
Village Sidewalk Study

Conceptual Design Report



Moultonborough, New Hampshire

November 2013

KVPartners
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

Background:

This report documents the findings and assessments of a feasibility study to construct sidewalks in the Village area of Moultonborough, New Hampshire. The study was initiated by a citizen's petition and subsequently approved by warrant article at the 2013 March Town Meeting. The warrant article called for the SelectBoard to present a plan for construction of a sidewalk or sidewalks in the Village area at the March 2014 Town meeting. The scope of work performed for the study included:

1. Identification of the study area (refer to Figure1).
2. Completion of five public meetings to solicit community input and provide feedback regarding sidewalk location, type and project implementation.
3. Review of previous work completed by the Town relevant to constructing sidewalks in the Village area.
4. An assessment of existing conditions by visual inspection to better define site constraints, challenges and opportunities for the construction of a sidewalk network.
5. Development of base plans showing existing conditions information, conceptual plans showing potential sidewalk routes and alignments, recommendations for the preferred sidewalk network and order of magnitude estimates for probable project costs.
6. Documentation of assessments, findings and results of the conceptual design process.

Evaluation Criteria:

Sidewalks are pedestrian lanes that provide people with space to travel within the public right-of-way separated from motor vehicles and on-road bicycles. As a public facility, there are design standards and guidelines that should be considered to ensure the facilities are a safe and provide an enjoyable mode of travel. The standards and guidelines that were established for the Village Sidewalk Study included:

1. SelectBoard guidelines defining a sidewalk as a designated hard surfaced walkway for pedestrians to travel from a point of origin to a point of destination within the study area alongside a roadway. The sidewalks, to the extent reasonable and practicable, should be 6 feet wide and separated vertically or horizontally from the roadway.
2. Public Comments: Comments from meeting participants reflect key considerations to be taken into account including: keep children safe; address business owner concerns; make the Village area

more pedestrian friendly and “walkable”; make provisions for future development of the Village area; retain the character of the Village area; address emergency response needs and concerns; be practical and cost effective; minimize property impacts; develop a plan that can get Town Meeting support; phase construction for a multi-year buildout; and coordinate with the Planning Board and School Board.

3. **General Design Guidelines:** When constructing sidewalks, the following engineering standards should be considered: provide a continuous and accessible network; provide a level, hard and slip-resistant surface; provide a minimum sidewalk width of 5 to 6 feet; minimize the number of street crossings; provide appropriate crossings at driveways; provide appropriate crosswalks; maintain natural walking patterns; provide separation from vehicle traffic; provide for snow storage; provide street lighting; and meet Americans with Disabilities Act (ADA) requirements.
4. **NHDOT Requirements:** Because the study area is in the NH Route 25 corridor, the Town must coordinate with the NHDOT regarding sidewalk segments located within the NHDOT right-of-way. Based on discussions with the NHDOT, NHDOT requirements include: maintain 16 foot travel way and shoulder; maintain a minimum sidewalk width of 5 feet; provide separation from the roadway; and meet ADA requirements.

Results of Public Participation Process:

To assist in the process of screening alternative sidewalk networks, the Town engaged in a comprehensive public participation process. Over the course of several meetings, alternative alignments were discussed and vetted by the participants. The process culminated in a plan that identified all the alignments the participants thought feasible for further consideration (refer to Figure 2). The alignments were then benchmarked against the evaluation criteria defined above and key opportunities and constraints were identified for each sidewalk segment (refer to Table 1). Estimates of probable project costs were developed for each segment (refer to Table 2).

Recommendations:

The following are recommendations for a sidewalk network within the study area defined by the Town. The recommendations are based on input received from the public participation process and KVPartner’s understanding of the consensus opinion expressed by the community at large, coordination and input received from NHDOT and standard engineering practice. The recommendations are conceptual and

should be used for planning purposes only. A more detail assessment must be completed to fully understand project requirements and impacts. In summary, the recommendations are as follows:

1. KVPartners recommends that the Town take a long term view when considering a sidewalk network. To that end KVPartners recommends that the Town plan for a buildout of sidewalks on both sides of NH Route 25 from the Central School to the Town Complex (Library, Recreation Department, Town Hall) located at the intersection with NH Route 109 (refer to Figure 4 and Table 3).
2. KVPartners recommends that the Town phase the buildout of the sidewalk network over time. Completing the sidewalk in phases addresses the cost concerns raised during the public participation process and gives the Town an opportunity to achieve objectives and observe the suitability and functionality of a first phase before committing to a more comprehensive network. As a first phase, KVPartners recommends that the Town consider constructing sidewalks on portions of the north side and south side of NH Route 25 (refer to Figure 5 and Table 4).

Once sidewalks are installed, the Town, by virtue of case law and NHDOT policy (refer to Appendix B, Exhibit 8), is required to maintain them. Therefore as part of the sidewalk evaluation, Town staff prepared estimates to maintain the sidewalk network including capital expenditures for equipment as well as labor and materials cost for on-going maintenance activities (refer to Table 5).

Based on the work completed to date, KVPartners recommends the following steps be taken to determine the suitability of the recommended sidewalk alignments.

1. Contact the Bank of New Hampshire to formalize access to their property for a designated sidewalk or pathway.
2. Contact property owners along the proposed alignment to discuss potential impacts to their property and business operations.
3. Complete field survey through the NH Route 25 corridor and conduct the necessary evaluations to better define the requirements and cost of construction and to confirm the limits of the NHDOT right-of-way. There is conflicting information on the record regarding the right-of-way width through the study area.

