

*New Hampshire*  
**DOT**  
**Research**



**Transit Facilities in  
New Hampshire DOT Rights-of-way**

**Final Report**



Prepared by the New Hampshire Department of Transportation, in cooperation with the U.S.  
Department of Transportation, Federal Highway Administration



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16. Abstract Public transit providers in New Hampshire have bus stops, transit amenities, and way finding signage within public highway rights-of-way (ROWs), including state-maintained ROWs. The New Hampshire Department of Transportation (NHDOT) lacked a clear policy or process by which a transit provider seeks and gains approval to implement these facilities and amenities. NHDOT recognized the need to formalize this process to create a more consistent, transparent, and effective process. This report documents a literature review and interviews with NHDOT staff, transit agencies, and peer Departments of Transportation (DOT) to summarize current practices in New Hampshire and peer states involving transit stop approval. The research outputs include a form that can be used to request transit stop installation or improvements and a process flow establishing responsibilities for reviewing and approving the request.			
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# Transit Facilities in DOT Rights-of-way

## final report

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**New Hampshire Department of Transportation**

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**December 20, 2022**

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## Executive Summary

The New Hampshire Department of Transportation (NHDOT) lacks a clear policy or process by which transit providers can seek and gain approval to implement bus stops, transit amenities, or wayfinding signage in public highway rights-of-way (ROW). Transit Agencies in New Hampshire have found that the process and criteria for approval of new stops are unclear and often yield no decision from NHDOT. NHDOT recognizes the need to formalize this process in order to create a more consistent, transparent, and effective process. This report documents a literature review and interviews with NHDOT staff, transit agencies, and peer Departments of Transportation (DOT) to summarize current practices in New Hampshire and peer states involving transit stop approval.

Several existing State laws and policies in New Hampshire were instructive in this effort, including the Driveway Permit and several other permitting processes related to highway crossing signage. These processes provide insight into safety and infrastructure considerations at potential sites of new transit stops.

Peer agency interviews offered differing examples of how neighboring states approach transit stop approval. The Vermont Agency of Transportation's (VTTrans) permitting process is highly structured, and requires detailed information on new stop site conditions.

A review of the research literature indicates that state access management systems range from informal processes without standardized applications to highly formalized procedures with legislative mandates. The literature also provides insight into basic design and placement of bus stops that could be useful as NHDOT considers criteria for stop approval.

Interviews generated several additional key findings that were used to guide the development of a standardized application and approval process:

- **There is no standard on minimum bus stop infrastructure needs.** NHDOT should establish a minimum level of infrastructure required for a safe and effective bus stop.
- **A new process will need to balance consistency and flexibility.** There is a tension between the consistency of process—that is, a more rigid or prescriptive approach that minimizes decision-making—and the degree to which a process can adapt quickly and flexibly respond to transit agencies' needs.
- **NHDOT will need emphasize predictability.** Agencies should understand what turnaround times to expect and be able to reasonably determine whether a stop will meet requirements.
- **NHDOT may benefit from establishing transit stop maintenance responsibilities.** Responsibilities for these tasks are not currently uniformly established when stops are installed; establishing a maintenance agreement prior to a transit stop's approval may help clarify these responsibilities.
- **A more established approval process may help integrate transit stop planning into longer-term planning processes.** NHDOT would benefit from a formal stop approval process that ultimately conveys information on new stop locations into a centralized repository.

The effort to build the tools and processes necessary for a transit stop approval process centered on a three-day design sprint. A design sprint is a process originally devised in the software world that allows teams to build and test prototype solutions to problems in a structured “sprint” period.

The design sprint took place over three days in June 2022 at NHDOT headquarters. Participants defined a vision, challenges, and identified a target; storyboarded and discussed processes and tools to address the identified target; “tested” the selected prototype with NHDOT and transit agency staff outside of the sprint team; and defined roles and responsibilities moving forward. In a few days, the team was able to generate clarity and consensus around an approach to mitigate the issues outlines above.

The design sprint generated two important outputs: a fillable PDF form, which agencies can use to request transit stop installation or improvements in the DOT ROW, and a process flow establishing responsibilities for reviewing and approving the request. These items are included in this document in Appendices F and G.



## 1.0 Introduction

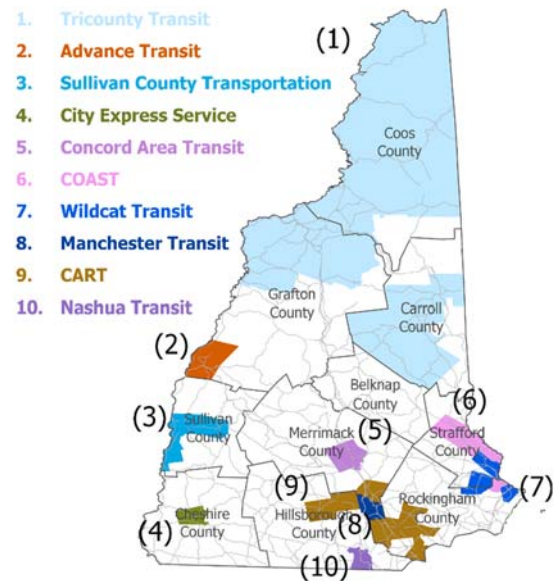
### 1.1 Project Background

The NHDOT currently lacks a clear policy or process by which transit providers in the state can seek and gain approval to implement bus stops, transit amenities, or wayfinding signage in the public highway ROWs. NHDOT recognizes the need to formalize this process in order to create a more consistent, transparent, and effective process around approval and implementation of these types of transit stops.

This document draws on a literature review and interviews with NHDOT staff, transit agencies, and peer DOTs to summarize NHDOT's current practices with regards to transit stops in DOT ROW. It also identifies needs and opportunities for staff to consider in development of a new process. These findings will be used to guide the development of tools to support a standardized application and approval process.

New Hampshire has 11 local transit providers and seven intercity bus routes. Figure 1.1 indicates the service areas for the local transit providers. COAST, MTA, Wildcat Transit, and Nashua Transit are urban agencies that draw on the Federal Transit Administration's (FTA) Urbanized Area Formula Funding program (49 U.S.C. 5307) for incorporated areas with a population of 50,000 or more. The remaining agencies are rural transit providers that draw funding from FTA's Rural Transit Assistance Program (49 U.S.C. 5311(b)(3)).

**Figure 1.1 Agency Service Areas**



### 1.2 NHDOT, Transit Agency, and Peer Agency Interviews

NHDOT guided the selection of interviewees who are likely be involved in approval of new transit stops in the DOT ROW (Table 1.1). The team conducted interviews with staff from the following agencies and providers:

- **Vermont Agency of Transportation (VTrans)**. As a neighboring New England state of similar size and rural character, NHDOT considers VTrans a peer agency.
- **Maine Department of Transportation (MaineDOT)**. As a neighboring New England state with similar population and rural character, NHDOT considers MaineDOT a peer agency.
- **Manchester Transit Authority (MTA)**. MTA operates fixed route, demand response, student transportation, and an intercity commuter bus (Manchester-Concord-Nashua) for the City of Manchester.
- **Cooperative Alliance For Seacoast Transportation (COAST)**. COAST operates fixed route and on-demand services in southeastern New Hampshire.
- **University of New Hampshire Wildcat Transit**. Wildcat Transit provides transit service at the University of New Hampshire, which is located in Durham, NH.

**Table 1.1 NHDOT, Peer Agency, and Transit Agency Interviewees**

Name	Title	Organization
Shelley Winters	Bureau Administrator	NHDOT Bureau of Rail & Transit
Fred Butler	Public Transportation Administrator	
Roger Appleton	Assistant District Six Engineer	NHDOT Highway Maintenance
Bill Oldenburg	Assistant Director of Project Development	NHDOT Commissioner's Office
Lynne York	Financial Analyst	NHDOT Bureau of Finance & Contracts
Bill Watson	Administrator, Civil Engineer VII	NHDOT Bureau of Planning & Community Assistance
Mike Whitten	Executive Director	MTA
Michael Williams	Director of Operations	COAST
Beverly Cray	Transportation Services Manager	UNH Wildcat Transit
Dan Currier	Public Transit Coordinator	VTrans
Brian Burne	Highway Maintenance Engineer	MaineDOT
Ryan Neale	Policy Development Specialist	MaineDOT

Appendices A and B include the interview guides used for NHDOT, peer agency, and transit agency interviews.

### 1.3 Key Takeaways

Over the course of conversations with NHDOT staff, transit providers, and peer agencies, several themes emerged:

**NHDOT already has several permitting processes that could guide a new transit stop approval process.** The driveway permit and permitting processes for various trail crossings in the DOT ROW could help inform any new transit stop permit. Applicants for driveway permits must submit information on driveway location, nearby drainage structures or traffic control devices, and grades. In the case of cross-country ski crossings, a field review is required prior to approval. In the case of snowmobile crossing permit applications, crossings are never authorized where sight distance is less than 400 feet.

Though transit agencies and the Bureau of Rail and Transit Bureau expressed caution around too complicated a permitting process, there is a precedent for the collection of basic information to assess safety and feasibility of interventions in the DOT ROW.

**There is no standard on minimum bus stop infrastructure needs.** Interviewees differed in their concept of the minimum infrastructure required for a safe and effective bus stop, and state statute does not establish requirements for such stops. A survey distributed to interviewees post interview asked respondents to describe the infrastructure they felt was necessary at transit stops in New Hampshire. The question was intended to identify a “minimally viable” set of conditions that could allow for streamlined bus stop assessment and approval.

Table 1.2 summarizes survey results; though every respondent agreed on the need for signage, only 25 percent agreed to the need for a pull-off or sidewalk. The interviewee from Vermont, a State with

comparatively stringent requirements for bus stop amenities, submitted a written answer: “Signage is a yes for all stops. Shelter and sidewalks should be paired together for locations with high ridership or long wait times,” indicating an openness to requiring different types of stop amenities based on the location. Transit agencies prefer simpler stops; all transit agency respondents selected “signage” only.

**Table 1.2 Post-Interview Poll—Physical Infrastructure**

*At a minimum, what type of physical infrastructure do you think is necessary for a bus stop?*

	Signage	Pull-Off	Shelter	Sidewalk	Other
Lynne York (NHDOT)	●	●		●	
Shelley Winters (NHDOT)	●				
Fred Butler (NHDOT)	●				
Roger Appleton (NHDOT)	●	●			
Mike Whitten (MTA)	●				
Michael Williams (COAST)	●				
Beverly Cray (Wildcat Transit)	●				
Dan Currier (VTrans)	●		●	●	● <sup>1</sup>

<sup>1</sup> Specified that signage is necessary, but that shelter and sidewalk accommodations should depend on site context.

Interviews provided additional context for these results. Several interviewees—from both transit agencies and NHDOT—expressed concern about “overengineering” bus stops, which could be expensive to construct and maintain given the relatively low number of passengers served by these stops. Transit agencies did not identify accessibility as a top priority, noting that they offer alternative transportation options for passengers with accessibility needs. One interviewee offered that stops could be required to include differing amenities based on different levels of anticipated ridership.

**A new process will need to balance consistency and flexibility.** There is a tension between the consistency of processes and the degree to which those processes can adapt to quickly respond to transit agencies’ needs. New Hampshire’s current ad-hoc decision-making allows for flexibility for NHDOT staff and for New Hampshire transit agencies; new stops are considered on a case-by-case basis, and transit agencies can request new stops with a simple email message.

