# Main Street and Mill Street Scoping Study

## Link to final presentation on January 7, 2026:

https://hctv.us/hardwick-downtown-study-january-7-2026/

Slides of the Final presentation are also provided in the Select Board Google drive

Funded by: Transportation Alternatives Program

Work performed by VHB Consultants

For the ~~January 22~~, February 5, 2026 Select Board Meeting

Over the past six months, the Town has completed a structured public process for the Mill Street and Main Street Scoping Study that included three public presentations and multiple opportunities for comment. More than 80 residents, business owners, and stakeholders provided input through meetings, discussion, and follow-up feedback. That process followed the project schedule approved at the outset, including alternatives development, public review, and refinement phases.

Based on that input, Town staff and VHB consultants have consolidated the feedback into one final preferred alternative, rather than multiple competing options. This final version reflects the clear themes that emerged from the public process, including specific direction on issues residents felt strongly about, such as maintaining access on Summer Street and not pursuing its closure. The purpose of this step is to honor the public input by resolving tradeoffs and presenting a single, coherent outcome.

Tonight's request to the Selectboard is procedural, not financial. No funding authorization is being requested, and no implementation decisions are being made. VHB and Town staff are seeking the Select Board's confirmation that the public process has been sufficient and that the Town may proceed with documenting the final consolidated alternative as the official outcome of the study.

Select Board approval at this stage allows the project to move forward cleanly to a final report that accurately reflects community input and provides a clear foundation for future discussions, should the Town choose to pursue funding or phased implementation later.

***Motion:*** To acknowledge completion of the public engagement process for the Mill Street and Main Street Scoping Study, authorize VHB and staff to finalize the study, and endorse the final version as a basis for future funding applications and phased implementation planning, subject to future Select Board approval.

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verdantas

Project No. 250463
Town of Hardwick – Replacement of Tucker Brook Road over Tucker Brook
December 30, 2025

## Superstructure Options Evaluation

Replacement with Steel Girder and Concrete Deck: Horizons Engineering, Inc. (Verdantas) evaluated the replacement of the crossing with a new steel girder and concrete deck bridge founded on either cantilever abutments with spread footings or steel bearing piles with a concrete pile cap. This option allows for the customization of the steel girders to fit any vertical constraints the site may create with elevated flood water levels. Steel girders with concrete deck is a common form of construction that offers a balance between ease of construction and cost. This option provides a reasonable low-chord elevation without excessive roadway profile manipulation but requires more construction labor to construct compared to other alternatives. Therefore, this is not the preferred superstructure alternative of Verdantas.

Replacement with Precast Concrete Beams: Verdantas evaluated the replacement of the crossing with a new precast concrete beam bridge founded on either cantilever abutments with spread footings or steel bearing piles with a concrete pile cap. Utilizing precast concrete members allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, several beam sizes fit the anticipated span while providing a minimal superstructure depth that will not require excessive roadway profile manipulation. Therefore, due to the reasons listed above, this is a viable superstructure alternative.

Replacement with Precast Concrete Arch Bridge: Verdantas evaluated the replacement of the crossing with a new precast concrete arch bridge founded on customized precast concrete express footings. This alternative would specify a product from the precast company Contech that develops many products fitting this application. Utilizing precast concrete members of this type allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, an O-Series 740 fits the anticipated span and would need to be further researched in conjunction with Contech to decide on a final product. This alternative would not require significant vertical profile manipulation. Therefore, due to the reasons listed above, this is a viable superstructure alternative.

Replacement with Precast Concrete Arch Bridge – Skewed: Verdantas evaluated the replacement of the crossing with a new precast concrete arch bridge founded on customized precast concrete express footings that would be perpendicular to the flow of the bridge and contain a skew to the direction of traffic. This alternative would specify a product from the precast company Contech that develops many products fitting this application. Utilizing precast concrete members of this

type allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, an O-Series 326 fits the anticipated span and would need to be further researched in conjunction with Contech to decide on a final product. This alternative would allow for a shorter span but would require a wider structure. This alternative would not require significant vertical profile manipulation. Therefore, due to the reasons listed above, this is a viable superstructure alternative.

Replacement with Corrugated Arch Bridge: Verdantas evaluated the replacement of the crossing with a new corrugated arch bridge founded on customized precast concrete express footings. This alternative would specify a product from the precast company Contech that develops many products fitting this application. Utilizing prefabricated members of this type allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, several arch types fit the anticipated span and would need to be further researched in conjunction with Contech to decide on a final product. When designed properly, corrugated arch bridges that are kept out of normal flow elevations can achieve lifespans in excess of 50-years while providing a less expensive and faster lead-time product. This alternative would not require significant vertical profile manipulation. Therefore, due to the reasons listed above, this is the preferred superstructure alternative of Verdantas.

