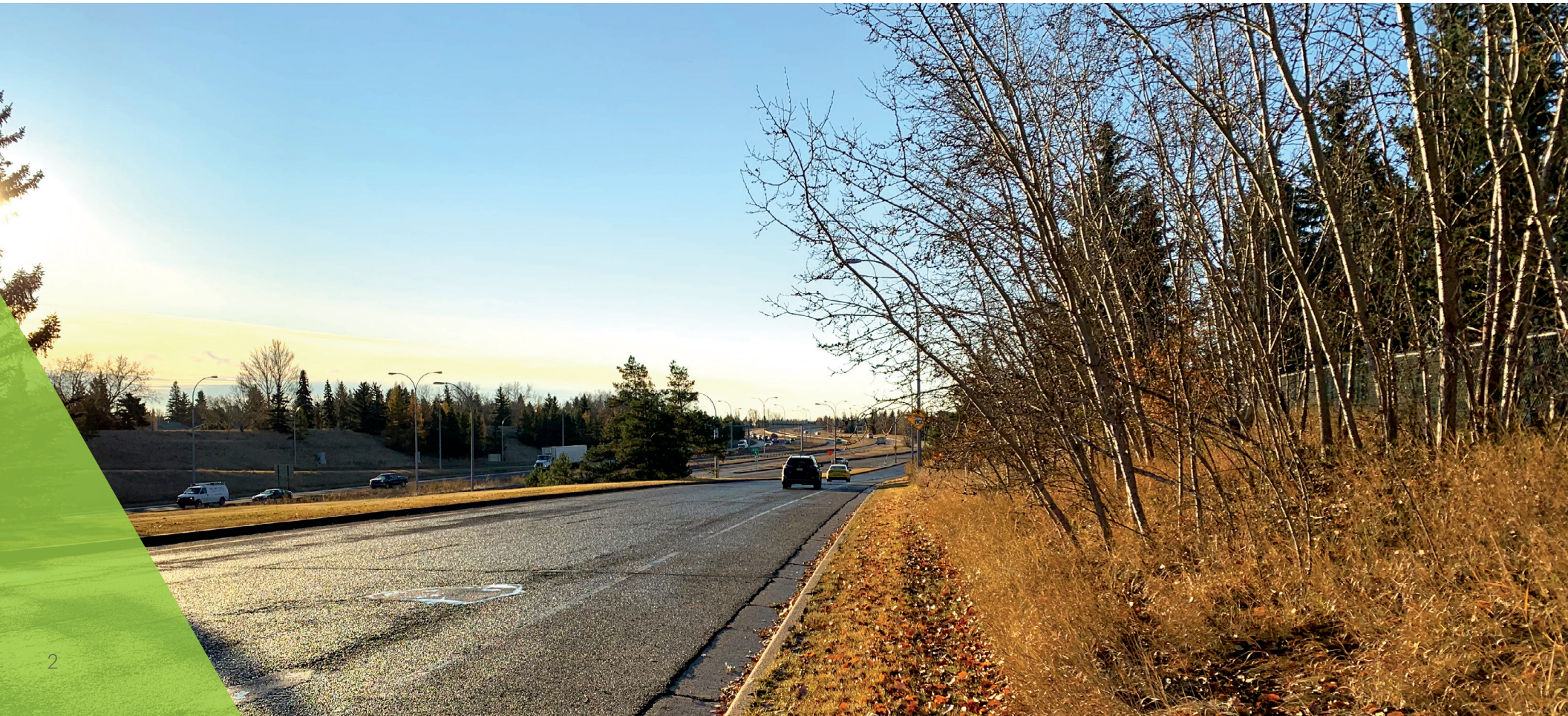


Complexity

Terwillegar Drive is a key corridor in southwest Edmonton that is currently congested. It is also an important future from Anthony Henday Drive (the City's ring road), southward to Highway 2 south of the City of Leduc.

Originally envisioned as a free-flowing roadway to accommodate future travel demand within southwest Edmonton, Terwillegar Drive will now remain an expressway with transit priority infrastructure added.

The 13.5 km corridor was broken into three stages with Stage 2 now starting construction. Stage 2 encompasses operational improvements, rapid transit facilities, and rehabilitation along Whitemud Drive, as well as the ultimate reconfiguration of the Terwillegar Drive/Whitemud Drive interchange and rehabilitation and widening of the Rainbow Valley Bridges over Whitemud Creek.