In contrast, the Section 1111 permitting process in Vermont is highly structured and consistent and requires that municipalities collect and assemble significantly more detail on potential stop locations. In post-interview surveys, interviewees indicated where a new process in New Hampshire should fall along a spectrum of flexibility and consistency. In keeping with New Hampshire’s current approach, answers tended to prioritize flexibility over consistency; half of the answers expressed a preference for a process that was as flexible as possible (Table 1.3). All three transit agencies surveyed selected the most flexible option available.

**Table 1.3 Post-Interview Poll—Flexibility and Consistency**

*Do you think an effective process would need to be more flexible (e.g., to different site conditions) or that it be consistently applied across sites?*

	Flexible	More Flexible	Neutral	More Consistent	Consistent
Lynne York (NHDOT)			●		
Shelley Winters (NHDOT)			●		
Fred Butler (NHDOT)	●				
Roger Appleton (NHDOT)		●			
Mike Whitten (MTA)	●				
Michael Williams (COAST)	●				
Beverly Cray (Wildcat Transit)	●				
Dan Currier (VTrans)		●			

**NHDOT will need to find a balance between thorough and speedy processes.** There is a tension between the thoroughness of a process and the speed at which it can be completed. Transit providers are interested in designing a process that allows them to respond to customers’ needs in a timely manner. Table 1.4 provides post-interview survey data on appropriate turnaround times. While a plurality of respondents felt one to two months was an appropriate timeline for a new process, all transit providers marked that one to two weeks or two to four weeks were most appropriate. This indicates a need to spend more time establishing agreement on basic turnaround times that is acceptable for all parties involved.

**Table 1.4 Post-Interview Poll—Turnaround Time**

*What do you think would be a sufficient turnaround for the process?*

	1–2 weeks	2–4 weeks	1–2 months	2–4 months	5+ months
Lynne York (NHDOT)			●		
Shelley Winters (NHDOT)			●		
Fred Butler (NHDOT)			●		
Roger Appleton (NHDOT)				●	
Mike Whitten (MTA)	●				
Michael Williams (COAST)		●			
Beverly Cray (Wildcat Transit)	●				
Dan Currier (VTrans)		●			

**NHDOT may benefit from establishing transit stop maintenance responsibilities.** Transit stop maintenance in New Hampshire differs greatly by season. In the summer months, maintenance is generally minimal, at times involving repairs to pavement. Wintertime maintenance is more involved, oftentimes encompassing de-icing and snow removal. Responsibilities for these tasks are not clearly established when stops are installed; NHDOT’s Maintenance Bureau expressed concern that if stops with additional amenities such as shelters and sidewalks were installed, the public would expect NHDOT to maintain them.

VTrans' transit stop process may be instructive on this topic; VTrans requires that a maintenance agreement for the stop is in place prior to the transit stop's approval. In Vermont, localities are generally responsible for maintenance responsibilities.

**A more established approval process may help integrate transit stop planning into longer-term planning processes.** Conversation with NHDOT staff in the Commissioner's Office and in Planning and Community Assistance highlighted another element of this process: the extent to which, if planned far in advance, transit stop projects could be integrated into NHDOT's project development process. NHDOT would prefer to be aware of transit stops, whether existing or planned, at the beginning of a highway project. Currently, it is the responsibility of transit agencies to reach out if there is a planned stop in a project area and the responsibility of NHDOT to track locations of existing stops.

In practice, NHDOT possesses no comprehensive geographic information system (GIS) file for all transit routes and stops and is at times unaware of existing stops. In these cases, NHDOT must revise project plans to incorporate stop amenities late in the process and at greater cost. If better coordinated, NHDOT could provide cost-effective amenities for stops. NHDOT would benefit from a formal stop approval process that ultimately conveys information on route and stop locations into a centralized repository. Ultimately, this centralized repository would prove most beneficial as a GIS layer, which would allow staff to easily determine needs around transit agency coordination.



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## 2.0 Existing Systems in New Hampshire

### 2.1 Interview Summaries

**Shelley Winters and Fred Butler (NHDOT Bureau of Rail and Transit).** Winters and Butler are the NHDOT staff that interact most directly with the transit stop request and approval process; both are involved in coordinating communication and administration around transit services in New Hampshire and receive transit stop requests from transit agencies. The discussion provided context on the relationship between NHDOT and transit providers and covered potential longer-term systemic and shorter-term process changes to the approval process.

In terms of variables that should be important to transit stop approval, Winters and Butler raised ridership thresholds, presence of proximate stops, Americans with Disabilities Act (ADA) accessibility, and safety, particularly in wintertime conditions. At a minimum, any approved stop would need a sign, have a schedule, and include enough space for a lift. There was agreement that if a transit agency could demonstrate having achieved some threshold on these conditions, it should be possible to “fast track” applications without substantial further review.

**Roger Appleton (NHDOT Bureau of Maintenance).** Appleton is not currently involved in the bus stop approval process. Rather, this discussion raised considerations around stop maintenance that may be useful to integrate into a redesigned process. First, plowing is a real need in New Hampshire’s wintertime conditions; Appleton has observed that some bus stops installed by transit agencies are not plowed or are plowed insufficiently, leading buses to stop in the travel lane. Second, buses damage road shoulders when they are not equipped with bus-friendly pull-offs.

New Hampshire does not have an established system for determining maintenance responsibilities for new stops; an approval process would be improved, Appleton noted, by establishing these responsibilities up front. In the wintertime, plowing is the most important maintenance responsibility. In the summer, repaving could likely be incorporated into regular summer maintenance activities. As far as stop facilities, Appleton felt that pull-offs could be constructed quickly if needed in approximately one week at low cost. Issues that would be important to raise in an approval process would also include sight distance and ROW acquisition.

**Bill Oldenburg (NHDOT Office of the Commissioner).** This discussion centered on how transit stops could be better integrated into the long-term planning and project development process. Oldenburg described informal interactions with transit providers where NHDOT finds out about existing or planned transit stops late in a highway project process. Because it is fairly low cost and effort to include improved facilities for a stop—such as a turnout for pickup or a sign in projects—in highway projects, it would be beneficial to incorporate these needs into planning up front. As far as considerations for stop placement, Oldenburg cited traffic flow, safety of crossings, and ROW abutments. In Oldenburg’s experience, long-term operational costs of transit stops are expected to be taken over by the transit provider or local municipality.

**Lynne York (NHDOT Bureau of Finance & Contracts).** York is the analyst within the Bureau of Finance and Contracts supporting the transit group. In this role, she researches financial transactions and coordinates monthly transactions to distribute FTA funds. While she has limited involvement in the transit stop approval process, she expressed a preference that funding be secured and verified early on in a project, as redistributing funding later is more complicated. Echoing the perspective of those in project development

and planning positions, she indicated that transit stops that are integrated into documents such as the 10-year plan are most straightforward to approve, track, and manage.

**Bill Watson (NHDOT Bureau of Planning and Community Assistance).** The Bureau of Planning and Community Assistance develops NHDOT’s 10-year transportation plan. As such, the bureau’s interaction with the transit stop approval is mainly through the long-range planning and project development process. Echoing the sentiment expressed in the interviews with Lynn York and Bill Oldenburg, Watson discussed how transit stops might be better integrated into the 10-year plan. Watson noted that funding is available and the bureau has staff capacity to engage in more long-term planning with transit agencies around locating future transit stops.

**Mike Whitten (MTA), Michael Williams (COAST), Beverly Cray (Wildcat Transit).** This conversation brought together three transit providers in New Hampshire, including COAST, which would likely be the most frequent user of any new process. Agencies pride themselves on responsiveness to customer needs. Requests for new stops may come through the agency’s online form or through a dispatcher or bus operator, and it is not unusual for an agency to consider tweaking a route based on a single customer’s needs. Before installing a new stop, staff will generally determine whether there is space for a pull-off, take note of sight distance, and note pedestrian amenities at the site, though there is no set of common standards for stops.

From the transit agency perspective, a transit stop approval process is an infrequent and fairly simple need; agencies would prefer a defined process that incorporates a designated point of contact and a simple email. This point of contact, they noted, should be someone at NHDOT who understands transit and understands tradeoffs and that having an imperfect stop is ultimately safer than having no stop at all. The transit agencies are most interested in ensuring that any new process is simple; they do not want to spend a large number of staff hours compiling requests. The agencies are satisfied with simple facilities—e.g., a sign—and do not expect NHDOT to maintain their stops. They agreed that the idea of a “by-right” stop would be helpful (e.g., with demonstrated need, adequate facility, and low infrastructure need, stops could be approved rapidly).

**Dan Currier (VTrans), Brian Burne (MaineDOT), and Ryan Neale (MaineDOT).** Interviews with peer agencies provided context on New Hampshire’s existing processes. The MaineDOT staff interviewed were not aware of any formalized processes for transit stop approval beyond urban compacts, though they offered an example of the permit used in Maine for highway access. In contrast, VTrans offered insight into Vermont’s highly structured and formalized process for transit stop approval through their State Highway Access and Work Permit (19 V.S.A. Section 1111). The permit solicits information on location, project description, and whether related permitting is required.

## 2.2 Current Process

In the past, transit agencies have adopted an independent approach towards transit stop installation that has not necessarily involved consultation with NHDOT. NHDOT staff interface with this practice in different ways; though most bureaus interviewed were unaware of this practice at all, the Bureau of Maintenance reported encountering stops that had been installed independently in the course of routine roadway work.

Today, NHDOT asks that transit agencies submit requests for new stops to the Bureau of Rail and Transit through email. The stops requested are often low-impact designs limited to a sign on the highway shoulder. Figure 2.1 offers an example of the type of content submitted in these requests. The transit agency, in this case COAST, provides photos of the potential stop location, information on distance to nearby stops, and addresses basic safety questions.



NHDOT has no formalized process for reviewing and approving these requests once they are submitted. Requests for new stops are infrequent; COAST reports having made three stop requests in the last five years, and post-interview surveys indicated that six out of eight interviewees anticipated fewer than five stops per year to be submitted for approval. Transit agencies have found that the process and criteria for approval are unclear; once submitted to the Bureau of Rail and Transit, requests are circulated among other bureaus but ultimately succumb to a breakdown in communication and receive no response. The transit agencies express a lack of clarity around responsibilities for approval and liability.

**Figure 2.1 Example of Current Stop Request Process**

Hi Shelley and Fred,

I've had a request from a passenger to add new stops on NH R. 11 for our Route 6 at Aylward Motors due to a rider trying to regularly access that location, I believe for work. There is a long stretch on Rt. 11 with no bus stops. This location would be:


0.6 miles from closest stop to the south  
 1.1 miles from closest stop to the north

This stretch is fairly straight with wide shoulders and matches conditions of our stops in other locations along this same road. We would need to put in new posts. Names would be:

- Farmington Road (Aylward Motors) Northbound
- Farmington Road (Aylward Motors) Southbound

How would we move forward with requesting permission to locate these stops?

Maybe here?



Here are shots of existing stops on Rt. 11 before and after this location. They have nearly identical conditions to the stop we have been proposing, and have not had safety concerns.

Source: NHDOT.