For all regular span superstructure options, it was determined that a 38-foot structure would be the most hydraulically efficient span. For the skewed arch option, it was determined that a 26-foot structure would satisfy hydraulic requirements. These alternatives would include 2:1 slopes away from the abutments down to the normal channel bed elevation. Grading of the adjacent channel banks would utilize stone riprap to protect the abutments, minimize flood velocities, prevent scour, and shape the channel from the upstream reach, through the bridge, and into the downstream reach of the river.

No Replacement – Natural Channel: Verdantas evaluated a no replacement option in which existing structure would be removed from the channel, the constriction at the bridge crossing be widened, and the rest of the channel would be shaped back to a natural state. This floodplain restoration would include bank armoring with riprap to be utilized in areas where scour and bank erosion were present from past storm events. This option was considered in the event that a suitable bridge replacement alternative was not feasible within the hydraulic criteria. Although the road is a low-volume, local road, the permanent road closure would require a 5-mile-long detour for residents living on the road. Therefore, it is not the recommended alternative.

## Substructure Options Evaluation

Cantilever Abutments with Spread Footings: Cantilever abutments are commonly used with spread footings in areas with shallow ledge profiles where deeper foundations are not feasible. These abutments offer the benefit of not requiring tall riprap slopes between them and the stream, offering larger waterway openings and smaller superstructure spans. The downside to cantilever abutment construction is the volume of excavation and concrete required. Typically, these types of abutments are more expensive, more labor-intensive, and more time consuming. This type of abutment is not the preferred method of construction as outlined by the Vermont Agency of Transportation, but due to the shallow depths of refusal encountered during geotechnical boring explorations, this is a viable alternative. Bottom of footing elevations should be located a minimum of 6 feet below the bottom of streambed or founded on ledge, when applicable.

Integral Abutments with Steel Bearing Piles and Concrete Pile Cap: Integral abutments are commonly used in locations where ledge is not present and steel bearing piles are able to be driven deep into the ground. These abutments offer the benefit of deeper foundations that minimize the risk of scouring during extreme storm events. Typically, riprap slopes are utilized in front of these abutments to provide additional channel and abutment protection, lending themselves to longer spanning superstructures. Although integral abutments typically require longer spanning bridges, their cost and ease of construction are considerably less than that of cantilever abutment construction. Integral abutments are the preferred method of construction of the Vermont Agency of Transportation, but due to shallow depths of refusal encountered during geotechnical boring explorations, this is not the recommended alternative of Verdantas.

Contech Express Footings: Contech utilizes precast express footings that are like a concrete and rebar cage delivered to the site and installed on top of a structural fill base. The cage is then filled with cast-in-place concrete with precast abutments attached to the express footing. This application is commonly used with Contech's precast arch bridges. Should a Contech arch bridge superstructure option be selected, the express footings would be the recommended substructure alternative of Verdantas.

## Conclusion and Recommendations

After evaluation of multiple superstructure and substructure alternatives, Verdantas recommends either a precast concrete arch bridge or corrugated arch bridge founded on precast concrete express footings.

Verdantas appreciates the opportunity to work with the Town of Hardwick to evaluate the best course of action for the Tucker Brook Road over Tucker Brook crossing. We are pleased to provide you with this report of our findings. Should you have any questions or comments, please do not hesitate to contact us.

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Project No. 250463
Town of Hardwick – Replacement of Carey Road over Nichols Brook
December 30, 2025

## Superstructure Options Evaluation

Replacement with Steel Girder and Concrete Deck: Horizons Engineering, Inc. (Verdantas) evaluated the replacement of the crossing with a new steel girder and concrete deck bridge founded on either cantilever abutments with spread footings or steel bearing piles with a concrete pile cap. This option allows for the customization of the steel girders to fit any vertical constraints the site may create with elevated flood water levels. Steel girders with concrete deck is a common form of construction that offers a balance between ease of construction and cost. This option provides a reasonable low-chord elevation without excessive roadway profile manipulation but requires more construction labor to construct compared to other alternatives. Therefore, this is not the preferred superstructure alternative of Verdantas.

Replacement with Precast Concrete Beams: Verdantas evaluated the replacement of the crossing with a new precast concrete beam bridge founded on either cantilever abutments with spread footings or steel bearing piles with a concrete pile cap. Utilizing precast concrete members allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, several beam sizes fit the anticipated span while providing a minimal superstructure depth that will not require excessive roadway profile manipulation. Therefore, due to the reasons listed above, this is a viable superstructure alternative.

Replacement with Precast Concrete Arch Bridge: Verdantas evaluated the replacement of the crossing with a new precast concrete arch bridge founded on customized precast concrete express footings. This alternative would specify a product from the precast company Contech that develops many products fitting this application. Utilizing precast concrete members of this type allows for an accelerated construction schedule that can also reduce overall costs for the project. For this option, an O-Series 740 fits the anticipated span and would need to be further researched in conjunction with Contech to decide on a final product. This alternative would not require significant vertical profile manipulation. Therefore, due to the reasons listed above, this is a viable superstructure alternative.