FIGURE 4: SIDEWALK NETWORK BUILDOUT



Legend

- Contours
- Parcel Lines
- Buildings
- Drainage Structures
- Drainage Pipes
- Wetlands
- Village Zone C Boundary
- Limits of Study Area

Comprehensive Shoreland Protection Area

- 50' Waterfront Buffer/Primary Building Setback
- 150' Natural Woodland Buffer
- 250' Protected Shoreland

NWI Wetlands

- Locustrine
- Palustrine
- Riverine

Proposed Sidewalk Routes

- Route 1
- Route 2
- Route 3
- Route/Segment Designations
- Crosswalks
- Property owners object to sidewalks in these areas

Scale: 1" = 150'

Proposed Sidewalk Routes & Crosswalks

Moultonborough, New Hampshire
2012-2013

Revisions:

Plan Labels	7-5-13
Conceptual Walk Layout	8-22-13
Conceptual Walk Layout REV	8-30-13
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PROPERTY LINES CURRENT TO APRIL 1, 2012

Prepared by:
KV Partners
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Landscape Architecture Site Planning Graphics

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Table 3
Opinion of Probable Project Cost
Recommended Sidewalk Network Buildout

Sidewalk				Construction	Engineering	Construction Oversight	Easements	Legal	Contingency	Total
Route	Segment	Type	Length (ft)							
1	S1	A	530	\$83,000	\$12,000	\$10,000	\$6,000	\$2,000	\$22,000	\$135,000
1	S2	C	1040	\$106,000	\$16,000	\$13,000	\$9,000	\$2,000	\$29,000	\$175,000
1	S3	B	330	\$34,000	\$4,000	\$3,000	\$5,000	\$1,000	\$9,000	\$56,000
1	S4A	B	950	\$145,000	\$22,000	\$17,000	\$14,000	\$3,000	\$40,000	\$241,000
2	S1-CS	D	140	\$5,000	\$1,000	\$1,000	\$0	\$0	\$1,000	\$8,000
2	S2	C	990	\$56,000	\$6,000	\$5,000	\$12,000	\$1,000	\$16,000	\$96,000
2	S3	B	1050	\$154,000	\$23,000	\$18,000	\$11,000	\$3,000	\$41,000	\$250,000
3	S1A	D	350	\$17,000	\$2,000	\$2,000	\$0	\$0	\$4,000	\$25,000
3	S2A	D	780	\$29,000	\$3,000	\$3,000	\$19,000	\$1,000	\$11,000	\$66,000
Year: 2013:			6160	\$629,000	\$89,000	\$72,000	\$76,000	\$13,000	\$173,000	\$1,052,000
Year 2014:			6160	\$642,000	\$91,000	\$73,000	\$78,000	\$13,000	\$176,000	\$1,073,000
Year 2015:			6160	\$655,000	\$93,000	\$74,000	\$80,000	\$13,000	\$180,000	\$1,094,000

FIGURE 5: SIDEWALK NETWORK PHASE 1



Scale: 1" = 150'

Legend

- Contours
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Table 4
Opinion of Probable Project Cost
Recommended Sidewalk Network Phase 1

Sidewalk				Construction	Engineering	Construction Oversight	Easements	Legal	Contingency	Total
Route	Segment	Type	Length (ft)							
1	S1-CS	B	150	\$16,000	\$3,000	\$2,000	\$0	\$0	\$4,000	\$25,000
1	S3	B	330	\$34,000	\$5,000	\$3,000	\$5,000	\$1,000	\$9,000	\$57,000
2	S1-CS	D	140	\$5,000	\$1,000	\$1,000	\$0	\$0	\$1,000	\$8,000
2	S2	C	990	\$56,000	\$8,000	\$6,000	\$12,000	\$1,000	\$16,000	\$99,000
2	S4A	B	950	\$145,000	\$26,000	\$17,000	\$14,000	\$3,000	\$41,000	\$246,000
3	S1A	D	350	\$17,000	\$3,000	\$2,000	\$0	\$0	\$4,000	\$26,000
3	S2A	D	780	\$29,000	\$4,000	\$3,000	\$19,000	\$1,000	\$11,000	\$67,000
Year: 2013:			3690	\$302,000	\$50,000	\$34,000	\$50,000	\$6,000	\$86,000	\$528,000
Year 2014:			3690	\$308,000	\$51,000	\$35,000	\$51,000	\$6,000	\$88,000	\$539,000
Year 2015:			3690	\$314,000	\$52,000	\$36,000	\$52,000	\$6,000	\$90,000	\$550,000

1. INTRODUCTION

1.1 Purpose of Study

This report documents the findings and assessments of a feasibility study to construct sidewalks in the Village area of Moultonborough, New Hampshire. The study was initiated by a citizen's petition and subsequently approved by warrant article at the 2013 March Town Meeting. The Town Meeting approved an article which called for the SelectBoard to present a plan for the construction of a sidewalk or sidewalks in the Village area for consideration by residents at the March 2014 Town Meeting.

1.2 Background

The Town of Moultonborough has been discussing sidewalks in the Village area for years. This is evidenced by the work completed by local committees, Town Planning Board and the Lakes Region Planning Commission who were charged with addressing transportation needs and issues within the community. The following is a summary of excerpts from recent studies completed by the Town as it relates to sidewalks and pathways.

Safe Routes to Schools Travel Plan, Lakes Region Planning Commission, March 2010

Recommendations include:

- *“Install sidewalks within a 1 mile radius of schools, especially on an NH Route 25, and NH Route 109 and Blake Road.”*
- *“Investigate and establish appropriate NH Route 25 and Blake Road crosswalks in accordance with the NHDOT Marked Crosswalk policy.”*
- *“Procure an easement from Laconia Savings Bank to continue use of and legalize use of the pathway between Laconia Savings Bank and Moultonborough Academy.”*
- *“Install shoulders along NH Route 25 and other main routes to school (NH Route 109, Sheridan Road and Blake Road).”*

Vision, goals and action items include:

- *“Identify and adopt the best mechanisms to encourage pedestrian activity and to achieve ongoing Village improvements.”*
- *“Moultonborough envisions a future that relies less on automobiles and more on intermodal forms of transportation that will, overall, reduce pressure on the regional highways and contribute toward a healthier lifestyle.”*
- *“Enhance existing and create new pedestrian connections in and adjacent to the village area.”*
- *“Construct sidewalks on Route 25 in the village, at least on the north side.”*
- *“Construct a crosswalk at Blake Road to north side of Route 25 to connect schools to village.”*
- *“Establish a pedestrian connection within the civic complex with commercial buildings in the village.”*
- *“Improve pedestrian safety including village crossing, connection to trail network and ties to housing.”*
- *“Maintain a local network of roads, sidewalks and trails that meets the vehicular and non-vehicular needs of Moultonborough's residents and that does not conflict with the Town's place in the regional transportation system.”*
- *“Take immediate action to identify and act on measures to encourage pedestrian activity in the Village, which would have been an immediate visible impact on revitalization and community character and appearance.”*
- *“Designate crosswalks across Route 25 in the village area to link the north and south sides of Whittier Highway/Route 25.”*

- *“A study to look at the potential to develop a village center, where multiple village/neighborhood centers have positive transportation implications. This would encourage pedestrian activity, density to promote public transit and reduction in travel on congested corridors.”*

NH Route 25 Corridor Study, Lakes Region Planning Commission, April 2008

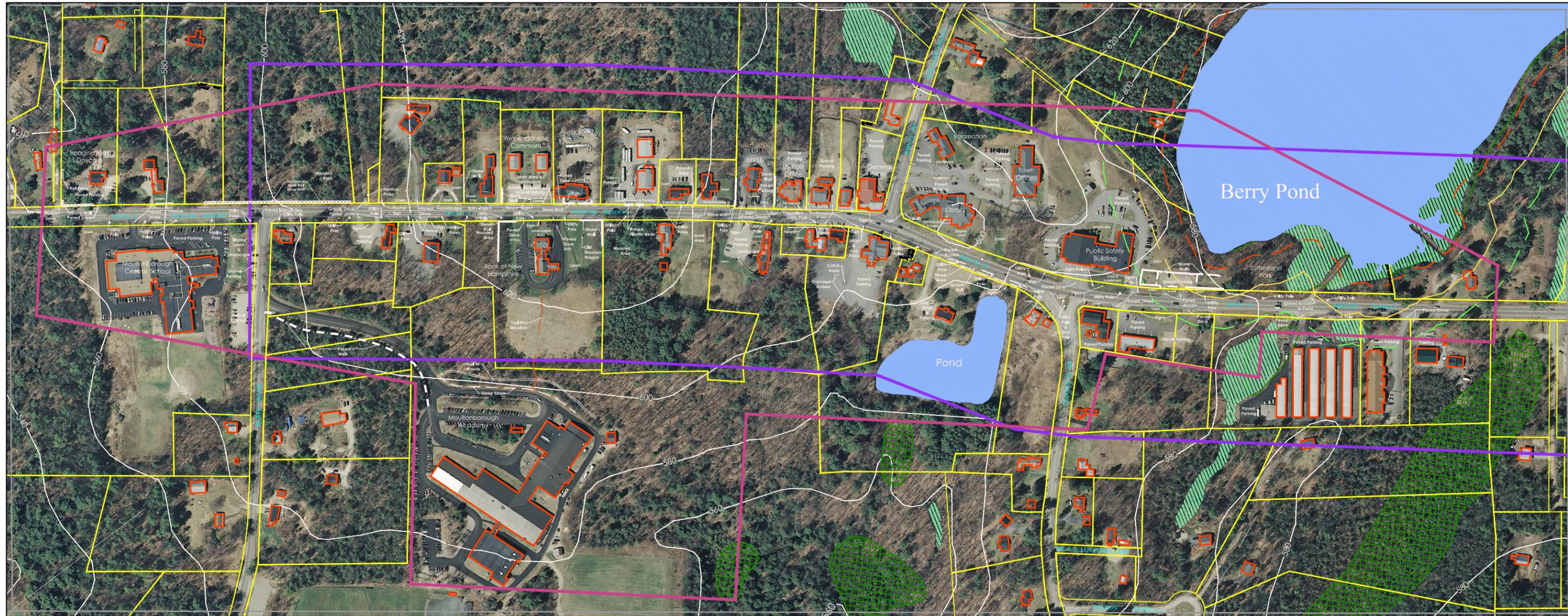
Observations and issues include:

- *“Another corridor issue of importance is the treatment of pedestrian flows/crossings in village centers and other locations where the pedestrian activity is greatest.... approximately between Blake Road and Old NH Route 109. It is important that a pedestrian circulation/sidewalk master plan including bicycle facilities and priority enhanced crosswalk locations be considered for these village activity centers, working in consultation with local elected officials, police/emergency officials, village residents and business owners.”*
- *“ADA accessible 5’ pathways should provide connections to adjacent streets, parking areas and existing sidewalks.”*

1.3 Existing Conditions

As a first step in the development of a sidewalk plan, the Town defined the limits of the study area via the public participation process. The study area is depicted in Figure 1. The study area is predominately zoned commercial and is comprised of residential and commercial use properties. At the westerly limit of the study area are the Moultonborough Central School and Moultonborough Academy and at the easterly limit, the Town Complex (Town Hall, Recreation Department Building, Public Library, Public Safety Building), Sutherland Park and Berry Pond. The study area is bisected by NH Route 25 which is a major east-west transportation corridor in central New Hampshire. Within the study area, NH Route 25 has 12-foot travel lanes and paved shoulders of varying width. The right-of-way contains drainage (NHDOT) and overhead power (New Hampshire Electric Cooperative), cable (Time Warners) and telephone (Fairpoint) utilities. Existing sidewalks are limited to the school campuses, in front of the Public Library and in front of and on the east side of the Old Country Store at the NH Route 25/Holland Street (NH Route 109) intersection. There are no special accommodations made for alternative modes of transportation through the study area. For a photo log of the study area, refer to Appendix A. For identification and location of existing parcels, roadways, buildings and important physical features, refer to Figure 1.