Beyond review and approval of new transit stops, there is a disconnect between highway projects and information around new and planned transit stops. The Projects and Planning Bureau is at times unaware of existing transit stops that fall within the scope of a planned highway project, which makes it difficult to coordinate around possible relocation or upgrades to facilities. The bureau reports at times learning about

transit stops in a project area well into project planning and design, leading to off-schedule adjustments to budget, public engagement materials, and design. If funding for transit stop facilities was not initially included in project cost estimates, NHDOT has the authority to request that the local transit agency fund the cost. In order to include transit stops in the highway project development process, the stops would need to be included in NHDOT's 10-year plan. These challenges indicate that any process designed to approve new transit stops would likely be most useful if it also included some pathway for logging incoming data on stop location.

## 2.3 State Law and Policy

This section identifies state law and policies relevant to the issues and questions raised around in this research around processes for siting transit stops or other amenities in the DOT ROW. Chapters 228 through 242 of the New Hampshire Revised Statutes relate to authority in transportation. In addition to statute, several other laws, policies, or procedures provide some insights into established regulatory structures that might be useful on which to build.

**Section 236:13—Driveways and Other Accesses to the Public Way.** This section describes the process required for applying and gaining approval for driveways within the right-of-way of any Class I or Class III highway or the State-maintained portion of a Class II highway. These requirements could provide insight into the type of information useful to NHDOT in evaluating an application for a new transit stop.

Applicants for a driveway permit must file a construction permit application with NHDOT. The application must detail the following characteristics of the driveway location:

- Location of the driveway, entrance, exit, or approach.
- Any drainage structures, traffic control devices, and channelization islands to be installed by the abutter.
- Identification of grades that adequately protect and promote highway drainage and permit a safe and controlled approach to the highway.
- For access to a proposed commercial or industrial enterprise or subdivision, NHDOT requests additional information:
  - The permit application must include engineering drawings.
  - There must be an all-season safe sight distance of 400 feet in both directions along the highway only one access point per parcel of land is allowable.<sup>1</sup>

**DOT Declaratory Ruling: Approval and Regulation of OHRV Trail Crossings within the State Highway Right-of-Ways.** The purpose of this policy is to provide a uniform procedure throughout New Hampshire whereby Off-Highway Recreational Vehicles (OHRV) may cross the State's highway systems at permitted locations. At a high level, the permitting procedure incorporates the following qualities:

- Applications are submitted to the District Engineer who oversees highway maintenance operations at the proposed crossing location. The District Office is responsible for permit review. If accepted, the permit will be issued through the Bureau of Trails.

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<sup>1</sup> NH Rev Stat § 236:13, 2020. <https://law.justia.com/codes/new-hampshire/2021/title-xx/title-236/section-236-13/>.

- Crossings will not be authorized where sight distance is less than 400 feet. Crossings must be a minimum of 100 feet from any intersection or highway.
- The permittee is responsible for recommending the need, location, size, and message of signage for the crossing, while NHDOT is responsible for erecting and maintaining the sign.<sup>2</sup>

**Alpine and Nordic Ski Area Direction Sign Permits.** This process implements state law and Federal regulation “Manual on Uniform Traffic Control Devices Millennium Edition” adopted by Federal Highway Administration. These provisions are intended to be used by DOT staff in the processing and issuance of alpine and Nordic ski area directional sign permits. The policy outlines the following key processes and requirements:

- The request for signage is submitted to the Bureau of Traffic. This request must include the following information: contact information; municipality; state highway name or number; hours of day and days of the week that services are provided to the public; and a sketch showing the proposed location of the sign that indicates distance from easily found reference markers.
- The Bureau of Traffic conducts a field review of the proposed location, and denies the application if the proposed sign structure would limit a user’s ability to safely navigate the road, would interfere with highway maintenance efforts, or would require the Department to apply for a permit from any other governmental agency prior to sign placement.<sup>3</sup>

**Section 236:87—School Bus Shelters.** This section establishes design requirements for new school bus shelters that carry advertising material. Though different in many respects from public transit stops, the statute provides some insight into expectations around bus stops and shelters in New Hampshire. This section requires that each such shelter be constructed of durable material, have a concrete floor raised above ground level, be kept clean and well-maintained, and be kept free from snow.<sup>4</sup>

These established processes provide initial detail on what could ultimately be involved in a new transit stop application. Applicants for driveway permits must submit information on driveway location, nearby drainage structures or traffic control devices, and grades. School bus shelters must at a minimum include a raised concrete floor and be kept clean and free from snow. In the case of cross-country ski crossings, the Bureau of Traffic is responsible for conducting a field review of the proposed location prior to approval. In the case of snowmobile crossing permit applications, the District Engineer overseeing highway maintenance operations at the proposed crossing location is responsible for permit review, and crossings are never authorized where sight distance is less than 400 feet. A combination of some of this basic information on project location, including crucial information such as sight distances, could provide the basis for a simple transit stop application.

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<sup>2</sup> NHDOT, 2016. *Declaratory Ruling No. 2016-01: Approval and Regulation of OHRV Trail Crossings Withing State Highway Right-Of-Ways*. <https://www.nh.gov/dot/laws/documents/atvdecruling-2016-01.pdf>.

<sup>3</sup> NHDOT, 2003. *Alpine & Nordic Ski Area Directional Signs*. <https://www.nh.gov/dot/org/operations/traffic/documents/SignsSkiPolicy.pdf>.

<sup>4</sup> NH Rev Stat § 236:87, 2020. <https://law.justia.com/codes/new-hampshire/2020/title-xx/title-236/section-236-87/>.



## 3.0 Best Practices

This section identifies policies, tools, and procedures relevant to the installation of bus stops and other transit amenities in DOT ROW. First, it reviews policies in peer states Vermont and Maine with regards to the installation of transit stops in those states' DOT ROW. Much of this content is drawn from interviews with agency staff. Second, the section reviews research at the national level on best practices around transit stop siting.

### 3.1 Peer Agency Practices

**Vermont Agency of Transportation.** VTrans manages approval of new transit stops in DOT ROW through its highway access management process. This process is designed for use in any instance where a third party will be using state-owned ROW, whether in a temporary or ongoing basis. In the case of new transit stops, municipalities—or in some cases, private developers—apply for a State Highway Access and Work Permit (19 V.S.A. Section 1111) on behalf of transit agencies. The permit solicits basic information on location, project description, and whether related permitting is required (see full permit in Appendix C).

Applicants are required to provide documents at DOT staff's discretion. These materials generally include one or more of the following: a site plan, traffic control plan, grading and drainage plans, erosion control plan, traffic impact study, or performance bond. Some of these requirements may be onerous for small towns without staff engineers; oftentimes, towns must hire an engineer in order to provide the information. Applicants can access the permit application form through the VTrans website, where they also are able to view guidance and definitions, a map of the DOT ROW, a database of current and former permit listings, and the process for requesting archived permits.<sup>5</sup>

After a Section 1111 permit is submitted, a VTrans permit specialist assigned to the project may perform a site investigation if needed. Among other details, the permit specialist will review sight distance as it relates to roadway speed, signage, any special maintenance needs (e.g., foliage), and proximity to other transit stops. Vermont's review is thorough in part because the agency requires more of its transit stops; VTrans requires that transit vehicles have a space to pull out of the travel lane, ensures that a maintenance agreement for the stop is in place prior to approval, and limits the number of stops per mile. VTrans does not permit stops on roads with speeds greater than 50 miles per hour. This process varies in length from start to finish. Permits may be approved by the local district as quickly as a week, but true construction could take much longer.

**Maine Department of Transportation.** MaineDOT reported little interaction with the transit stop approval process, noting that in Maine, like New Hampshire, municipalities are responsible for transit stop approval and maintenance within their "urban compact" boundaries. Per statute, all state and state aid highways within the bounds of urban compact municipalities must be maintained in good repair by the town in which the highways are located at the expense of the town.<sup>6</sup> State aid roads are usually maintained by MaineDOT in the summer and by the municipalities in the winter.<sup>7</sup> As in Vermont, requests of MaineDOT for new access are reviewed through permit applications. Driveway and Entrance Permits require basic information

<sup>5</sup> VTrans, n.d. *Frequently Asked Questions*. <https://vtrans.vermont.gov/planning/permitting/faqs>.

<sup>6</sup> MaineDOT, 2018. *State vs Municipal Maintenance Responsibilities on State and State Aid Highways*. <https://www.maine.gov/mdot/csd/docs/roadwayinfo/maintdefsinsideUCAfinalFeb2018.pdf>.

<sup>7</sup> MaineDOT, n.d. *Road Classification: What it means to a Municipality*. <https://www.maine.gov/mdot/csd/docs/roadwayinfo/RoadClassification.pdf>.

regarding location, the material and size of any surface treatment, the purpose and number of expected users, a construction timeline, and a site plan.<sup>8</sup>

The Highway Opening Permit is used for nonaccess work in highway ROW such as excavations or installation of certain utility facilities. Applicants must submit a traffic control plan, permit fee, general location map, specific location plan, and a completed application form that details purpose and type of work being proposed, the schedule of work, the name of the contractor that will be used, whether a Funding Agency Addendum is applicable, and the level of coordination that has occurred with other nearby utilities (see full permit in Appendix D). MaineDOT’s key considerations in permit review include sight distance, safety, and maintenance concerns. From start to finish, MaineDOT estimates that submission and approval of a new stop takes an average of 30 days.

**Maryland Department of Transportation (MDOT).**<sup>9</sup> The Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) Bus Stop Design Guide provides guidance for the design of bus stops. The guide is intended to serve as an internal resource for MDOT MTA, provide guidance to local governments and developers for best integrating MDOT MTA bus stops into their plans, and educate passengers, elected officials, and the public about the planning and design of bus stops. The Bus Stop Design Guide incorporates best practices from several guides, but substantially draws from the Transit Street Design Guide by the National Association of City Transportation Officials.

The guide describes the factors related to access, safety, and operational efficiency are considered when evaluating proposed new bus stop locations (Table 3.1).