Replacement with Corrugated Arch Bridge: Verdantas evaluated the replacement of the crossing with a new corrugated arch bridge founded on customized precast concrete express footings. This alternative would specify a product from the precast company Contech that develops many products fitting this application. Utilizing prefabricated members of this type allows for an accelerated construction schedule that can also reduce overall costs for the project. For this

option, several arch types fit the anticipated span and would need to be further researched in conjunction with Contech to decide on a final product. When designed properly, corrugated arch bridges that are kept out of normal flow elevations can achieve lifespans in excess of 50-years while providing a less expensive and faster lead-time product. This alternative would not require significant vertical profile manipulation. Therefore, due to the reasons listed above, this is the preferred superstructure alternative of Verdantas.

For all superstructure options, it was determined that a 40-foot structure would be the most hydraulically efficient span. This would include 2:1 slopes away from the abutments down to the normal channel bed elevation. Grading of the adjacent channel banks would utilize stone riprap to protect the abutments, minimize flood velocities, prevent scour, and shape the channel from the upstream reach, through the bridge, and into the downstream reach of the river.

No Replacement – Natural Channel: Verdantas evaluated a no replacement option in which existing structure would be removed from the channel, the constriction at the bridge crossing be widened, and the rest of the channel would be shaped back to a natural state. This floodplain restoration would include bank armoring with riprap to be utilized in areas where scour and bank erosion were present from past storm events. This option was considered in the event that a suitable bridge replacement alternative was not feasible within the hydraulic criteria. Although the road is a low-volume, local road, the permanent road closure would require a mile-long detour. Therefore, it is not the recommended alternative.

## Substructure Options Evaluation

Cantilever Abutments with Spread Footings: Cantilever abutments are commonly used with spread footings in areas with shallow ledge profiles where deeper foundations are not feasible. These abutments offer the benefit of not requiring tall riprap slopes between them and the stream, offering larger waterway openings and smaller superstructure spans. The downside to cantilever abutment construction is the volume of excavation and concrete required. Typically, these types of abutments are more expensive, more labor-intensive, and more time consuming. This type of abutment is not the preferred method of construction as outlined by the Vermont Agency of Transportation, but due to the shallow depths of refusal encountered during geotechnical boring explorations, this is a viable substructure alternative. Bottom of footing elevations should be located a minimum of 6 feet below the bottom of streambed.

Integral Abutments with Steel Bearing Piles and Concrete Pile Cap: Integral abutments are commonly used in locations where ledge is not present and steel bearing piles are able to be driven deep into the ground. These abutments offer the benefit of deeper foundations that

minimize the risk of scouring during extreme storm events. Typically, riprap slopes are utilized in front of these abutments to provide additional channel and abutment protection, lending themselves to longer spanning superstructures. Although integral abutments typically require longer spanning bridges, their cost and ease of construction are considerably less than that of cantilever abutment construction. Integral abutments are the preferred method of construction of the Vermont Agency of Transportation, but due to shallow depths of refusal encountered during geotechnical boring explorations, this is not the recommended alternative of Verdantas.

Contech Express Footings: Contech utilizes precast express footings that are like a concrete and rebar cage delivered to the site and installed on top of a structural fill base. The cage is then filled with cast-in-place concrete with precast abutments attached to the express footing. This application is commonly used with Contech's precast arch bridges. Should a Contech arch bridge superstructure option be selected, the express footings would be the recommended substructure alternative of Verdantas.

## Conclusion and Recommendations

After evaluation of multiple superstructure and substructure alternatives, Verdantas recommends either a precast concrete arch bridge or corrugated arch bridge founded on precast concrete express footings.

Verdantas appreciates the opportunity to work with the Town of Hardwick to evaluate the best course of action for the Carey Road over Nichols Brook crossing. We are pleased to provide you with this report of our findings. Should you have any questions or comments, please do not hesitate to contact us.

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| Tucker Brook Road Bridge Alternatives | Cost | Rounded |
|---|---|---|
| **Contech Arch** | **$1,452,845** | **$1,500,000** |
| Contech Arch (Skew) | $1,435,710 | $1,500,000 |
| **Contech Corrugated Arch** | **$1,150,354** | **$1,200,000** |
| Steel Girders | $1,228,554 | $1,300,000 |
| Precast Deck Beams | $1,252,625 | $1,300,000 |

Engineering Recommendations: After evaluation of multiple superstructure and substructure alternatives, Verdantas recommends either a **precast concrete arch bridge** or **corrugated arch bridge** founded on precast concrete express footings.

| Carey Road | Cost | Rounded |
|---|---|---|
| **Contech Corrugated Arch** | **$1,245,427** | **$1,300,000** |
| **Precast** | **$1,554,078** | **$1,600,000** |

Engineering Recommendations: After evaluation of multiple superstructure and substructure alternatives, Verdantas recommends either a precast concrete arch bridge or corrugated arch bridge founded on precast concrete express footings.