



2022 Canadian Consulting Engineering Awards

# BEAR STREET RECONSTRUCTION: REDEFINING URBAN SPACE IN BANFF

Category F: Special Projects



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*Visitors linger on Bear Street*

## WHY BEAR STREET

The Bear Street Reconstruction project created a pedestrian-priority street in the heart of the Town of Banff. Running parallel to Banff Avenue, Bear Street is home to a mix of visitor and local-oriented services alike. The \$9.5 million reconstruction transformed the street into a pedestrian-friendly space where people live, shop, dine, visit galleries, rent bikes or skis, visit dentists and medical offices, get supplies, or simply relax and take in the mountains.

The overarching design concept of Bear Street prioritises a people-centric shared space, encourages active modes of transportation, and increases pedestrian amenity space, while still enabling vehicle access.

WSP led a diverse team to deliver the Bear Street Reconstruction project – Banff’s first shared street. The project includes a full reconfiguration of the street level layout, replacement of shallow and deep utilities, removal of curbs to create a uniform paving stone surface and greater accessibility, more efficient lighting, more planting, more places to sit, integration of the stormwater management network to utilise soil cells, and a gas to wood burning convertible fire pit at the heart of the street complete with Adirondack chairs, bringing the campfire experience from the National Park into downtown Banff. The design phase of the project was completed in 2019 and construction was completed in 2021.

The project’s origins are two-fold; the need to replace and upgrade aging underground infrastructure, some up to 100 years old, and the desire to create a more pedestrian-friendly, attractive commercial street in downtown Banff that does not rely on the use of personal vehicles.

In 1992, the Town of Banff’s Downtown Enhancement Concept Plan identified the opportunity to transform Bear Street into a more pedestrian-friendly commercial street. Banff’s 2013 Transportation Master Plan further recommended that Bear Street be explored as a candidate for a shared street to align with goals of the Banff Community Plan vision of a transportation system that:

- Encourages active transportation within the Town of Banff
- Enhances resident and visitor experience
- Is economically and environmentally sustainable

The intent of the Bear Street Reconstruction was to create an environment that would foster active transportation, provide an alternate destination to Banff Avenue, enriching the visitor experience for those who fuel Banff’s economy, and serve to provide a sense of place by taking inspiration from the surrounding natural environment of the Rocky Mountains.

With the aging major underground civil infrastructure requiring replacement, the Town took the opportunity to move ahead with the Bear Street project and further the goals of the Banff Community Plan.



### *Open for Business on Bear Street*

Through increased visitation to Bear Street, pedestrians would be distributed in a more balanced fashion within the downtown core and create more economic opportunity for local businesses through increased footfall and by creating opportunities for people to linger longer on Bear Street.

The Bear Street project is part of a larger Town wide strategy to change transportation habits and address the congestion that the Town encounters. WSP has worked with the Town on various transit, sidewalk and bike infrastructure improvements as well as working with a private developer through the design, approvals and construction of Banff's first intercept parking lot at the Banff Train Station, providing free parking a 10-minute walk outside of the downtown core. The intercept lot is able to accommodate more than 500 vehicles and has allowed for removal of street parking in the downtown core, providing another 'nudge' to get people out of their vehicles and enable the success of the Bear Street Reconstruction project.

## **KEY CHALLENGES**

### **Stakeholder Management**

From 2014 to 2019, a shared street trial was implemented by the Town of Banff in order to test pedestrian circulation and vehicle patterns, introduce a graduated approach to change, and allow for public input prior to proceeding with permanent redesign. In 2019, the design was developed with input from a vast array of stakeholders including members of the public – locals and visitors – the business community, Town Administration and Town Operations Staff.