**Table 3.1 MDOT Factors for Evaluating New Proposed Bus Stop Locations**

Access Considerations	Safety Considerations	Operational Efficiency Considerations
<ul style="list-style-type: none"> <li>• Transit need, defined by demographics, socioeconomic, and other criteria.</li> <li>• Access to (and at) the proposed stop in compliance with the ADA, including the boarding and alighting area, sidewalks, curb ramps, and pedestrian crossings.</li> <li>• Equity, as defined and measured by Title VI of the Civil Rights Act of 1964.</li> <li>• Amenities, including the feasibility of installing seating or a shelter.</li> <li>• Block lengths, street connectivity, presence of controlled pedestrian crossings, and topography around the proposed stop.</li> <li>• Curb space uses (i.e., loading, parking) and available curb space for buses to dwell.</li> </ul>	<ul style="list-style-type: none"> <li>• Lighting, visibility, and protection from vehicle traffic for waiting passengers.</li> <li>• Presence of controlled pedestrian crossings.</li> <li>• Ease of bus movement in and out of the proposed stop.</li> <li>• Volumes and movements of traffic other than transit.</li> </ul>	<ul style="list-style-type: none"> <li>• Routes that would serve the proposed stop, including their service type and frequency of service.</li> <li>• Land uses surrounding the proposed stop and their suitability for transit service.</li> <li>• Spacing between adjacent stops and compliance with the Bus Stop Spacing Guidelines.</li> <li>• Travel time and dwell time effects on bus operations and passengers’ trips.</li> <li>• Potential ridership, primarily in the form of passengers who currently do not have adequate access to the transit network.</li> </ul>

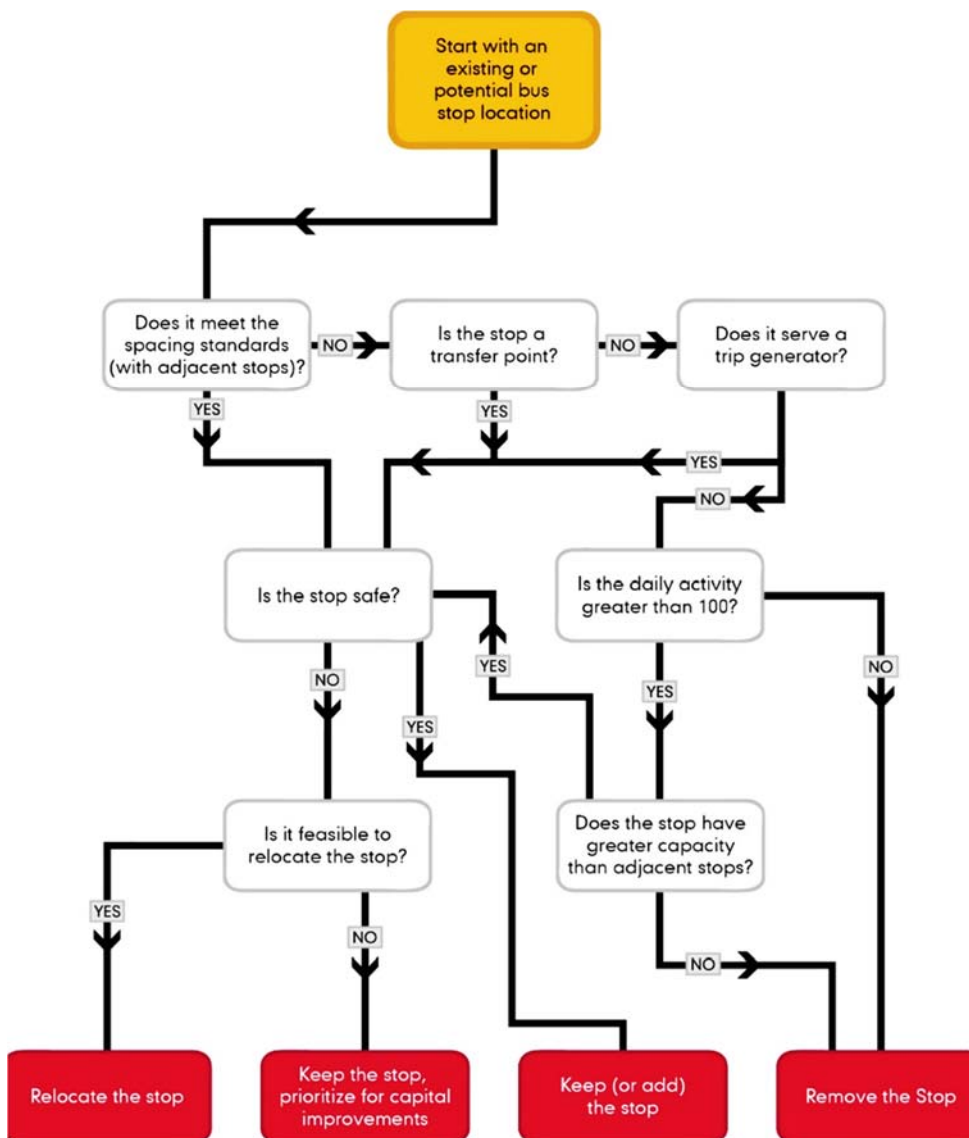
<sup>8</sup> MaineDOT, n.d. *MaineDOT Driveway/Entrance Permit Applications*. <https://www.maine.gov/mdot/traffic/drivewaypermits/>.

<sup>9</sup> MDOT, n.d. *Bus Stop Design Guide*. <https://www.mta.maryland.gov/bus-stop-design-guide>.

Before a stop is added to the transit network, notification letters are sent to property owners and occupants on the adjacent and opposite block faces. While MDOT MTA can place stops within the public ROW if it has received approval from the appropriate local Government body, MDOT MTA invites property owners and occupants to provide input.

MDOT MTA also periodically reviews bus stop spacing throughout an entire route or street/road corridor as part of a comprehensive bus stop optimization process. A flow chart describes the process for optimizing bus stops on a BaltimoreLink route, with the goals of increasing safety, efficiency, and reliability (Figure 3.1). Note that the flow chart describes several determinations that NHDOT would expect transit providers to make internally; for example, the that the stop meets spacing standards for transit stops. In fact, the list of expectations developed during the design sprint (see Sketching Exercises, Page 4-5) incorporated several of these characteristics to reflect NHDOT’s expectations for transit agency due diligence.

**Figure 3.1 Maryland DOT Bus Stop Optimization Process**



Source: MTA Bus Stop Design Guide, 2019 Edition.



**Florida Department of Transportation (FDOT).** FDOT commissioned a report to review problems and suggest improvements for intergovernmental coordination of their access management procedures. The research found that these issues arose from a lack of clarity access managements requirements, communication, and ultimate legal authority. The report recommended communication that is coordinated, timely, and procedural; development of an access permit application that is consistent across relevant jurisdictions and has a published review process with early conversations between all relevant organizations; development of a public online permit tracking system so that permitters can track their progress; and inclusion of other relevant Government entities in DOT committee meetings for permitting procedures and ROW.<sup>10</sup>

**New Jersey Department of Transportation (NJDOT).** NJDOT has allowed New Jersey Transit to site bus stops along their ROW for many years. In New Jersey, the transit operator has no authority to designate bus stops. That power is statutorily delegated to the jurisdiction responsible for each roadway, including the state, counties, or, in most cases, municipalities. In 2005, NJDOT considered how to reconfigure its highway access management plan to better support the transit agency in the access management permitting process. The rationale for incorporating public transportation requirements into a revised access code were to mitigate disputes between new access facilities and existing stops and ensure bus stops were considered in any new development along the State-owned ROW. Much of the input from transit agencies revolved around the need for the transit operator to review access permits for major developments.

The proposed coordination process would be activated on sites proximate to transit (within half a mile of a rail transit station or a quarter mile of a bus line). NJ Transit staff suggested several items for developers to address in access permit applications: identification of bus routes and stops on all streets adjacent to the site; assurance that driveways would not interfere with the operation and stopping patterns of public buses; provision of accessible sidewalks along the entire frontage of the site bordering the state highway; and relocation of bus stops with approval from the transit operator and the appropriate local jurisdictions, provided that the relocation did not unreasonably increase walking distances for transit riders. New Jersey legislators did not ultimately incorporate these recommendations into the state's access code.<sup>11</sup>

## 3.2 Review of Literature

Most literature related to bus stop design and site selection is oriented towards urban areas, and literature on bus stop design focuses on access management procedures. State access management systems range from informal processes without applications to highly formalized procedures with legislative mandates.<sup>12</sup>

**New Hampshire Highway Design Manual.** This manual draws on the American Association of State Highway and Transportation Officials (AASHTO) design manual and provides guidance for several typical roadway criteria that may also be applied to buses and stop locations.<sup>13</sup>

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<sup>10</sup> Center for Urban Transportation Research, 1998. *Intergovernmental Coordination in Access Management—A Discussion Paper*. <https://www.cutr.usf.edu/1998/06/intergovernmental-coordination-in-access-management-a-discussion-paper/>.

<sup>11</sup> Jerome M. Lutin, 2010. *Proposal for Incorporating Public Transit Provisions into a State Highway Access Management Code*. <https://doi.org/10.3141/2171-06>.

<sup>12</sup> Frawley, W.E. Eisele, W.L., 2001. *Assessment of Current Access Management Programs in Other States and Recommendations for Developing a Comprehensive Access Management Program in Texas*. <https://trid.trb.org/view/713763>.

<sup>13</sup> NHDOT, 2014. Highway Design Manual Vol. 1. <https://www.nh.gov/dot/org/projectdevelopment/highwaydesign/designmanual/index.htm>.



**Shoulders:** The guide establishes that shoulders, which theoretically may accommodate buses entering and exiting traffic, range from 1.2 meters (about 4 feet) to 3.6 meters (about 12 feet) on major facilities. Shoulders may be smaller on a minor road. The guide further states that shoulders should be paved unless otherwise approved. When compared to the literature discussing bus stop design, a 12-foot, paved pull-off zone is ideal, and anything smaller than 10.5 feet or 3.2 meters are likely too small to fully accommodate a typical bus. Shoulder smaller than this minimum would require a bus to either stop partially in a travel lane or partially in the area beyond the shoulder.

**Sight Distances:** Stopping sight distances are key factors in the design of any roadway design and decisions around bus stop placement. Drawing on AASHTO guidance, NHDOT’s guidance recommends the same stopping distances for trucks (and presumably, buses). What is most important in terms of sight distance is not that bus drivers, who are highly trained and can anticipate bus stops, have time to brake for stops, but that cars behind buses are able to react appropriately to what is more likely to be an unexpected stop. Beyond physical capabilities, “decision” sight distances refer to distances that accommodate a normal driver’s ability to perceive an unusual roadway condition, decide on a course of action, and perform what may be a complex maneuver safely and efficiently (Table 3.2). Decision sight distance values are significantly greater than stopping sight distances decision sight distances. At 60 mph, a recommended decision sight distance for cars approaching a bus stop would be 1,125 feet, assuming avoidance maneuver D: Speed/path/direction change on suburban road.

**Table 3.2 AASHTO Decision Sight Distances<sup>1</sup>**

Design Speed (mph)	Avoidance Maneuver				
	A	B	C	D	E
30	220	490	450	535	620
35	275	590	525	625	720
40	330	690	600	715	825
45	395	800	675	800	930
50	465	910	750	890	1030
55	535	1030	865	980	1135
60	610	1150	990	1125	1280
65	695	1275	1050	1220	1365
70	780	1410	1105	1275	1445
75	875	1545	1180	1365	1545
80	970	1685	1260	1455	1650

<sup>1</sup> Decision sight distance measurements are in feet.

Avoidance Maneuver A: Stop on rural road.

Avoidance Maneuver B: Stop on urban road.

Avoidance Maneuver C: Speed/path/direction change on rural road.

Avoidance Maneuver D: Speed/path/direction change on suburban road.

Avoidance Maneuver E: Speed/path/direction change on urban road.

Source: AASHTO, 2018, Policy on Geometric Design of Highways and Streets, 7<sup>th</sup> edition.

**Transit Cooperative Research Program (TCRP)-19: Guidelines for the Location and Design of Bus Stops.** The primary objective of this research was to develop guidelines for locating and designing bus stops in various operating environments. The guidelines include information about locating and designing bus stops and checklists of factors that should be considered.<sup>14</sup> The guidelines include three sections: the “big picture,” street-side design, and curb-side design. Key takeaways relevant to New Hampshire’s experience within each section include:

**“Big Picture” Guidelines:** Broadly, the guide advises that agencies consider transit system performance, traffic flow, vehicular and pedestrian safety, and customer security when choosing a bus stop location. It also advises that agencies consider equity and accessibility of their system when planning for new stops, keeping in mind who is and is not served by the current network.