The goal of Stage 2 is to reduce congestion and travel times for goods and commuters on Terwillegar Drive, while providing a dedicated rapid transit connection between Leger transit centre and the South Campus LRT station.

The planned changes exceeded the budget for the corridor which included a reconfiguration of the key Terwillegar Drive/ Whitemud Drive interchange. The consultant team was required to develop an interim improvement scenario for the project that added capacity and reduced congestion while accommodating transit and active transportation users.

To develop an interim plan for the project that minimized conflicts with the future ultimate plan, the ultimate plan was broken into independent components that could be constructed as stand-alone items resulting in nine packages of work with their component construction costs.

A value engineering session was held to optimize the design of the individual components and reduce their costs.

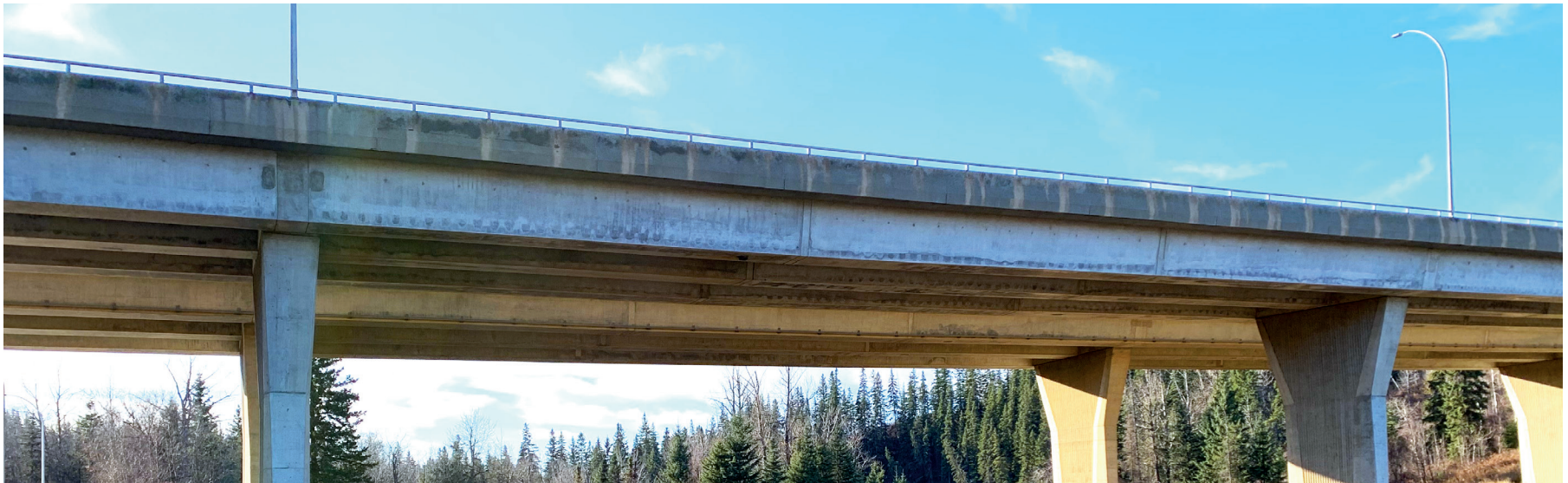
Over 200 ideas were generated that were then evaluated, grouped with similar ideas, and carried-forward for further consideration.

Additional detail was added to the project packages to reflect the ideas and this revised information was presented at the follow-up priority ladder workshop.

At the priority ladder workshop, the revised work packages were evaluated, and priorities established based upon how well the work met the project goals and whether the City had previously publicly committed to include the component in the project.

As a result, six of the nine packages were identified as core components due to these public commitments. Additional packages were considered optional and added into the project until the budget was slightly exceeded.

The group evaluated the combination of options and selected one that formed the basis of the interim plan and design scope of work.