At its core, the Town of Banff is a small community and Banff residents are fiercely passionate about their little town. Listening to and delivering on key feedback was very important to the success of the project. Seeking input from so many stakeholders, often with competing interests, added pressure to the schedule as concepts were not easily finalised. WSP worked closely with the Town of Banff and other relevant stakeholders to listen to their goals, challenges, wants and needs, and determined what was easily achievable and what obstacles could arise in addressing some items. Having the end users at the table with the decision makers forced many conversations early on, but resulted in much faster design reviews and fewer changes later in the project. This process also facilitated early 'buy-in' from operations and administrative staff before complex design elements were too far developed.

Design elements that were included as part of the early feedback from a wide range of stakeholders included:

- Additional water main valves and sanitary manholes in key locations for ease of maintenance.
- Further customisation of the 'treetop' style streetlights that were previously installed on Banff Avenue to include additional access to power and anchor points for seasonal pageantry.
- Plant species that were carefully selected based on the approved Parks Canada and Town of Banff planting lists, knowledge of what grows well in the downtown core, and what can be maintained effectively. Lessons learned from the Banff Avenue project informed the types and initial size of trees to be planted to limit sight-line obstructions to businesses and signage along the street, as well as supporting decisions to provide optimal conditions (i.e., soil cells and irrigation) to support tree health.
- Method of installation for the landscape pod retaining boulders – a detail was developed to install a more robust base to avoid the movement seen in similar installations elsewhere in the Town of Banff, as well as limit debris/garbage build up around the boulders, and allow for easier maintenance.





Something for everyone



Overhead view on Bear Street, looking north

### Aging Infrastructure

Aging infrastructure with poor or non-existent records meant that additional background investigation was required, particularly for water and sanitary services. During the design process, detailed closed-circuit television inspections were conducted and WSP and Town staff visited every building along Bear Street to investigate existing infrastructure to fill knowledge gaps and identify as many ‘known unknowns’ as possible. As a result of these inspections and review of all available data, it was clear that unidentified infrastructure would be encountered during construction. To accommodate these known unknowns, WSP worked closely with the Town to develop design and financial contingency plans which could be deployed quickly during construction, limiting impact to the overall schedule.

### Stormwater management

The Town of Banff, located within Banff National Park, strives to be a model environmental community, adopting and implementing innovative programs to protect and enhance the natural environment. The Town also works closely with Parks Canada to meet or exceed the environmental guidelines of the National Park.

In alignment with the Town of Banff’s and Parks Canada’s environmental context, it was important that the stormwater infrastructure being implemented as part of the Bear Street project would effectively capture and treat flows before they discharge further downstream into the Bow River. Effective stormwater management was also emphasised to have particular importance on Bear Street to maintain pedestrian use – when a street is impacted by poor stormwater management, pedestrians and other vulnerable users are the first to lose access to the street and the last to get it back.

Several stormwater management techniques were investigated, and a stormwater management plan was developed that utilises soil cells as an alternative to not only manage and treat stormwater, but also to reduce stormwater flows reaching the Bow River. The system also provides a passive water source and sufficient uncompacted soil volumes for tree growth, so the Town of Banff proceeded with the soil cells to reap the dual benefits of stormwater treatment and support of tree growth in a downtown area.

The soil cells on Bear Street were designed in conjunction with stormwater infrastructure to collect and store runoff from the street and surrounding buildings, while providing sufficient soil volumes for trees and passively irrigating street trees. The soil cells effectively act as an underground bioswale, filtering and treating stormwater and eliminating 80-95% of total suspended solids. Sensors within the soil cells activate irrigation of the trees when needed, ensuring healthy plant growth and overall long term effectiveness of the system. The ability to plant an abundant number of trees downtown also helps to offset the urban heat island effect, which is particularly prevalent in areas such as Bear Street with a high ratio of hard surfaces.



*Gathering at the Fire Pit on Bear Street*

### **Banff Design Guidelines**

Central to the overall design aesthetic was the Banff Design Guidelines, a guidebook to community character that has been in use since the early 1990s. The Design Guidelines reinforce that any development in the community needs to reflect the unique sense of place, with its outcomes most recognizable through building form and materials used in construction in the community. On the Bear Street project, examples include elements such as natural stone bases for streetlights, abundant planting to reflect our National Park setting, and natural wood for public seating furniture.