The guide identifies several key issues transit agencies consider when determining whether a bus stop is needed: transit agency Policy (e.g., route types, guidelines for stop installation, Special cases/Exceptions), equity, and accessibility/ADA. Additionally, agencies are likely to ask the following important questions in determining need:

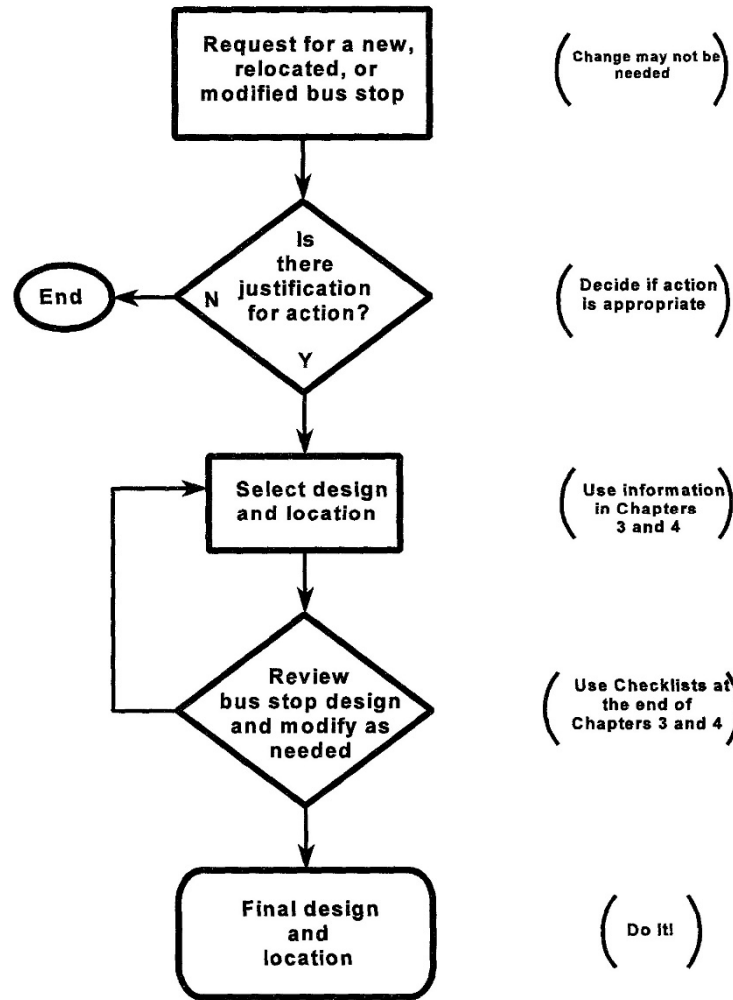
- Trip Generation/Land Use—How many potential bus passengers?
- Walking Distance—How far do passengers have to walk?
- Boardings and Alighting’s—How many passengers are getting on and off?
- Dwell Time—How long does the bus dwell at the stop?
- Travel Time—How long is the trip from the origin to the rider’s destination?
- Transfer Potential—How many routes serve this stop?

The report describes a series of decisions required to determine the need for a transit stop (Figure 3.2). One a request for a new, relocated, or modified bus stop is submitted, agencies must decide if there is a justification for action. If there is, the agency embarks on an iterative stop design and location process that terminates in a final, approved, stop. This flow chart provided a helpful example of how NHDOT might wish to structure their process flow.

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<sup>14</sup> Transportation Research Board, 1996. *Guidelines for the Location and Design of Bus Stops*. [https://nacto.org/docs/usdq/tcrp\\_report\\_19.pdf](https://nacto.org/docs/usdq/tcrp_report_19.pdf).

Figure 3.2 TCRP Guidance on Bus Stop Design and Location Decisions



Source: TCRP.

**Streetside Design:** Streetside design factors include anything related to the roadway traveled by buses. The guidelines This chapter discusses bus stop placement, bus stop zone design types, and different types of bus stops (e.g., bus bays, nubs, etc.), vehicle characteristics, and intersection design.

In considering bus stop placement, the guide advises that after ridership potential has been established, the most critical factors in bus stop placements are safety and avoidance of conflicts that would otherwise impede bus, car, or pedestrian flows. Many of the safety and operational examples offered by the report, though, most readily apply in urban contexts. Some operational elements relevant to New Hampshire’s consideration of stop locations include:

- Adequate curb space for the number of buses expected at the stop at one time.
- Impact of the bus stop on adjacent properties.
- Directions (e.g., one-way) and widths of intersection streets.

- Types of traffic signal controls (signal, stop, or yield).
- Volumes and turning movements of other traffic.
- Width of sidewalks.
- Proximity and traffic volumes of nearby driveways.

The guidelines identify several factors that might necessitate a “bus bay,” or pull-off (Table 3.3) NHDOT may wish to integrate these factors into review of certain types of bus stop requests.

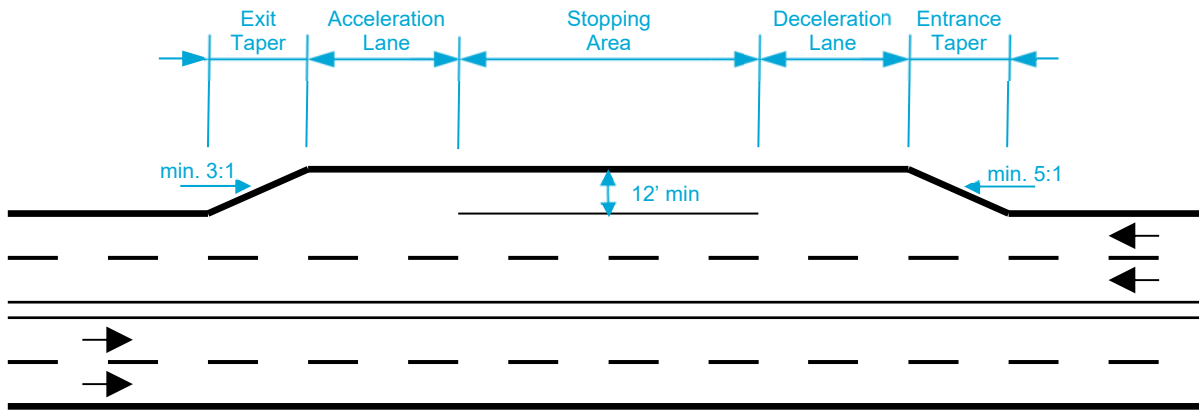
**Table 3.3 TCRP Guidelines on Factors that Might Necessitate a Bus Pull-Off**

<b>Roadway Characteristics</b>	<b>Passenger or Operational Characteristics</b>
<ul style="list-style-type: none"> <li>• Potential for auto/bus conflicts warrants separation of transit and passenger vehicles.</li> <li>• Right-of-way width is adequate to construct the bay without adversely affecting sidewalk pedestrian movement.</li> <li>• Sight distances (i.e., hills, curves) prevent traffic from stopping safely behind a stopped bus.</li> <li>• A right-turn lane is used by buses as a queue jumper lane.</li> <li>• Appropriate bus signal priority treatment exists at an intersection.</li> <li>• Bus parking in the curb lane is prohibited.</li> <li>• Improvements, such as widening, are planned for a major roadway.</li> </ul>	<ul style="list-style-type: none"> <li>• Passenger volumes exceed 20 to 40 boardings an hour.</li> <li>• Average peak-period dwell time exceeds 30 seconds per bus.</li> <li>• Buses are expected to layover at the end of a trip.</li> <li>• History of repeated traffic and/or pedestrian accidents at stop location.</li> </ul>

Agencies must also consider how buses will enter and exit traffic. The guidelines recommend that bus pull-off zones or shoulders should be available when traffic speeds are high, sight distances are obscured, traffic volume is high, or where buses in travel lanes would impede traffic.

Figure 3.3 describes typical dimensions for bus pull-offs. The width of a pull-off zone would ideally be 12 feet and at a minimum 10.5 feet to accommodate a typical bus. Other characteristics transit agencies may wish to consider include roadside and overhead obstructions, pavement strength, traffic lane widths, turning radii, driveway access, and proper signage. The guidelines note that roadway pavements (or shoulders, if that is where the buses stop) need to be of sufficient strength to accommodate repetitive bus axle loads of up to 25,000 pounds.

**Figure 3.3 Typical Bus Pull-off Zone**



Source: TCRP.

Table 3.4 summarizes the recommended lengths for each portion of the bus pull-off lane based on the travel lane through speed. Traffic speeds greater than 40 mph are considered high enough to warrant a pull-off zone. For a speed of 60 mph, a minimum design that only includes tapers and stopping areas is recommended at a minimum of 590 feet. In any case, the location of a stop is limited by how easily the bus can slow down and speed up to re-enter traffic. Large sight distances and low traffic volumes make this task much easier for drivers to perform, as does having multiple travel lanes with which through traffic can maneuver to avoid buses.

**Table 3.4 TCRP Guidelines on Recommended Pull-Off Lane Length**

Through Speed (mph)	Entering Speed (mph)	Length of Acceleration Lane (ft)	Length of Deceleration Lane (ft)	Length of Taper (ft)
45	35	700	360	210
50	40	975	470	230
55	45	1400	595	250
60	50	1900	735	270

Source: TCRP.

Regarding bus stop signage, guidelines call for transit agencies and local and/or state jurisdictions to coordinate when deciding locations for bus stops and signposts. In some cases, a shared signpost can be used to reduce the number of obstructions in high pedestrian volume locations. Bus stop signs also are commonly located on a shelter or existing pole (such as a streetlight). The signs should not be obstructed by trees, buildings, or other signs. Bus stop sign posts that are not protected by a guardrail or other feature should be a break-away type to minimize injuries and vehicular damage, and to facilitate replacement of the post.

**Curbside Design:** This section provides information on how to choose bus stop locations and implement bus stop amenities. Areas of discussion include shelter design and placement, amenities, and enhancing bus patron comfort at bus stops.

For stops where customers are not expected to have long waits or where the number of customers is likely to be low, the guidelines acknowledge that amenities may not be cost effective. Agencies are encouraged to

partner with developers and landowners to coordinate facilities and create seamless and efficient points of access between adjacent land uses and bus stops. In considering when a bus shelter may be necessary, agencies may consider the characteristics listed in Table 3.5.

**Table 3.5 TCRP Guidelines on Factors that Might Necessitate a Shelter**

Curbside Characteristics	Passenger or Operational Characteristics
<ul style="list-style-type: none"> <li>• Availability of space to construct shelters and waiting areas.</li> <li>• Proximity to major activity centers.</li> <li>• Adjacent land use compatibility.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimated number of passenger boardings (this usually has the greatest influence; the guidelines recommend that in rural areas, 10 boardings per day justifies a shelter).</li> <li>• Frequency of service.</li> <li>• Number of transfers at a stop.</li> <li>• Number of elderly or physically challenged individuals in the area.</li> </ul>

The guide describes in detail considerations around location, materials, and design of a range of additional bus stop amenities, including informational signage, benches, and lighting. It lists key considerations for design and type of curbside amenities (Table 3.6). Though many of these are more relevant to urban stops with greater levels of traffic and infrastructure, some considerations may apply to the more rural transit stops that are the focus of this effort.