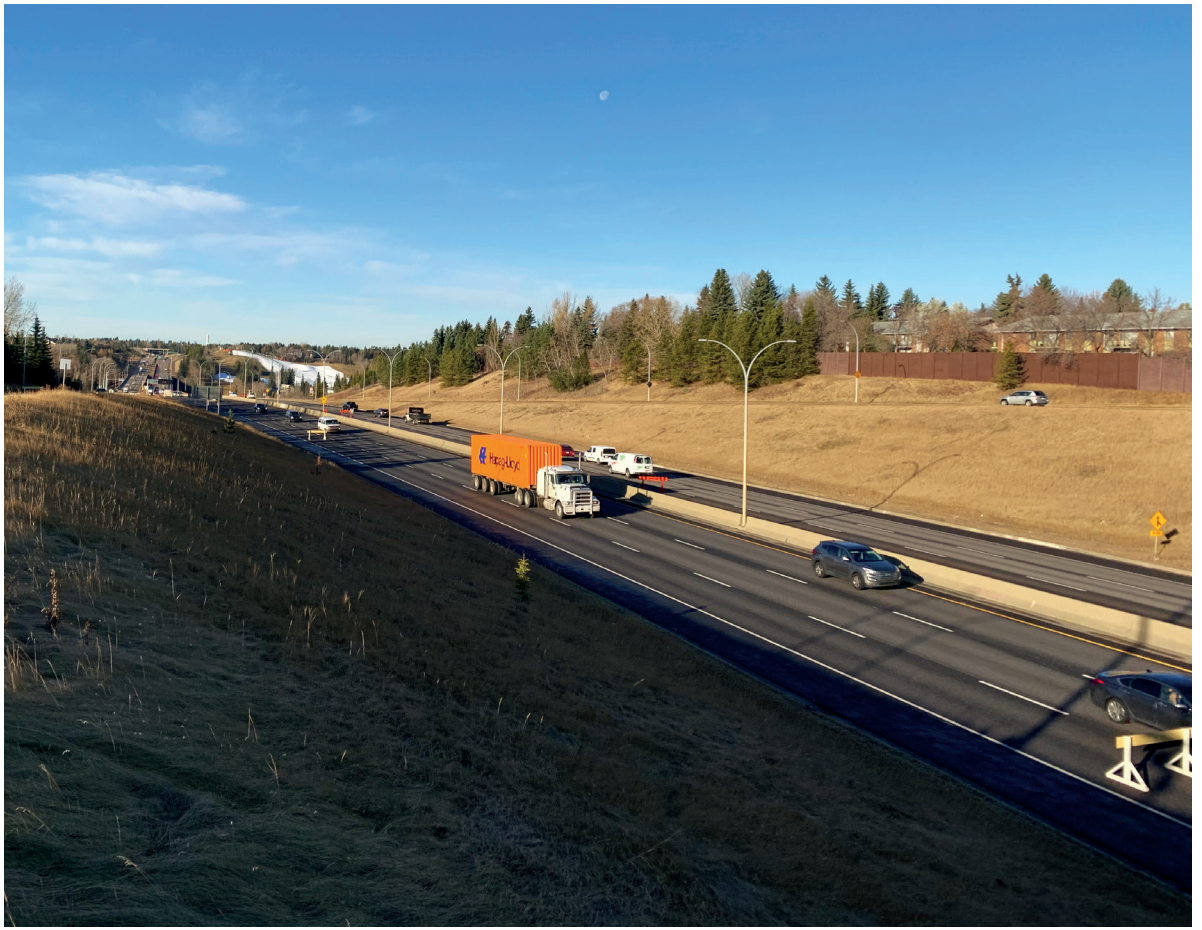


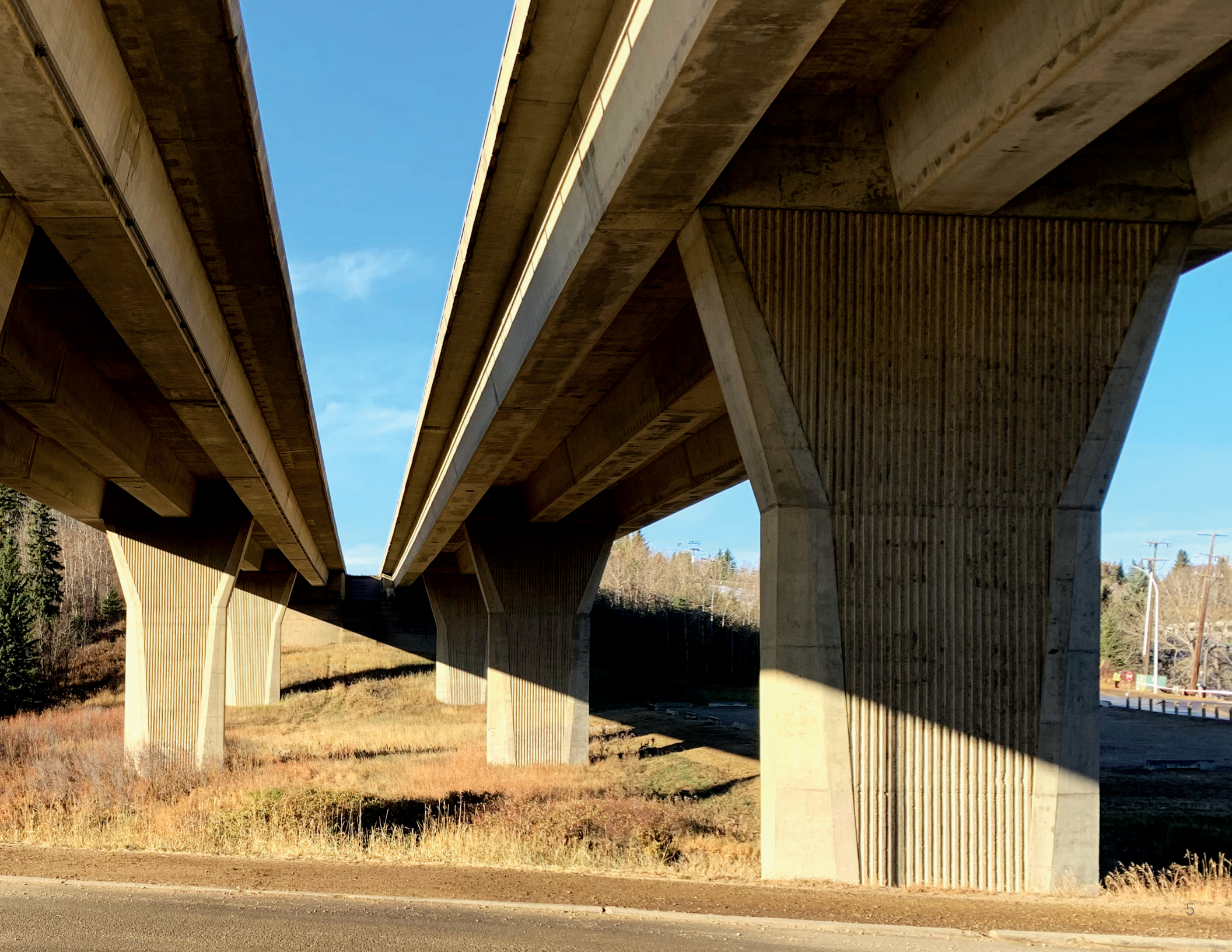
Social and/or economic benefits

The overall project will reduce congestion and delays and therefore greenhouse gases, but this information was not made available to us by the City. From a societal benefits perspective, while the project has some tree impacts approximately 30,000 trees, and shrubs will be added to the corridor as compensation for the removal of existing trees.

This will help to deal with vehicle pollution and greenhouse gases. In addition, rapid bus facilities will be added to the corridor and will take up to 40 people from cars and puts them into each bus which will reduce congestion and emissions. Bus frequency is anticipated to be one bus every 5 to 10 minutes. Finally, new active mode trails and bridges are included in the project to improve usage and allow for more commuting and a healthier population.

The economic benefits from the priority ladder process include an increased budget due to COVID, inflation, and supply chain issues but also a project that is approximately 50% of the ultimate project that we started with. This postponing of a $100 million expenditure now to 25 years into the future reduces the tax impact to every homeowner and every business for the next 25 years.





Environmental benefits

The overall project's environmental benefits follow below while environmental benefits for the priority ladder process are at the end.