All visible aspects of the project took the Banff Design Guidelines into account including universal (accessible) design. The removal of concrete sidewalk and asphalt drive lanes allowed for a flat uniform surface that is more accessible to everyone including people with limited mobility and people in wheelchairs. The designers ensured integrated accessibility, performing a review tailored to Banff allowing the design to stay true to Banff Design Guidelines. While normal concrete and asphalt cues were not present to guide people with visual impairments, additional vertical elements in the form of boulder landscape borders and vegetation were introduced to help guide people down the street.

There are many flexible aspects of the street that allow for a shift in use during the seasons and for special events. Mid-block Bear Street, known as the ‘Heart of the Street’ has been designed as a central focus incorporating a fire pit, additional movable public seating, and the ability to close off different portions of the street to vehicular access.

### **Construction**

Reconstructing a busy commercial street while minimising disruptions to businesses was a challenging undertaking. For the Bear Street project, additional complications included unreliable or non-existent records for existing infrastructure, and the need to complete construction during the COVID-19 pandemic.

In the weeks prior to construction start, the COVID-19 pandemic presented a serious consideration for the project to proceed. Town Council, with input from residents and business owners (some of whom were shuttered due to provincial restrictions), elected to proceed with construction during 2020. Construction during an emerging pandemic meant working through constantly changing requirements for work on site, as well as accommodations for the public. As businesses were allowed to re-open, the need for wider sidewalks to allow for physical distancing for example, decreased the construction working space, and the construction schedule had to accommodate access during the critical opening hours of two testing and vaccination sites.

WSP and the Town worked closely with the contractor to mitigate schedule delays and limit how much individual businesses were impacted. Remote work allowed non-local key team members to temporarily relocate to Banff in order to provide immediate onsite support when needed. The use of virtual construction meetings that previously would have been held on site became the norm and the Town was able to install webcams in key locations so that the project could be monitored remotely to limit the number of non-essential people on site.





The Bear Street that was, looking north



Preparing the way on Bear Street, looking north

## KEY PLAYERS

**Jessica Wheatley, P.Eng., PMP (WSP Canada Inc.)** Project Management, Civil design lead, Contract Administration

**Kelsi Hurlbut (The TULA Project, previously at Ground Cubed)** Landscape Architecture design

**WSP Canada Inc.** Geotechnical design, lighting design, electrical design, structural design, environmental testing and review, transportation review

**Level Playing Field** Universal (Accessible) Design

**Landscape Irrigation Solutions Ltd.** Irrigation Design

**Taylor Geotechnical Engineering** Materials Testing during construction

**Bremner Engineering and Construction Limited**  
General Contractor

**Pierre-Hugues Gagnon (Town of Banff)**

**Darren Enns (Town of Banff)**

## CLIENT TESTIMONIAL

*"The Town of Banff holds a long-lasting relationship with Jessica Wheatley and her team. Throughout the years, her team's relentless dedication to deliver projects – small or large – have exceeded our expectations. Jessica truly cares for her clients. She provides great technical and management services. She is responsive to our evolving needs and she provides high quality customer service. I highly recommend WSP's services."*  
**Adrian Field, Director of Engineering, Town of Banff**

# INNOVATION/TECHNOLOGY ADVANCEMENT

## STREET LAYOUT

As a tourist destination, many visitors to Bear Street are coming for the first time. As the design of the street is unconventional, intuitive design was key to provide subconscious cues to users on Bear Street and meet the Town's goals. There are three private parkades accessed from Bear Street and a public paid parking lot that needed to be maintained and vehicle access supported while discouraging Bear Street as a vehicular throughfare.

In order to create an equitable space for people walking, wheeling, and driving, Bear Street was divided into two main user zones:

1. The pedestrian 'sidewalk' zone, between planters and the building face – intended for pedestrians only.
2. The shared zone, open to people walking, wheeling, and driving.