**Table 3.6 TCRP Guidelines on Considerations for Curbside Amenities**

Pedestrian-Oriented Characteristics	Other Environmental Characteristics
<ul style="list-style-type: none"> <li>• <b>Compatibility:</b> Bus stops should be located so as to limit conflicts with pedestrians and other activities.</li> <li>• <b>Direct Access to Bus Stop:</b> access to and from the bus stop is critical to the convenience of using transit.</li> <li>• <b>Proper Pedestrian Circulation:</b> Avoid locating stops near items that may restrict proper movement in and around a bus stop.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Impervious Ground Surfaces:</b> Avoid locating bus stops on exposed soil, grass, or uneven ground.</li> <li>• <b>Location Within the Community:</b> The location of the bus stop should be coordinated with the business community and neighborhood.</li> <li>• <b>Existing Street Furniture:</b> Selecting sites with existing street furniture can save the transit system money while providing patrons with amenities.</li> <li>• <b>Environmental Treatments:</b> Existing site conditions can be used to enhance the environmental comfort of a bus stop.</li> </ul>

**Impact of Buses on Highway Infrastructure: Case Study for New Jersey.** This research examines bus contribution to pavement damage and how this information might affect agency decision-making when choosing among different types of buses for procurement or type of transit service for a corridor. The degree of damage caused by a bus is a function of bus weight, pavement strength, and frequency of stopping. Overall, the research finds that the impact of buses stopping on highway shoulders may be trivial since buses represent a small portion of the total traffic volume.<sup>15</sup>

**New York City Bus Permitting.** New York City Department of Transportation (NYC DOT) is authorized by the New York State Legislature and Local Law to implement a Bus Stop Permit system for bus operators. This system requires owners or operators to apply for a permit from NYC DOT before they can make on-

<sup>15</sup> Maria Boilé, Preethi Narayanan, Kaan Ozbay, 2003. *Impact of Buses on Highway Infrastructure: Case Study for New Jersey State.* <https://doi.org/10.3141/1841-04>.

street stops in the City. Charter buses, school buses, buses licensed by NYC Taxi and Limousine Commission, MTA buses, and buses operating pursuant to a contract or franchise agreement with New York City do not need permits, but must follow all applicable rules and laws.

**Application:** Bus owners or operators are required to submit an application for each proposed bus stop location. The application must provide owner or operator information, including:

- Contact information.
- Federal and State Motor Carrier Identification Numbers for each bus.
- Sight-seeing bus company must provide Department of Consumer Affairs Number.
- Proposed bus stop location and two alternate locations.
- Schedule of bus service to and from proposed location(s).
- Proof of Insurance and Registration ID Cards.
- Planned route within, into, and out of New York City.
- Bus layover/storage location when not in operation.

**Application Review:** For each permit application, NYC DOT considers criteria such as: traffic and pedestrian flow, public health and safety, the preferences of the applicant, location of planned parking garage or other parking location during periods when the bus is not in operation and includes input from the Community Board and affected agencies. The permit approval process includes consultation with local community boards and other agencies such as the MTA and Port Authority of New York and New Jersey, where appropriate, ensuring the involvement of stakeholders in the process.

**Community Involvement:** The local community board is notified of permit applications and has a 45-day consultation period to offer input. There is no provision for community boards to appeal decisions. Approved bus stop locations will be published online within 30 days of approval.

**Fees:** For intercity buses, application fee varies based on number of trips or number of buses and the lowest fee will be charged to the permit holder. The fee is \$30 per scheduled pick-up or drop-off or \$275 per bus. Fee information will be provided once the requested stop is approved. Fee calculation is as follows:

$$((\text{Total number of weekly trips} \cdot \$30) / 12 \text{ months}) \cdot \text{number of months}$$

or

$$((\text{Total number of buses} \cdot \$275) / 12 \text{ months}) \cdot \text{number of months}$$

**Timeline:** The process of obtaining a permit can take up to 150 days for intercity buses and 180 days for other types of buses from the time that all of the required information is provided by an applicant to NYC DOT. Bus Stop Permits are issued for a period of up to three years.<sup>16</sup>

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<sup>16</sup> NYC DOT, n.d. *Bus Stop Permits*. <https://www1.nyc.gov/html/dot/html/ferrybus/intercity-bus.shtml>.

**Penalties:** Permit holders must follow all requirements established on the Bus Stop Permit and in all other applicable rules and laws. NYC DOT may revoke or suspend a Bus Stop Permit if any of the following occur:

- Bus is stopped without proper identifying markings.
- Bus is loading/unloading without a permit.
- Bus with a valid permit is stopping or standing in its assigned bus stop but is not actively engaged in the loading/unloading of passengers.
- Bus with a valid permit fails to prominently display a copy of its permit or a list of all Bus Stop Permits and specific bus stop locations as required by the NYC DOT rules.
- A permit holder alters its Bus Stop Permit.



## 4.0 Design Sprint

The effort to build the tools and processes necessary for a transit stop approval process centered on a three-day *design sprint*. A design sprint is a process originally devised in the software world that allows teams to build and test prototype solutions to problems in a compacted period. The design sprint process is highly structured; this effort aligned with the methodologies established in *The Design Sprint Book*.<sup>17</sup> Though design sprints are usually spread over a five-day period, the team decided that the scale of this problem could be managed through a somewhat condensed three-day schedule.

The sprint took place at NHDOT headquarters in June 2022. Over the course of the three days, participants defined a vision, challenges, and identified a target; storyboarded and discussed processes and tools to address the identified target; “tested” the selected prototype with NHDOT and transit agency staff outside of the sprint team; and defined roles and responsibilities moving forward. The team was able to generate in a matter of days a level of clarity and consensus that may have otherwise taken weeks or months of coordination discussions across bureaus and offices.

The subsequent sections describe key areas of discussion, exercises, and important decision points over the course of this effort.

### 4.1 Day 1—Key Challenges and Questions

The group began by establishing NHDOT’s goals for the sprint:

- **Focus on limited scope.** Participants agreed that the focus of the sprint should remain on projects that only involve the addition or upgrade of bus stops and are unrelated to a broader roadway redesign effort.
- **Ensure consistency, transparency, and usefulness of NHDOT process in DOT ROW.**
- **Balance safety with personal mobility.** The group agreed that it was important to find the safest way to provide the transit service to the traveling public. This implies a need to manage tradeoffs.
- **Flexibility in use.** The group also agreed that would be helpful but not a necessary outcome would be a process that could be repurposed as needed by municipalities.

#### 4.1.1 Key Challenges

The group next discussed existing challenges, including barriers to achieving a consistent process, main challenges in ensuring that the new process would be useful, and major gaps/issues with the status quo. Participants raised the following topics over the course of this wide-ranging discussion:

- **Balancing safety with mobility.** This was a consistent topic of discussion throughout the sprint. NHDOT staff and transit agencies recognize that not all transit stops, particularly those in rural areas, will have ideal safety conditions. At the same time, offering transit services to riders at these stops is an important consideration. Ultimately, this discussion led to the draft Policy Statement on the presumed right of transit to operate on DOT ROW, which is described in greater detail later in this section.

<sup>17</sup> Content from the book is available online at: <https://www.thesprintbook.com/the-design-sprint>.

- **Determining responsibilities and key points of contact.** Transit agencies feel there is a need for clarity on who to contact regarding transit stop needs and how long the approval process will take. This would also benefit NHDOT, because it would allow the agency to take a high-level look at the number of bureaus that are and should be included in the process. Over the course of this discussion, initial entities surfaced for involvement included: Rail and Transit, District, Traffic, Highway Design, Planning, Right-of-way, the Commissioner’s Office, and Finance.
- **Designing a process for different stop types.** Participants agreed that application and review requirements should be different for a simple new bus sign on an existing route indicating a stop versus designing a bus pull-off with a sidewalk and bus shelter. In the first example, transit agencies feel they are not requesting anything from NHDOT but permission, and should thus be subject to a simplified review process. Participants agreed that any process and application designed should account for the differing levels of complexity and evaluation rigor required for different stop types.
- **Establishing “thresholds” for different stop types.** Participants discussed how NHDOT and transit agencies might determine the appropriateness of a simple sign as a bus stop versus a pull-off or additional infrastructure. Initial qualities raised included roadway speed, ridership, distance to subsequent stops, and maintenance expectations. Overall, transit agencies need to know what NHDOT considers acceptable in specific contexts so that they can comply with expectations.
- **Determining/establishing standards and maintenance responsibilities for bus stops.** Participants agreed that the process should clearly establish stop maintenance responsibilities. They also discussed how to determine bus stop standards, and where the agency might look for inspiration in this effort. NHDOT’s existing driveway permit process emerged as one potential template.
- **Engaging with appropriate stakeholders.** In the case that a transit stop requires a sidewalk, for example, municipalities would need to be involved in the bus stop request process. Key questions raised included how and when these parties would be brought into a newly designed process.
- **Understanding how this process relates to the 10-year planning process.** In order to incorporate bus stops into design of corridor projects or other developments, transit agencies must be involved in processes early on. NHDOT staff also expressed that knowing about transit stop needs early could help incorporate stops into the 10-year planning process. At the same time, District Offices evaluating developer projects could keep transit in mind. The Design Sprint ultimately developed a “swim lane” designed for stops with more infrastructure requirements. However, this “transit-awareness” is an orientation that occurs at an institutional level.
- **Properly evaluating requests given existing data gaps.** The most fundamental of these gaps is that the Rail and Transit Bureau lacks a database of all transit stops in the State; they only have geographic data for transit route alignments. Developing a holistic inventory would allow NHDOT to better integrate transit stop considerations into its planning process, thereby solving some of the issues raised in the previous bullet point.

## Questions

Building on the discussion of challenges, the group raised key questions to answer over the course of the sprint in order to design a successful process (Table 4.1). Understandably, most of these questions focused

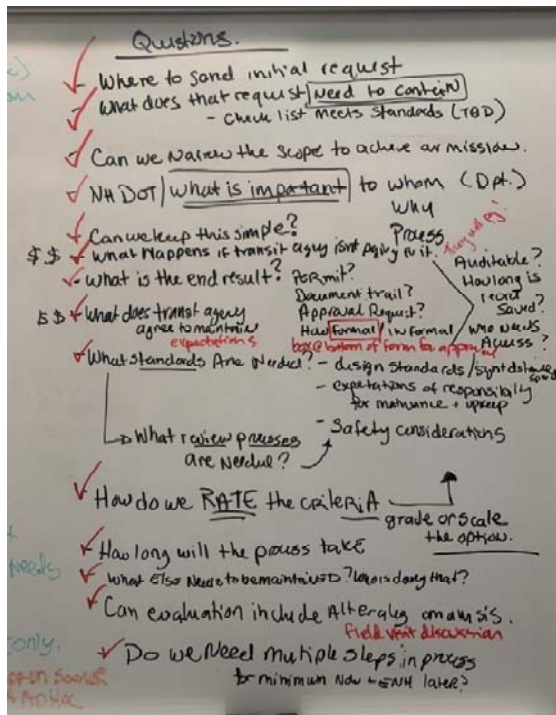
on the as-yet undefined components of this challenge within NHDOT: the process and mechanics involved in requesting and approving transit stops.