FIGURE 1: STUDY AREA



Scale: 1" = 150'

<p>Legend</p> <ul style="list-style-type: none"> — Contours — Parcel Lines ▭ Buildings — Drainage Structures — Drainage Pipes ▨ Wetlands ▨ Village Zone C Boundary ▭ Limits of Study Area 	<p>Comprehensive Shoreland Protection Area</p> <ul style="list-style-type: none"> — 50' Waterfront Buffer/Primary Building Setback — 150' Natural Woodland Buffer — 250' Protected Shoreland <p>NWI Wetlands</p> <ul style="list-style-type: none"> ▨ Locustrine ▨ Palustrine ▨ Riverine
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Village Sidewalk Study

Moultonborough, New Hampshire
2012-2013

Revisions:
Plan Labels 7-5-13

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2. PLAN DEVELOPMENT

2.1 Public Participation Process

To assist in the process of screening alternative sidewalk networks, the Town engaged in a comprehensive public participation process. The intent of the process was to:

- Provide a mechanism for the public to share ideas and concerns, to set strategic objectives and to identify issues, challenges and possible solutions.
- Provide opportunity to disseminate information to the community to better ensure solutions are in alignment with community expectations.

The public participation process included the following key elements:

1. A community meeting was held on April 14, 2013 to determine the limits of the study area referred to as the “Village Area”. Refer to Exhibit 1, Appendix B.
2. The Board of Selectmen approved key criteria and definitions of a sidewalk. Refer to Section 3.1.
3. A community meeting and site walk was held on June 11, 2013 to discuss and share available information and background on the Village Sidewalk Study. Refer to Exhibit 3, Appendix B.
4. A community meeting was held on August 7, 2013 to obtain information from attendees regarding preferences for sidewalk alignments. Refer to Exhibit 4, Appendix B.
5. A community meeting was held on September 4, 2013 to review the results of the previous community meeting and better define the preferred sidewalk alignments. Refer to Exhibit 5, Appendix B.
6. A community meeting was held on October 2, 2013 to finalize the preferred sidewalk network and alignments. Refer to Exhibit 6, Appendix B

2.2 Engineering

In addition to the public participation process, the Town retained KVPartners and g2+1 to perform the following professional services:

1. Attend meetings with Town staff and NHDOT staff to discuss issues, concerns and project requirements. Attend and facilitate public meetings and workshops with Town staff, residents and business owners.

2. Obtain and review available data and information pertinent to the services provided. Data and information included: photogrammetric maps; street and right-of-way maps; tax maps; and topographic maps.
3. Perform field reconnaissance of the project area to assess existing conditions.
4. Develop base plans showing existing conditions information and concept plans showing potential sidewalk routes and alignments.
5. Document the results of the public participation process.
6. Develop recommendations for the proposed sidewalk network including: horizontal alignment; typical sidewalk detail, identification of site constraints, construction requirements and identifiable property impacts.
7. Prepare order of magnitude project cost estimates for alignments approved by the Town.
8. Prepare and submit a report documenting the assessments, findings and results of the conceptual design process.

3. EVALUATION CRITERIA

3.1 SelectBoard Comments

Prior to the start of the public participation process, the SelectBoard gave guidance for the construction of sidewalks in the Village area by defining sidewalks as follows:

- Sidewalk shall mean a designated walkway for pedestrians to travel from a point of origin to a point of destination within the study area by means of a hard surfaced way alongside a roadway separated vertically (i.e. raised curb) or horizontally (i.e. a 5' +/- buffer panel) from the roadway, or, a pathway suitable for pedestrian travel and capable of being maintained in the majority of local weather conditions.
- Design widths shall be, to the extent reasonable and practicable, 6 feet of clear or unobstructed width. When that is not possible, sidewalk furnishings and other obstructions should be located consistently so that there is a clear travel zone for pedestrians with vision impairments and a wider sidewalk should be provided to accommodate this line of obstruction.

3.2 Public Comments

Comments were received from participants of the aforementioned public meetings. The following items summarize key considerations regarding sidewalk locations and project execution as articulated by the participants:

1. Keep children safe (Connect schools to Town Complex).
2. Address business owner concerns (access, parking, signage, etc.).
3. Make the Village area more pedestrian friendly and “walkable”.
4. Make provisions for future development of the Village area.
5. Retain the character of the Village area.
6. Address emergency response needs and concerns.
7. Be practical and cost effective (life cycle).
8. Minimize property impacts.
9. Develop a plan that can get Town Meeting support.
10. Phase construction for a multi-year buildout.
11. Coordinate with the Planning Board and School Board.

3.3 Sidewalk Design Guidelines

Sidewalks are pedestrian lanes that provide people with space to travel within the public right-of-way separated from motor vehicles and on-road bicycles. As a public facility there are design standards and guidelines that should be considered to ensure the facilities are a safe and provide an enjoyable mode of travel. Key design elements for sidewalks include:

1. Provide a continuous and accessible network to improve mobility for all pedestrians, including those with disabilities, and for all types of pedestrian travel (schools, work, businesses, parks, shopping areas, transit stops and other destinations).
2. Where feasible, sidewalks should be provided on both sides of the street to minimize the number of street crossings, thereby improving pedestrian safety.