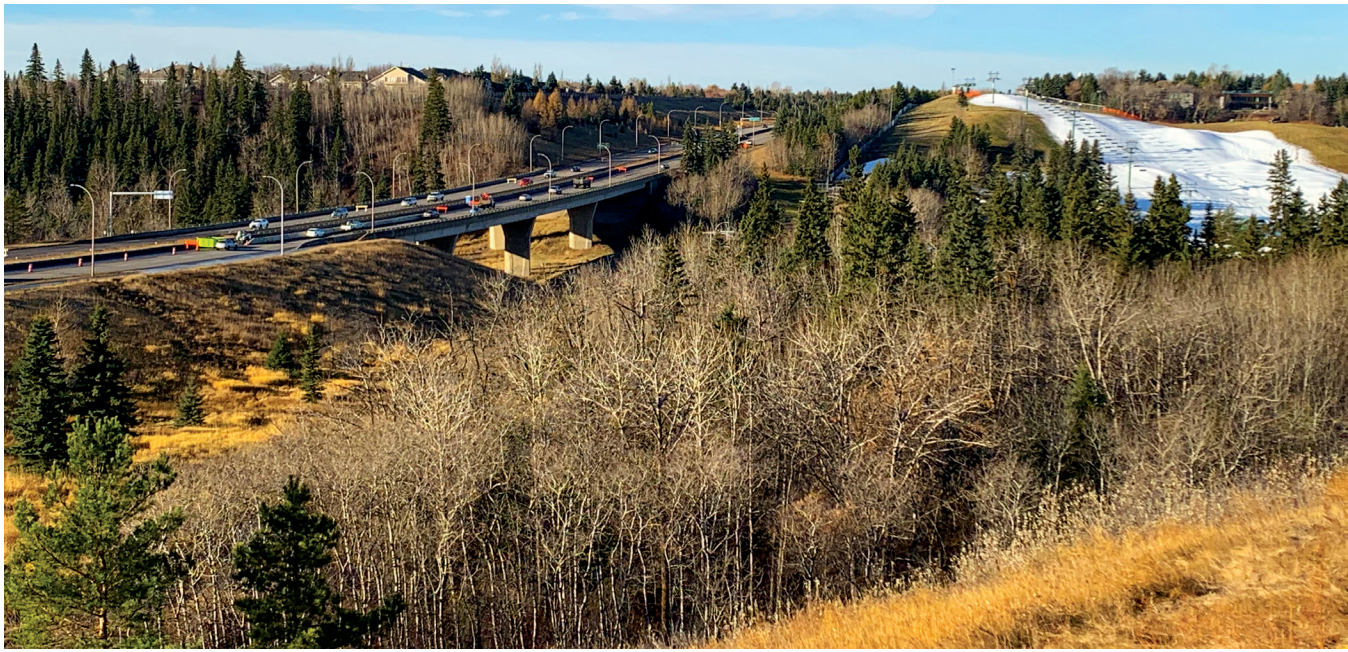
The existing Terwillegar Drive and Whitemud Drive corridors were constructed in the 1980s in cut sections or valleys. The sideslopes beside the roadways are long slopes with many trees.