*Early morning pedestrian zone on Bear Street, looking north*



*Early morning shared zone on Bear Street, looking north*

The pedestrian sidewalk zone is located on either side of the street where we would typically see conventional sidewalks. Wide enough to support high volumes of people walking, window shopping and lingering on the street, the area is protected on two sides by planters and the building face. This area is intended for those who want to access businesses and anyone who does not feel comfortable sharing space with other modes of transportation.

The shared zone is open to people walking, wheeling, and driving – all at walking pace. By slowing everyone down to the same walking speed, we create an equitable space available to all ages and abilities.

- The pedestrian zones were widened, and the shared zone narrowed to help indicate that the vehicle is a guest on the street and providing a sense of caution to people driving and encouraging slow movement.
- Bear Street was designed without curb and gutter, concrete sidewalks, or asphalt drive lanes. The surface of Bear Street is a single level.
- The surface is finished with paving stones further indicating a non-typical street and signaling to vehicles to behave differently.
- The paving pattern is set on a diagonal and acknowledges the Town’s design guidelines and existing streetscape elements; it also provides cues to people walking that crossing the street is possible at any location and any angle.
- Benches and informal seating areas are scattered throughout Bear Street, some facing the shared zone, reinforcing the shared nature of the area. Others are more protected closer to the pedestrian zone to cater to all.
- Sight lines are interrupted mid-block where streetlights and landscaping extend out into the shared zone, creating a chicane in the street’s alignment. The end of the block cannot be seen from one end to the other providing another cue to people driving that they must move slowly and with caution.

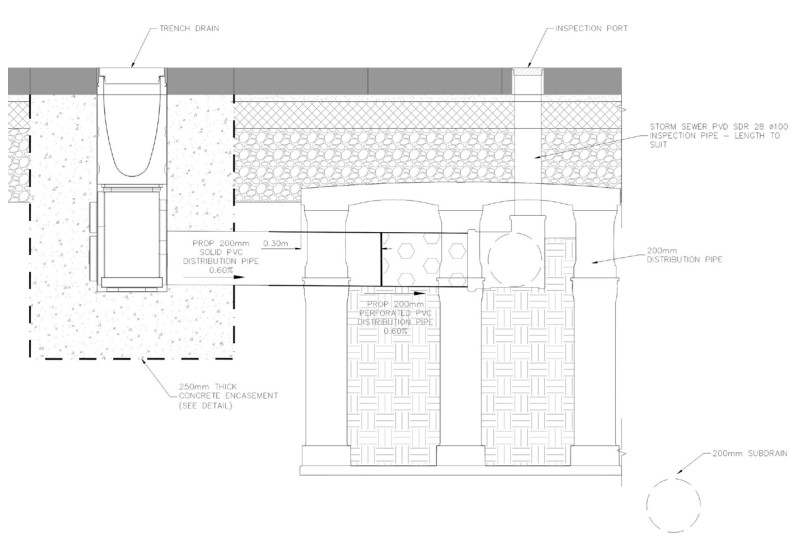
The design of surface features is intended to attract more visitors to the street and discourage its use as a vehicle thoroughfare. Prior to the Bear Street Reconstruction, Banff Avenue has five times as many pedestrians as Bear Street. Now finished, Bear Street will level that off, distributing visitors over more pedestrian areas in downtown Banff. Since opening, early data shows a 33% increase in pedestrian visitation to Bear Street (source: Town of Banff) which is expected to increase as the economy continues to open up after the COVID-19 pandemic.

We have informally observed a significant shift in the behaviour of people driving, walking, and wheeling where the shared zone is now occupied and shared equitably by all user groups. People in cars drive slowly behind people walking and wheeling, and those vulnerable users don’t appear to feel the urgency to move out of the ‘vehicle zone’ as is seen typically when crossing a road. In response to the paving stone surface finish, narrowed drive lanes, and more people walking and wheeling on the street, there seem to be fewer vehicles using Bear Street and they tend to be using the center of the shared zone, moving to the outer edge if an oncoming vehicle is encountered. Fewer vehicles travelling at slower speeds on Bear Street, along with the ‘nudge’ to get people out of their vehicles to experience the Town of Banff, mean less GHG’s, a reduced impact to the environment and better support the pristine air quality reflective of the National Park surround.