3. Sidewalk alignments should take into account natural walking patterns of area residents and the general public.
4. Provide a level, hard and slip-resistant surface. Sidewalks can be surfaced with a variety of materials to accommodate varying budgets and contexts. Heavily used (urban and suburban settings) sidewalks are typically made of concrete. Less expensive options include asphalt or crushed stone. Concrete and asphalt are the more common options. In comparison, concrete has a higher capital cost than asphalt but typically lasts longer and requires less maintenance.
5. Separate the sidewalk from motor vehicle traffic by a curb, buffer or curb with buffer. Pedestrians should feel comfortable when using the sidewalk especially in high speed traffic areas. Typical buffers include: planting strip of grass and trees; bicycle lane; parked cars where parking will not create a visual screen for pedestrians as they cross at midblock; and street furniture including benches, newspaper boxes, street lighting and public art.
6. Provide room for snow storage.
7. Provide a minimum sidewalk width of 5 to 6 feet. A 6 foot width allows two people to walk comfortably side by side and provides sufficient space for pedestrians crossing in the opposite direction. Sidewalk widths of 8 to 10 feet should be considered where there is no sidewalk buffer along an arterial street and along roads adjacent to school grounds where large numbers of walkers are expected. As stated, the SelectBoard has defined the sidewalk width to be 6 feet, to the extent reasonable and practicable.
8. Provide crossings at driveways that improve the walking environment, improve visibility and reduce conflicts between drivers and pedestrians. Extend the sidewalk at the same elevation across the driveway and avoid driveway aprons through the sidewalk. Reduce the number of driveways to make it easier for people with disabilities to access and walk on the sidewalk. Fewer driveways and narrower driveway crossings provide for improved pedestrian safety.
9. Provide street lighting to improve pedestrian visibility, personal security and aesthetics. Street lighting allows pedestrians and motorists to see each other at night.
10. Provide sidewalks that meet the requirements of the Americans with Disabilities Act (ADA).
11. Provide crosswalks that meet the following general requirements:
 - Establish or identify good crossing locations.
 - Reduce crossing distances.

- Provide crossings that are direct.
- Use appropriate traffic controls such as marked crosswalks, traffic signals and warning signs or flashers.
- Slow motor vehicle speeds.

3.4 NHDOT Requirements

The study area for proposed sidewalks is in the NH Route 25 corridor. KVPartners coordinated with the New Hampshire Department of Transportation (NHDOT) regarding their requirements for installing sidewalks within the NHDOT right-of-way. In summary, the requirements established to date are:

1. Maintain 16 feet (travel way and shoulder) from roadway centerline to face of curb.
2. Maintain a minimum sidewalk width of 5 feet.
3. Separate the sidewalk from the roadway horizontally or vertically for increased pedestrian safety when the right-of-way is available.
4. Provide accessible sidewalk ramps at crosswalks and driveways and meet ADA requirements for the safe and convenient movement of disabled persons.

The NHDOT has requested that prior to addressing specific requirements for the proposed sidewalks, that the Town develop more detail on the preferred alignment, sidewalk type and potential impacts to the NH Route 25 corridor. Additional NHDOT requirements may be identified through the design development process.

4. RESULTS OF PUBLIC PARTICIPATION PROCESS

4.1 Sidewalk Alignments

As stated, to assist in the process of screening alternative sidewalk networks, the Town engaged in a comprehensive public participation process. Over the course of several meetings alternative alignments were discussed and vetted by the participants. The process culminated in a plan that identified all the alignments the participants thought feasible for further consideration. These alignments are shown in Figure 2. The alignments were then benchmarked against the evaluation criteria defined in Section 3 and key opportunities and constraints were identified for each sidewalk segment. Refer to Table 1 for a summary of that analysis.

FIGURE 2: ALTERNATIVE SIDEWALK ALIGNMENTS



Legend

- Contours
- Parcel Lines
- Buildings
- Drainage Structures
- Drainage Pipes
- Wetlands
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- Limits of Study Area

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Table 1
Opportunities and Constraints
Alternative Sidewalk Alignments (As Defined By Public Participation Process)

Route	Segment	Comments	
		Key Opportunities	Key Constraints
1	S1	Existing ROW; Serves Multiple Properties; Unlimited Access; Security; Emergency Response	NHDOT Drainage; Clearing; Property Impacts
1	S2	Existing ROW; Serves Multiple Properties; Unlimited Access; Security; Emergency Response	NHDOT Drainage; Pole Relocations
1	S3	Existing ROW; Serves Multiple Properties; Unlimited Access; Streetscape Improvements; Security; Emergency Response	Property Impacts (Access)
1	S4A	Existing ROW; Serves Multiple Properties; Unlimited Access; Streetscape Improvements; Security; Emergency Response	NHDOT Drainage; Property Impacts (Access, Parking, Signage)
1	S4B	Limited Construction; Serves Multiple Properties	Clearing; Property Impacts; Limited Access; Footbridge Required; No Public Access; Security
2	S1	Existing ROW; Minimal Sitework; Security; Emergency Response	Limited Service
2	S2	Existing ROW; Serves Multiple Properties; Unlimited Access; Security; Emergency Response	NHDOT Drainage; Pole Relocations
2	S3	Existing ROW; Serves Multiple Properties; Unlimited Access; Streetscape Improvements; Security; Emergency Response	NHDOT Drainage; Clearing; Property Impacts; Possible Wetland Impacts
3	S1A	Existing Trail; Public Access	Limited Service; Security; Emergency Response
3	S1B	Existing Trail; Public Access	Limited Service; Security; Emergency Response
3	S2A	Existing Trail	No Public Access; Limited Service; Security; Emergency Response
3	S2B		No Public Access; Limited Service; New Trail; Clearing; Security; Emergency Response