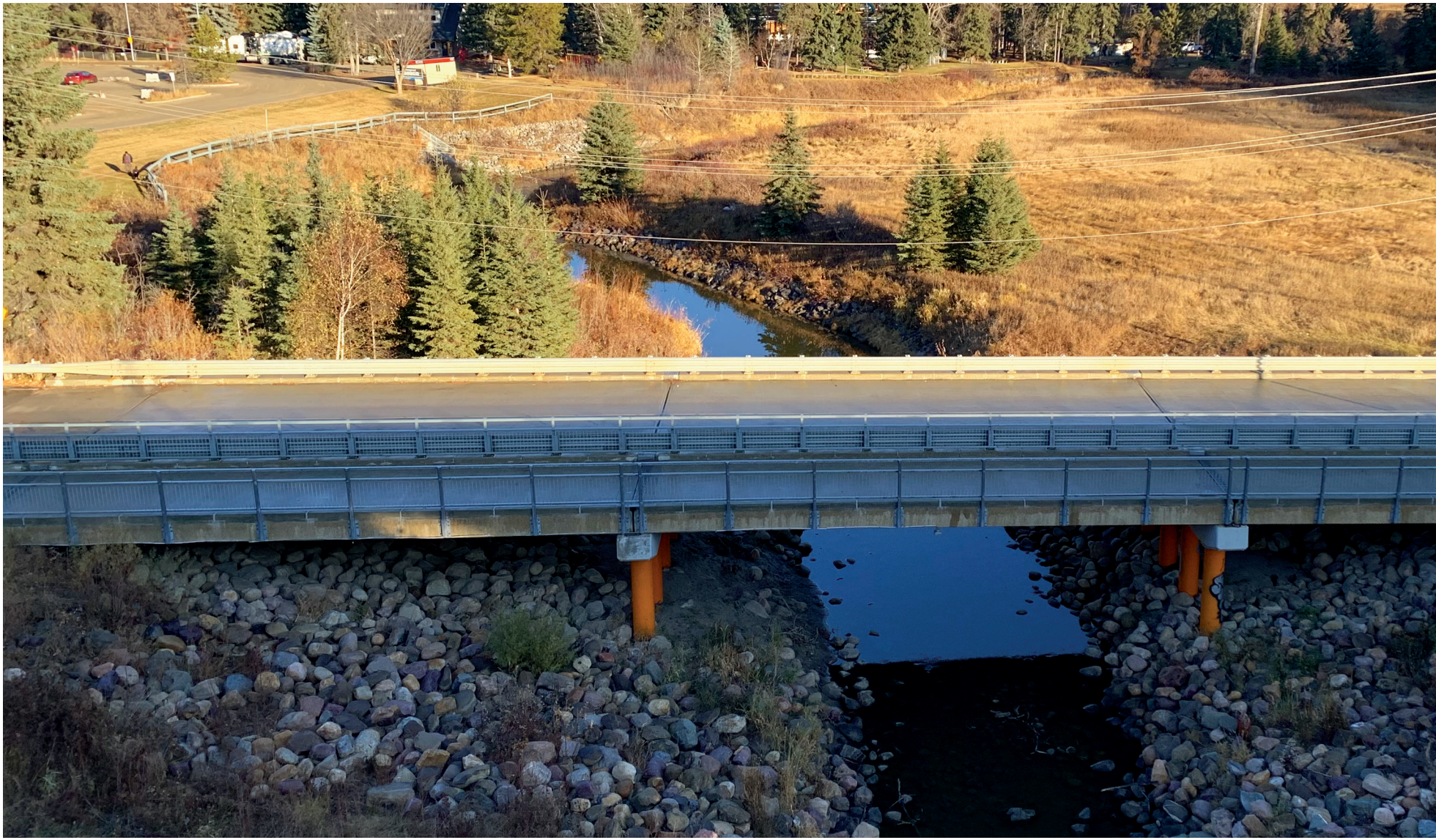
The improvement plans included roadway widening the roadways to the outside which would require the regrading of the cut slopes and removal of many trees.

Through careful examination of the tree health and design options, a combination of retaining walls with localized regrading in areas of higher tree value was used. In areas where the tree values were less, the slopes will be regraded. In addition to the trees, significant environmental approvals from Alberta Environment and Parks, as well as the City of Edmonton were obtained for the widening of the roadway and bridges in the Whitemud Creek valley.

Stormwater run-off containment and treatment were explored, and a solution agreed upon for the project. The existing run-off rate feeding the creek system is approximately 7 times the desired rate and the project increased this by less than 1%. As a result of this project and the work completed to investigate the stormwater situation, the City is advancing a broader approach to dealing with stormwater in this drainage basin.

The priority ladder process allowed the team to evaluate how to deal with the tree impacts as well as the stormwater needs of the project and define the priorities for the project.





Meeting client's needs

Specifically for Stage 2 several design and construction goals included bringing the corridor up to current standards, alleviating congestion, including bus-rapid transit, enhancing safety, and preserving the environment.

However, beyond providing a safe design the City required us to achieve the best value approach for design within the City's available funding envelope.

As a result, the consultant team needed to develop the scope of work for the project that fit within the target budget. The initial work included developing the preliminary design and cost estimate for the project in its entirety as desired by the City. Then, we needed to determine what an interim scope of work might be that could be constructed within the budget.

For the interim plan we developed the priority ladder process that helped the City staff and decision makers understand the constraints and the design. The project was broken into packages of work that could be constructed independently. The team attended a value engineering workshop where improvement ideas were generated aimed at reducing costs and schedule delays. Schedule concerns were enhanced due to COVID supply chain issues and the need for early works. The ideas were investigated, and new designs brought to a follow-up Priority Ladder workshop.

The process guided the attendees through decisions about each package of work that identified their priority. As a result of the process, the scope was reduced to close to the original budget and the design proceeded.