**Table 4.1 Summary of Key Questions Brainstorm**

Application and Evaluation Mechanics	Institutional and Process	Outreach and Communication
<ul style="list-style-type: none"> <li>Where do transit agencies send the initial request?</li> <li>What does this initial request need to contain?</li> <li>What standards (e.g., design standards, sight distance, maintenance and upkeep expectations, strategy) are needed?</li> <li>How do we rate any criteria that are developed?</li> <li>Can evaluation include an alternatives analysis?</li> </ul>	<ul style="list-style-type: none"> <li>Can we narrow the scope to achieve our mission? Can we keep it simple?</li> <li>What happens if the transit agency is not paying for the stop?</li> <li>Do we need multiple steps in the process?</li> <li>How long will the process take?</li> <li>What is the end result of this process? A permit? How formal or informal is this process?</li> </ul>	<ul style="list-style-type: none"> <li>What is important to whom, and why?</li> <li>What does the transit agency agree to maintain?</li> </ul>

By defining unknowns, these questions helped orient discussion throughout the course of the design sprint. On the final day of the sprint, the sprint team reviewed the questions to affirm that they had been addressed by the process/tool design; the red check marks in Figure 4.1 reflect this exercise. Ultimately, the form and process designed were able to answer every question.

**Figure 4.1 Key Questions**



**“How Might We?”**

The purpose of the next exercise was to frame the identified challenges and questions into opportunities. These opportunities could then serve as guidance and inspiration in subsequent sketching exercises. The starting point for this exercise was agreement on a shared “target,” which the consultant team offered: to identify, adapt, or develop tools to support review and approval of new transit stop requests from transit agencies. In design sprints, the target is the moment in a process that represents the greatest risk and/or opportunity for intervention.

In this exercise, participants were asked to capture “How might we?” questions on post-it notes shared on the board. Questions generally fell into four broad buckets: details of the request review and evaluation process itself; questions about coordination and responsibilities at an institutional level; approaches for engaging with appropriate parties in the process; and longer-term data gaps and needs (Table 4.2).

**Table 4.2 Summary of “How Might We...” Brainstorm**

Application and Evaluation Mechanics	Institutional and Process	Outreach and Communication	Data/Technology Goals and Needs
<ul style="list-style-type: none"> <li>• Develop design/safety criteria for transit stops?</li> <li>• Balance mobility needs with roadway safety?</li> <li>• Find safe locations for transit stops?</li> <li>• Establish minimum criteria for bus stops (shoulder width, speed, sight distance)?</li> <li>• Establish a timeline for the review process?</li> <li>• Develop a matrix/rubric to assess approval? (Safety, cost, mobility)</li> <li>• Develop a system “scoring sheet” to balance safety and mobility for all users?</li> <li>• Determine criteria for the transit stop depending upon where it is located (i.e., rural versus urban)?</li> <li>• Package needed information into an initial request?</li> <li>• Determine if transit stops should be relocated (or added, or removed)?</li> <li>• Consider alternatives to proposed stops (or upgrades)?</li> </ul>	<ul style="list-style-type: none"> <li>• Streamline review process, e.g., minimize # of DOT bureaus involved?</li> <li>• Minimize the need to rely on these applications in the future (via an inclusive planning process)?</li> <li>• Design a scalable review/approval process?</li> <li>• Implement a process within NHDOT that ensures the timely flow of application until approval or denial?</li> <li>• Determine who reviews/approves request?</li> <li>• Ensure that the process is only applied to new stops or upgraded stops and not all existing stops?</li> </ul>	<ul style="list-style-type: none"> <li>• Best explain the importance/need for a new stop or stop upgrade?</li> <li>• Leverage third parties (developers) to improve system of bus stops?</li> <li>• Ensure that the appropriate stakeholders are part of the “application” process?</li> <li>• Better work with public transit providers?</li> <li>• Balance “real” versus “perceived” concerns or issues?</li> </ul>	<ul style="list-style-type: none"> <li>• Collect and share GIS info on public transit stops and stops?</li> <li>• Use existing or new software to implement an approval process?</li> <li>• Track past stop approvals?</li> <li>• Track existing route ownership and stop locations?</li> <li>• Find out future transit needs?</li> </ul>

Understandably, most of the “How Might We...?” questions applied to the mechanics of the application and evaluation process. However, participants also raised several new opportunities. Several questions gestured at opportunities for better or more intentional communication with stakeholders, including transit agencies and municipalities. Other questions considered how a new process might feed into or help solve several existing data gaps in order to better inform planning processes in the future.

### Picking a Starting Point

The subsequent exercise asked participants to consider the discussion thus far and decide on the best point(s) of intervention. Consultant team synthesis of discussion yielded the following as a list of key questions and action items, and the sprint team agreed that these described the key tasks for the sprint ahead:

- What specific information needs to be discovered? Define standards.

- Who at DOT needs to initially review/subsequently review/approve?
- How are the criteria rated/graded/scaled? By whom? Will there be an alternatives analysis?
- What information does the transit agency need to provide/justify?
- What is the end product? How long does the record need to exist and who needs to see or access it?
- What feedback loops/follow-ups are needed?

These points were intended to synthesize the discussion at that point and focus the sprint team as they approached the sketching exercises.

## Outside Inspiration

In order to prepare for sketching, this exercise sought to offer peer practices as sources of inspiration. Participants were asked to arrive at the sprint with one or two examples in mind of how other states or agencies manage transit stop approval or highway access or what info/data would be important from you to review and consider stop locations.

The group discussed the processes of peer agencies VTrans and MaineDOT as well as examples of bus stop siting approval processes in Maryland, New York City, Portland, Oregon, Pennsylvania, and North Carolina. These processes offered a range of insights. In Pennsylvania and North Carolina, transit agencies are empowered to install stop signage independently; New York City requires an alternatives analysis. The Maryland DOT case offered an interesting example of a decision tree; this process is discussed in more detail in the Peer Agency Practices section of this memo. The group also discussed whether and how the processes used by municipalities for siting and designing stops within urban compacts might or might not offer a potential model. The group also noted the usefulness of a TCRP report *TCRP-19: Guidelines for the Location and Design of Bus Stops*, which is included in the Review of Literature section of this memo. The examples also offered an opportunity for reflection on what *not* to do; the group discussed the pitfalls of a process that is too complicated or takes too long to complete.

## 4.2 Day 2—Sketching Exercises and Tester Feedback

### 4.2.1 Sketching Exercises

During the sketching exercise, each member of the sprint team was charged with sketching out their idea for either a process for transit stop request evaluation and approval or for the physical forms that agencies might be required to submit under such a process. Participants took different approaches towards sketching; about half the group chose to design a physical form, complete with questions requesting specific project details or data, while others sketched out a draft process for transit stop approval. The transit agency participant listed every piece of data that would be collected on their sketch's suggested form.

Members of the sprint team then “voted” with stickers by marking any element of another person's sketch that they found compelling or interesting (Figure 4.2).



**Figure 4.2 Design Sprinters Review Peer Sketches**

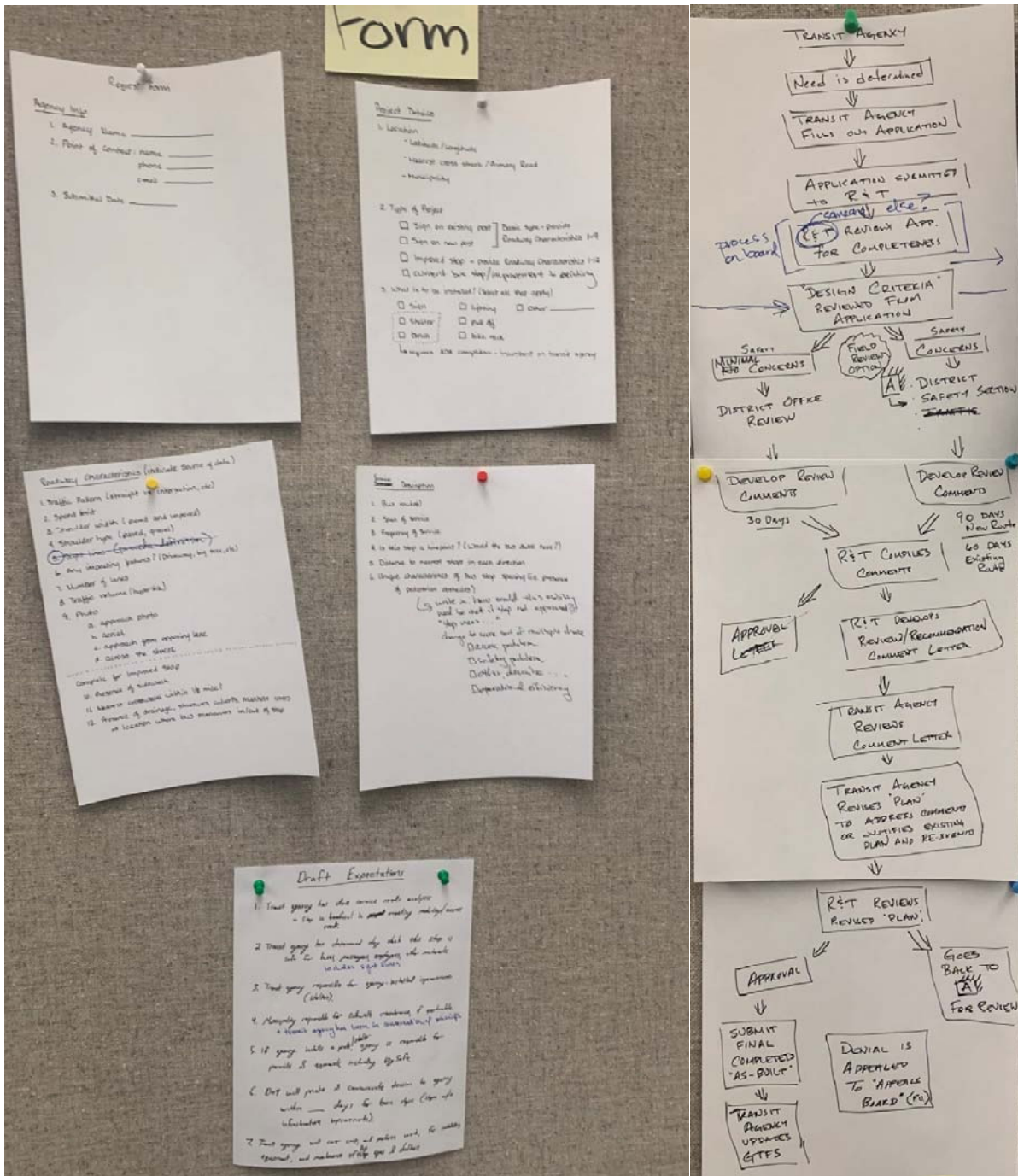
Following this process, the sprint team split into two groups to design draft forms and processes. These groups split off for an hour to integrate components of peer sketches into a draft product. This exercise yielded two results (Figure 4.2):

- **Draft Form.** The draft application form that emerged from this exercise was five pages and comprised several broad sections: transit agency information (agency name, point of contact, contact information), project details (specific location, project type, installation features), roadway characteristics (details on roadway characteristics, photos of the proposed location, and specific details only for improved stops), and service description (details on frequency and span of service as well as nearby stops).

An interesting innovation was inclusion of a “draft expectations” page that established NHDOT and transit agencies’ joint understanding of prior due diligence, maintenance responsibilities, and communication norms. The concept behind this page was to limit the amount of data transit agencies would be required to submit by asking agencies to affirm a certain level of prior analysis. This page formed the basis of the Policy Statement included in Appendix H.