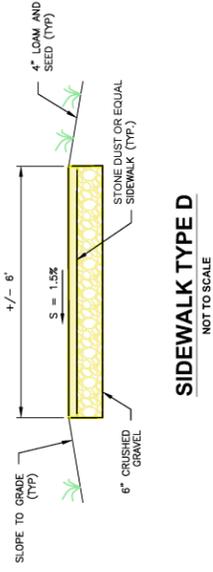
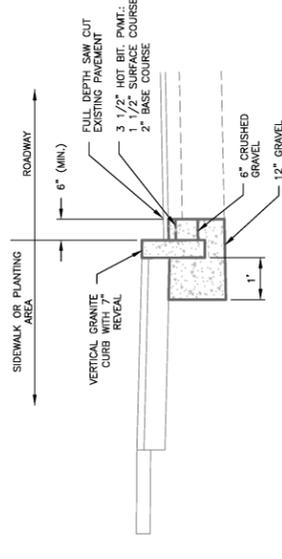
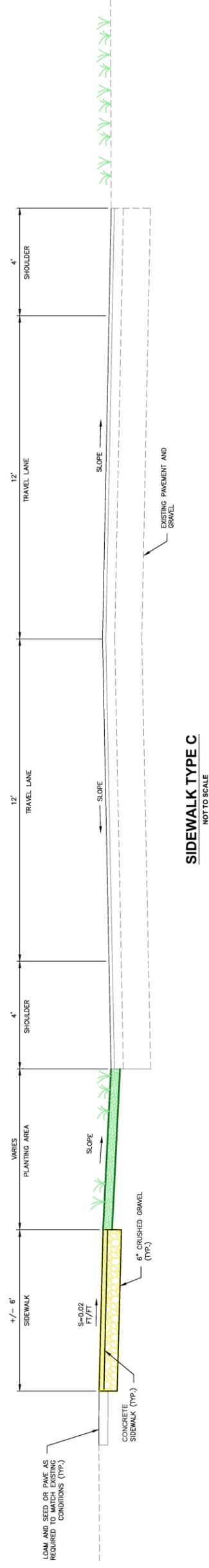
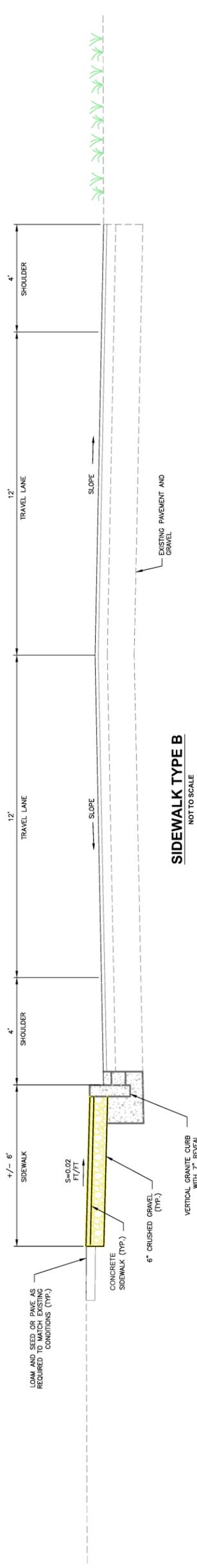
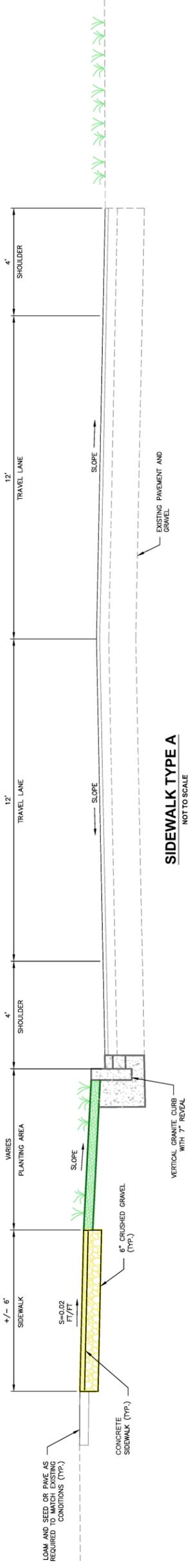
4.2 Cost Estimate

Table 2 is an opinion of probable project cost for the entire sidewalk network as defined by the public participation process. The cost estimate is subject to the following considerations:

- The costs are itemized by sidewalk route and segment. Refer to Figure 2.
- The sidewalk type selected for each segment is based on visually observed site constraints. Refer to Figure 3 for a description of sidewalk types and designation. For estimating purposes only, concrete was selected as the surface type.
- Construction costs include: sidewalks, sitework, utility pole relocations, an allowance for potential replacement of the NHDOT drainage system and an allowance for impacts to property features.
- Project development costs include: engineering (professional services, survey, subsurface investigations), construction oversight (administration and clerk-of-works), easements and legal costs. Engineering is approximately 10-18% of construction costs; construction oversight is approximately 8-12% of construction costs; easements are based on property value estimates per square foot prepared by the Town assessor (refer to Exhibit 7, Appendix B) and an assumed 10 foot (within the public right-of-way) or 20 foot (across private property) property impact area; legal costs are assumed to be 2% of construction costs.
- A contingency factor of 20 percent is included to reflect the conceptual level of detail of the information used to prepare the estimate.
- An annual inflation rate of 2% is applied for project implementation in calendar years 2014 and 2015.
- The cost estimate is an order of magnitude estimate based on the level of effort completed to date and should be used for planning purposes only. A more definitive cost estimate can be determined when sidewalk types and final locations are selected by the Town, a detailed field survey of the area is completed, a definitive right-of-way is established with the NHDOT and discussions are completed with property owners regarding resolution of identified property impacts and easement requirements.

Table 2
Opinion of Probable Project Cost
Alternative Sidewalk Alignments (As Defined By Public Participation Process)

Sidewalk				Construction	Engineering	Construction Oversight	Easements	Legal	Contingency	Total
Route	Segment	Type	Length (ft)							
1	S1	A	530	\$83,000	\$12,000	\$10,000	\$6,000	\$2,000	\$22,000	\$135,000
1	S2	C	1040	\$106,000	\$16,000	\$13,000	\$9,000	\$2,000	\$29,000	\$175,000
1	S3	B	330	\$34,000	\$3,000	\$3,000	\$5,000	\$1,000	\$9,000	\$55,000
1	S4A	B	950	\$145,000	\$22,000	\$17,000	\$17,000	\$3,000	\$40,000	\$244,000
1	S4B	D	830	\$48,000	\$5,000	\$4,000	\$30,000	\$1,000	\$17,000	\$105,000
2	S1	C	510	\$22,000	\$2,000	\$2,000	\$0	\$0	\$5,000	\$31,000
2	S2	C	990	\$56,000	\$6,000	\$4,000	\$12,000	\$1,000	\$15,000	\$94,000
2	S3	B	1050	\$154,000	\$23,000	\$18,000	\$11,000	\$3,000	\$41,000	\$250,000
3	S1A	D	350	\$17,000	\$2,000	\$1,000	\$0	\$0	\$4,000	\$24,000
3	S1B	D	320	\$18,000	\$2,000	\$1,000	\$0	\$0	\$4,000	\$25,000
3	S2A	D	780	\$29,000	\$3,000	\$2,000	\$19,000	\$1,000	\$10,000	\$64,000
3	S2B	D	570	\$32,000	\$3,000	\$3,000	\$6,000	\$1,000	\$9,000	\$54,000
Year: 2013:			8250	\$744,000	\$99,000	\$78,000	\$115,000	\$15,000	\$205,000	\$1,256,000
Year 2014:			8250	\$759,000	\$101,000	\$80,000	\$117,000	\$15,000	\$209,000	\$1,281,000
Year 2015:			8250	\$774,000	\$103,000	\$82,000	\$119,000	\$15,000	\$213,000	\$1,307,000