*Sharing the Space*



*In-line catchbasin to Soil Cell*

## STORMWATER MANAGEMENT AND SUPPORTING HEALTHY TREES

Bear Street's stormwater management network incorporates soil cells to capture, store, treat and reduce stormwater flows generated by Bear Street. The customised stormwater network is able to perform double duty, providing a solution to both water treatment and the need for adequate soil volumes to support healthy trees in an urban environment, in the most economical way possible while keeping the street accessible to pedestrians. As there is no curb and gutter, the entire street is designed with an offset centre swale draining to a trench drain (with custom surface grate designed to complement the paver pattern). The trench drain is interrupted in the Heart of the Street in order to preserve the aesthetic and not introduce lines that could unintentionally guide traffic straight through the chicane. This area was also designed as a high point to protect the main gathering and event space from ponding during major rainfall events or snowmelt.

The trench drain slopes internally toward in-line catch basins that direct water into the top of the soil cells via perforated pipe where the topsoil was left low to provide additional stormwater storage capacity for major events. As water infiltrates through the topsoil, street trees are passively irrigated while contaminants and 80 – 95% total suspended solids are captured within the soil matrix, and the tree's root system. Topsoil was carefully selected to provide a moderately high percolation rate ensuring that trees have enough time to utilise water, and ensure enough capacity to manage stormwater flows generated by the street. At the base of the soil cells, a subdrain collects excess water that has filtered through the soil and is directed to the main stormwater network which eventually discharges into the Bow River.

The irrigation was designed within the planter beds and the soil cells to ensure healthy trees that would enhance the system as time goes on. Conventional spray heads were installed within the landscape pods at street level, and drip irrigation was installed within soil cells. Moisture sensors were installed within the soil cells to activate and deactivate irrigation to maintain optimal growing conditions for trees for a more efficient system overall.

Due to the importance of keeping the street accessible throughout the year, additional redundancies were designed into the stormwater management to ensure effective drainage, should any part of the system become overwhelmed:

- Overall, both the street grades and the internal trench drain grades trend toward catch basins that are tied in directly to the storm main. If any part of the trench drain or receiving soil cell is blocked or overwhelmed, water will cascade to the next section of the trench drain where, if there is no available capacity in soil cells, runoff will overflow directly into the storm main.
- Perforated distribution pipe within the soil cells was oversized to provide additional storage capacity
- Grading was designed with freeboard around buildings due to the removal of curb and gutter.



## FLEXIBILITY

During stakeholder engagement and research into other similar streets around the world, it became evident that the use of Bear Street may evolve over time, and therefore flexibility and seasonality were important aspects to consider during the design.

The custom fire pit in the Heart of the Street is fed by natural gas during everyday operation and can be converted to burn wood during special events. The ability to burn wood was important to provide a more authentic campfire feel to downtown Banff, but the smoke and smell are unsuitable for everyday use and could have a negative impact on businesses.

Removable bollards were installed at various points along the street to restrict vehicle access to either the entire street or just the center for different sized events.

Streetlights can be controlled remotely to adjust brightness. Poles and light housings are fitted with attachment points for street pageantry and have been designed to accommodate string lights.

Customized public Café style tables were placed on the street as an alternative to restaurant patios for people not dining at private establishments, transforming the street into an urban park.

## TECHNICAL EXCELLENCE

The concept of a shared street is fairly new to North America: WSP believes that design elements applied on Bear Street provide a proof-of-concept for similar streetscapes in urban centres. The immediate popularity and positive feedback on Bear Street to date demonstrate the value of public space in downtown centres in supporting local economies and enhancing the user experience. Areas that were previously used simply for parking and thoroughfare can be celebrated as an attraction in themselves and a community amenity.