NUMBER	DATE	BY	REVISIONS	DESCRIPTION

DATE:	08/30/13
SCALE:	AS NOTED
DESIGNED BY:	RHK
DRAWN BY:	NMT
CHECKED BY:	RHK
APPROVED BY:	RHK

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5. RECOMMENDATIONS

5.1 Sidewalk Network

The following are recommendations for a sidewalk network within the study area as defined by the public participation process. The recommendations are based on input received from the public participation process and our understanding of the consensus opinion expressed by the community at large, coordination and input received from NHDOT and standard engineering practice. The recommendations are conceptual and should be used for planning purposes only. A more detail assessment must be completed to fully understand project requirements and impacts. In summary, the recommendations are as follows:

1. KVPartners recommends that the Town take a long term view when considering a sidewalk network. To that end KVPartners recommends that the Town plan for a buildout of sidewalks on both sides (eastbound and westbound) of NH Route 25 from the Central School to the Town Complex (Library, Recreation Department, Town Hall) located at the intersection with NH Route 109. Refer to Figure 4 for sidewalk alignments for the full buildout scenario. Note that this alignment assumes the Bank of New Hampshire will allow access through their property from Moultonborough Academy. It is our opinion that this buildout achieves the following objectives:
 - Provides a continuous, accessible and safe route between Schools and Town Complex.
 - Provides walking access to all commercial properties in the Village area thereby increasing opportunities for business activity.
 - Takes into account natural walking patterns.
 - Addresses key safety concerns including: separating the sidewalk from motor vehicle traffic on the State highway; reducing conflicts between drivers and pedestrians by defining designated and direct crossing points; and providing safe access through the corridor for those with disabilities.
 - Provides safe pedestrian access in Village area making for a more “walkable” and “welcoming” environment.
 - Meets the Town’s definition of a sidewalk.
 - Meets the Town’s objectives as stated in the *2008 Master Plan Update* and *Safe Roads to Schools Travel Plan*.

FIGURE 4: SIDEWALK NETWORK BUILDOUT



Legend

- Contours
- Parcel Lines
- Buildings
- Drainage Structures
- Drainage Pipes
- Wetlands
- Village Zone C Boundary
- Limits of Study Area

Comprehensive Shoreland Protection Area

- 50' Waterfront Buffer/Primary Building Setback
- 150' Natural Woodland Buffer
- 250' Protected Shoreland

NWI Wetlands

- Locustrine
- Palustrine
- Riverine

Proposed Sidewalk Routes

- Route 1
- Route 2
- Route 3

Route/Segment Designations

- S1-C
- S1A
- S2
- S2A
- S3
- S4A

Crosswalks

- Crosswalks
- Property owners object to sidewalks in these areas

Scale: 1" = 150'

Proposed Sidewalk Routes & Crosswalks

Moultonborough, New Hampshire
2012-2013

Revisions:

Plan Labels	7-5-13
Conceptual Walk Layout	8-22-13
Conceptual Walk Layout REV	8-30-13
Conceptual Walk Layout REV 2	9-5-13
Conceptual Walk Layout REV 3	9-12-13
Conceptual Walk Layout REV 4	9-17-13
Conceptual Walk Layout REV 5	9-24-13
Conceptual Walk Layout REV 6	10-2-13

NOTES

THIS MAP IS BASED ON THE TOWN OF MOULTONBOROUGH, NH PROPERTY MAPS PREPARED IN 2009 BY CARTOGRAPHIC ASSOCIATES, INC. IT IS INTENDED FOR REFERENCE AND PLANNING PURPOSES ONLY.

PROPERTY LINES CURRENT TO APRIL 1, 2012

Prepared by:

KV Partners
CONSULTING ENGINEERS

g2⁴¹ LLC
Landscape Architecture Site Planning Graphics

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- Meets NHDOT sidewalk requirements as currently identified.
- Does not impair future development of the Village area as proposed in the July 2012 Design Charrette.
- Can be designed with minimal impact to area features so as to maintain the character of the Village area.
- Can be designed to address emergency response requirements.
- Is a practical and cost effective approach for providing sidewalks in the Village area as it provides direct routing between key destination points and does so predominantly within an existing public right-of-way.
- Minimizes property impacts by leveraging the use of the NHDOT right-of-way.

An opinion of probable project cost was developed for the full buildout scenario and is presented in Table 3. The opinion is based on the same criteria and assumptions as outlined in Section 4.2.

2. KVPartners recommends that the Town phase the buildout of the sidewalk network over time. Completing the sidewalk in phases addresses the cost concerns raised during the public participation process and gives the Town an opportunity to achieve objectives and observe the suitability and functionality of a first phase before committing to a more comprehensive network. As a first phase, KVPartners recommends that the Town consider constructing sidewalks on the north side and south side of NH Route 25 as shown on Figure 5. Note that this alignment assumes the Bank of New Hampshire will allow access through their property from Moultonborough Academy. Note also that these alternatives meet the objectives stated above with the following exceptions:

- Does not provide walking access to all properties throughout the Village area corridor.
- Does not provide access to disabled persons throughout the Village area corridor.