The integration of stormwater management with a landscaping element to support street trees was key for Bear Street to ensure functionality of the pedestrian-centric street and the Town of Banff to strive to be a model environmental community. Celebrating the cross-over and collaboration between the civil engineering and landscape architecture disciplines was essential to achieving a truly effective stormwater management outcome; similar designs could be implemented elsewhere without impacting the usable footprint often required of other forms of Low Impact Design, making it well suited to a downtown or retrofit context within a predefined footprint.

## BENEFIT TO SOCIETY

WSP has undertaken an innovation initiative – Future Ready® – which challenges our teams to be more insightful in the way we see the future and deliver outstanding projects. By focusing on key trends in areas such as climate change, society, technology, and resources, we gain a deeper understanding of current environmental issues and their impacts and can plan to mitigate them as much as possible for a more sustainably built future.

### Future Ready delivers:

- Peace of Mind
- Lower Lifecycle Costs
- Resiliency

### Future Ready ensures that we:

- Help societies thrive
- Nurture sustainable societies, connect communities, seize opportunities
- Design places to thrive

The implementation of the Bear Street shared streetscape tailored to Banff's unique and fluctuating needs will forge an overall framework that will functionally and aesthetically bolster Bear Street as an accessible and pursued, people-centric zone as well as an even more desirable commercial zone for local business. The first few months



Everyone is welcome



Visitors on Bear Street, looking north

of the street opening coincided with the lifting of many COVID-19 restrictions and saw a significant increase in activity and revenues for local business. Bear Street has become a beautiful destination in itself that the Town and businesses alike are able to promote to a global market during the economic recovery, and for years to come.

Key benefits of the Bear Street Reconstruction include:

- **Stormwater and Trees:** the use of soil cells integrated into the stormwater management to collect street runoff and snow melt is an ingenious way to collect, treat and reduce stormwater and provide passive irrigation to the over 80 trees added to the street, which in turn offset the urban heat island effect and ensure accessibility for pedestrians. Beauty and brains wrapped up in a nice green ecological bow.
- **Increased Accessibility:** the design of the shared street opens up the space to create a welcoming environment for visitors and locals alike. Removing the traditional barriers of curbs and pavement, adding better streetlighting and more places to sit, and providing improved drainage has allowed people to reclaim the street to shop and explore as they see fit. And there is room for all – including pedestrians, bicycles, strollers, wheelchairs, scooters; and, if you must, cars.
- **Economic:** The first few months of the street opening coincided with the easing of COVID-19 restrictions. Banff is ready to welcome back the world and Bear Street is an amazing draw with outdoor restaurants, fresh greenery and ample outdoor seating; the best part of Banff is available for all the see – the glorious Rocky Mountains.

All of the above fit nicely within WSPs Future Ready framework, as well as meeting the requirements of the Town of Banff and Parks Canada. We worked with our team to accomplish something that we are optimistic will not only serve the Town of Banff, but will also serve as a benchmark for future community redevelopments.

## PROJECT SUCCESS

The Bear Street Reconstruction project has been very successful for a number of reasons. Aside from being brought in on budget, which is itself a feat given the potential unknowns at the beginning, this project lays the groundwork for other communities to open up key districts in their towns or cities for a more pedestrian friendly environment and creates a “future forward” space that the residents and visitors can now enjoy in the Town of Banff.

*"... I'm also very proud of the Bear Street shared street. It is so future forward when it comes to thinking about how we can all share space. If you were down there this summer, there's people sitting at cafes, there's people skateboarding, biking, kids scooting by. It's just really cool. I think it's a great experience for visitors and I think it was the people's street for residents. You would have interactions and bump-ins with friends. You just see it on paper when you're making these decisions, so it was cool to see it come to life."*

**Mayor Corrie DiManno, Town of Banff, during her interview with Rob Murray on Mountain FM radio.**