An opinion of probable project cost was developed for the Phase 1 scenario and is presented in Table 4. The opinion is based on the same criteria and assumptions as outlined in Section 4.2.

Table 3
Opinion of Probable Project Cost
Recommended Sidewalk Network Buildout

Sidewalk				Construction	Engineering	Construction Oversight	Easements	Legal	Contingency	Total
Route	Segment	Type	Length (ft)							
1	S1	A	530	\$83,000	\$12,000	\$10,000	\$6,000	\$2,000	\$22,000	\$135,000
1	S2	C	1040	\$106,000	\$16,000	\$13,000	\$9,000	\$2,000	\$29,000	\$175,000
1	S3	B	330	\$34,000	\$4,000	\$3,000	\$5,000	\$1,000	\$9,000	\$56,000
1	S4A	B	950	\$145,000	\$22,000	\$17,000	\$14,000	\$3,000	\$40,000	\$241,000
2	S1-CS	D	140	\$5,000	\$1,000	\$1,000	\$0	\$0	\$1,000	\$8,000
2	S2	C	990	\$56,000	\$6,000	\$5,000	\$12,000	\$1,000	\$16,000	\$96,000
2	S3	B	1050	\$154,000	\$23,000	\$18,000	\$11,000	\$3,000	\$41,000	\$250,000
3	S1A	D	350	\$17,000	\$2,000	\$2,000	\$0	\$0	\$4,000	\$25,000
3	S2A	D	780	\$29,000	\$3,000	\$3,000	\$19,000	\$1,000	\$11,000	\$66,000
Year: 2013:			6160	\$629,000	\$89,000	\$72,000	\$76,000	\$13,000	\$173,000	\$1,052,000
Year 2014:			6160	\$642,000	\$91,000	\$73,000	\$78,000	\$13,000	\$176,000	\$1,073,000
Year 2015:			6160	\$655,000	\$93,000	\$74,000	\$80,000	\$13,000	\$180,000	\$1,094,000

FIGURE 5: SIDEWALK NETWORK PHASE 1



Scale: 1" = 150'

Legend

- Contours
- Parcel Lines
- Buildings
- Drainage Structures
- Drainage Pipes
- Wetlands
- Village Zone C Boundary
- Limits of Study Area

Comprehensive Shoreland Protection Area

- 50' Waterfront Buffer/Primary Building Setback
- 150' Natural Woodland Buffer
- 250' Protected Shoreland

NWI Wetlands

- Locustrine
- Palustrine
- Riverine

Proposed Sidewalk Routes

- Route 1
- Route 2
- Route 3
- Route/Segment Designations
- Crosswalks
- Property owners object to sidewalks in these areas

Proposed Sidewalk Routes & Crosswalks

Moultonborough, New Hampshire
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PROPERTY LINES CURRENT TO APRIL 1, 2012

Prepared by:
KV Partners
CONSULTING ENGINEERS

g2⁴¹ LLC
Landscape Architecture Site Planning Graphics

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Table 4
Opinion of Probable Project Cost
Recommended Sidewalk Network Phase 1

Sidewalk				Construction	Engineering	Construction Oversight	Easements	Legal	Contingency	Total
Route	Segment	Type	Length (ft)							
1	S1-CS	B	150	\$16,000	\$3,000	\$2,000	\$0	\$0	\$4,000	\$25,000
1	S3	B	330	\$34,000	\$5,000	\$3,000	\$5,000	\$1,000	\$9,000	\$57,000
2	S1-CS	D	140	\$5,000	\$1,000	\$1,000	\$0	\$0	\$1,000	\$8,000
2	S2	C	990	\$56,000	\$8,000	\$6,000	\$12,000	\$1,000	\$16,000	\$99,000
2	S4A	B	950	\$145,000	\$26,000	\$17,000	\$14,000	\$3,000	\$41,000	\$246,000
3	S1A	D	350	\$17,000	\$3,000	\$2,000	\$0	\$0	\$4,000	\$26,000
3	S2A	D	780	\$29,000	\$4,000	\$3,000	\$19,000	\$1,000	\$11,000	\$67,000
Year: 2013:			3690	\$302,000	\$50,000	\$34,000	\$50,000	\$6,000	\$86,000	\$528,000
Year 2014:			3690	\$308,000	\$51,000	\$35,000	\$51,000	\$6,000	\$88,000	\$539,000
Year 2015:			3690	\$314,000	\$52,000	\$36,000	\$52,000	\$6,000	\$90,000	\$550,000

5.3 Operation and Maintenance Cost

Once sidewalks are installed, the Town is required to maintain them; this is consistent with New Hampshire case law and NHDOT policy for sidewalks constructed within their right-of-way (refer to Exhibit 8). Therefore as part of the sidewalk evaluation, Town staff prepared cost estimates to maintain the sidewalk network. The estimates include capital expenditures for equipment as well as labor and materials cost for on-going maintenance activities. The following is an opinion of probable operation and maintenance costs from the Department of Public Works.

Table 5
Operation and Maintenance Cost

Item	Type	Cost
Equipment (Sidewalk Plow)	Capital	\$110,000 – \$130,000
Equipment Replacement	Capital	\$10,000 per year
Labor, Materials	O & M	\$4,000 per mile

5.4 Additional Considerations

Based on the work completed to date, KVPartners recommends the following steps be taken to determine the suitability of the recommended sidewalk alignments.

1. Contact the Bank of New Hampshire to formalize access to their property for a designated sidewalk or pathway.
2. Contact property owners along the proposed alignment to discuss potential impacts to their property and business operations.
3. Complete field survey through the NH Route 25 corridor and conduct the necessary evaluations to better define the requirements and cost of construction and to confirm the limits of the NHDOT right-of-way. There is conflicting information on the record regarding the right-of-way width through the study area.