- **Draft Process.** The draft process created two “swim lanes” for a transit stop requests based on safety implications. For all projects, transit agencies would submit a request form to the Rail and Transit Division, where it would be reviewed for completeness. For a project with no safety concerns, requests would subsequently be routed directly to the relevant District Office for review. Projects with safety concerns would be routed to the District Office and Safety Section, who would conduct a joint field visit to assess needs and make recommendations for safety improvements. The Rail and Transit Division would then be responsible for compiling District Office and Rail and Transit comments (for minimal safety concern stops) or compiling those comments with those of the Safety Section (for safety concern stops) and returning them to the transit agency for comment. As needed, the transit agency would revise the plan and resubmit to the Rail and Transit Division.

Figure 4.3 Draft Products—Form and Process



### Testing the Prototypes

The draft initial prototypes reviewed by “testers.” This tester group did not attend the entire sprint; rather, their role was to join for a short period midway through the sprint to offer fresh eyes/feedback on preliminary products. NHDOT designed the tester group to cover a range of potential levels of involvement in the new approval process, and for experience in safety in particular. This group was comprised of the following members:

- Sally Gunn, Senior Safety Engineer, Safety Section of Project Development Bureau.
- Bill Lambert, Administrator/Traffic Engineer, Traffic Bureau.
- Brian Schutt, District 6 Engineer, Highway Maintenance Bureau.
- Terri Paige, Director of Transportation, Community Action Program, Belknap & Merrimack Counties, Inc. (CAPBMCI).

Discussion indicated that testers had few issues with the proposed process flow. As expected, the testers were highly attuned to safety concerns. Testers affirmed that the three qualities most likely to help make safety determination were traffic volume, roadway/shoulder width, and speed limits, which were all data requested in the draft form. Testers raised the idea of ridership as a potential additional factor, but sprint participants noted that the group had considered this factor and ultimately decided to add it to the “affirmation” step instead as it would be part of transit agencies’ service planning evaluation. Testers from the Traffic Bureau and Safety Section in particular were concerned that stops be evaluated for crosswalks, raising the “mobility versus safety” discussion from earlier in the sprint. COAST noted that a “simple stop is safer than no stop at all” in many cases.

CAPBMCI’s comments were important in clarifying the types of information that might be too burdensome for a small transit agency to collect. This tester noted that road and shoulder width could be challenging for smaller agencies to provide. After some discussion, the group decided that Google Maps would be appropriate to use to measure these dimensional questions, but that we should add a “source data” field to the form so NHDOT knows where info came from (e.g., a “field visit” versus “Google Maps”). The group agreed that it would be helpful to collect additional feedback from testers once a draft form had been designed in order to determine whether the form contained any requests of this nature.

### 4.3 Day 3—Prototype Refinement and Next Steps

On the final day of the design sprint, participants worked together to answer outstanding questions raised during the previous day, establish next steps, and define roles and responsibilities. The team also cross-checked emerging concepts against top existing challenges and determined whether the outputs flowed from the sprint mission established on Day 1.

#### Screening Tool

Discussion of the proposed process indicated the need for a screening tool to identify basic stops with minimal safety concerns that could be “fast-tracked” for approval. The goal in developing a screening tool was to identify proposed stop locations with minimal safety concerns or infrastructure needs that transit agencies could expect to be speedily approved if they met identified thresholds. The group arrived at three qualities for characterizing such a stop location, based on tester feedback Day 2:

- **Shoulder width:** If shoulder width is **6 feet or more**, the stop can be tracked for fast approval. If not, the stop must meet one of the subsequent two qualifications.
- **Speed limit:** If the speed limit is under **50 miles per hour**, the stop can be routed for fast approval. If not, it will receive enhanced review.



- **Traffic volume:** If the traffic volume is less than **20,000 ADT**, the stop can be routed for fast approval. If not, it will receive enhanced review.

These thresholds, and the review types that would result from different combinations, are represented in Table 4.3.

**Table 4.3 Screening Tool Overview**

Stop Location Qualities	Review Type
Shoulder width > 6 feet.	Fast approval
Shoulder width < 6 feet and both: 1. Speed limit < 50 mph. 2. Traffic volume < 20,000 ADT.	Fast approval
Shoulder width < 6 feet and only one of the following: 1. Speed limit < 50 mph. 2. Traffic volume > 20,000 ADT.	Enhanced review

### Discussion and Action Items

Discussion on the final day of the sprint was designed to allow participants to reflect on any outstanding items from the previous day’s discussion.

- **Enhanced versus fast review components.** Key components of both types of review remained undefined at the end of Day 2. Given the safety concerns raised by testers on Day 2, the group decided that enhanced review should involve a field visit with Maintenance, Safety, and transit agency representatives. Including both Safety Section and transit agency representatives was an approach conceived to help achieve the goal established at the beginning of the sprint of finding a balance of safety and mobility.
- **Need for a policy element.** It became clear over the course of the sprint that the fast approval process would be impossible to achieve without the support of a policy explicitly affirming the right of DOTs to install bus stops supporting their transit services along the DOT ROW.
- **Additional direction for reviewers.** The discussion surrounding prototype testing highlighted a need to proscribe specific stop components for review by the various parties in the new workflow. For example, reviewers in the safety section would need to limit their review to vehicle, rather than pedestrian, movement.
- **Need for better data collection and management.** NHDOT would benefit from a reliable inventory of transit stops in the state. Though outside the scope of this project, participants agreed that this process should feed into an effort to add stops to a database so that the agency can maintain a shapefile with information on stop locations. This would assist NHDOT in coordinating transit stops with the project development and long-range planning processes.

The group also agreed on a set of action items intended to begin the process of formalizing and institutionalizing the process designed. Table 4.4 summarizes action items.

**Table 4.4 Summary of Design Sprint Action Items**

NHDOT	Consultant Team
<ul style="list-style-type: none"> <li>• Develop policy language for submission and approval to the Commissioner.</li> <li>• Develop digital version of process flow.</li> <li>• Test screening criteria with sample COAST stops.</li> </ul>	<ul style="list-style-type: none"> <li>• Create fillable form and draft instructions.</li> <li>• User experience (UX)/User interface (UI) analysis of NH's traffic volume interface.</li> <li>• Follow up with testers as additional materials are developed.</li> </ul>

## 5.0 Next Steps

This section provides an overview of the status to date of sprint follow-up actions.

- **Test screening criteria with sample COAST stops.** This exercise is complete. Testing the criteria against sample stop locations clarified some outstanding decisions requiring NHDOT’s attention (e.g., establishing a shoulder minimum width for “fast track” approval) and identified a detail that should always be a part of the initial stop request (i.e., whether the application is for a new or upgraded stop).
- **Design sprint “tester” follow-up.** NHDOT intends to re-engage the testers upon further refinement of the transit stop approval process.

This report’s Appendices include draft content developed following the design sprint. Table 5.1 summarizes these products and the next steps required to transition these products from draft to final outputs.

**Table 5.1 Design Sprint Outputs**

Description	Responsibility	Report Section	Notes and Next Steps
Process flow diagram	NHDOT	Appendix F	Under internal NHDOT review.
Fillable form with and instructions	Consultant	Appendix G	To be reviewed by NHDOT in consultation with transit agencies.
Policy language	Consultant	Appendix H	To be submitted for approval to NHDOT’s Commissioner.
UI/UX Analysis	Consultant	Appendix I	Consider making several UI/UX changes to facilitate data access.



## Appendix A. Interview Guide

### A.1 Role

Describe your role in the process to approve, install, or maintain transit stops in the [NH, VT, ME]DOT ROW. *(Who do you report to? What are you required to review?)*

What other entities/departments/offices in or outside of your organization are involved?

Major decision points—what decisions are you required to make throughout the process? *(What is the basis for this? Are these asks consistent, or ad hoc?)*

### A.2 Current Process

Which parts of [New Hampshire, Vermont, Maine]’s current, ad hoc process are or are not working?

What does or does not work?

What is getting done that does not need to be? What is not getting done that needs to be?

Are there elements we want to carry forward in reengineering the process?

Can you discuss a specific time or edge case where the current process failed to meet its goals?

What are the most important considerations in this process? *(Whose interests are being included/considered advocated for? Whose are not?)*

Are there stops that might be successful in practice that you think the current process does not allow for, or are not submitted because of the process? Are there stops that should not be allowed that make it through?

Are there any other DOT processes or systems that would be useful to learn from or build on? *(Promise system for project management, driveway permitting, etc.)*

What are qualities unique to New Hampshire’s transit network that we should keep in mind in rethinking this process?

Are there any legal considerations we should be aware of?

How many stops are “signs in ground” versus shelters? What are the differences in the process to manage installation of one versus the other? *(Do transit providers invoice for both?)*

How is it decided who pays for an amenity? What would NHDOT prefer?

## A.3 Future Process

What do you think should be the most important variables in considering whether a location receives a new transit stop?

Can you describe an effective bus stop in a state-owned ROW from the passenger's experience? (*The transit operator? The agency? The State DOT?*)

What would you need to do to make this happen?

## Appendix B. Transit Agency Interview Guide

### B.1 Current Process

Describe your current planning process for determining route/transit stop locations for your service. Is it formalized or conducted on a case-by-case basis? What usually necessitates a new stop?

What level of involvement do you have with different state entities (RPCs, NHDOT bureaus)?

What are the issues you see in the current ad hoc system for transit stop requests? Are there any benefits to the current ad hoc system?

What are some specific variables that determine the location of stops? Some variables the DOT are curious about on their end: access facilities to the stop, nearby developments that support the stop, ADA accessibility and lift deployment, safety of road and transit users, exiting and reentering the traffic, signage, and rider comfort.

How does the agency handle safety and liability concerns at stops?

### B.2 Future Process

If we were to think about developing a more formalized process for applying for these stops—what would be key features for you? What would an ideal process look like? What would a reasonable process look like?

What is the typical lifetime of a stop? What would be the max lead time that would be acceptable from request to stop installation? Would the agency ever make requests to vet future stop locations?

Are there any current processes that would be useful as a model for a possible application? What would be the preferred venue for long term coordination of stop/route extensions?

Do you or the RPCs have GIS files detailing stop locations? How difficult would it be to create these?

Are there other solutions to this issue? Flag-stops for instance or relocating stops out of the DOT ROW?





# Appendix C. VTrans State Highway Access and Work (Section 1111) Permit

Applicant to Complete

PERMIT ID# \_\_\_\_\_

FOR AGENCY USE ONLY

Town: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Mile Marker: \_\_\_\_\_  
 Log Station: \_\_\_\_\_

**VERMONT AGENCY OF TRANSPORTATION  
 State Highway Access and Work Permit**

Owner's/Applicant's Name, Address, E-mail & Phone No. \_\_\_\_\_

Co-Applicant's Name, Address, E-mail & Phone No. (if different from above) \_\_\_\_\_

The location of work (town, highway route, distance to nearest mile marker or intersection & which side) \_\_\_\_\_

Description of work to be performed in the highway right-of-way (attach plan) \_\_\_\_\_

Property Deed Reference Book: \_\_\_\_\_ Page: \_\_\_\_\_ (only required for Permit Application for access)

Fee \$ \_\_\_\_\_ (fees do not apply for residential or agricultural purposes)

Is a Zoning Permit required? Yes  No  - If Yes, # \_\_\_\_\_

Is a 30 VSA § 248 permit required? Yes  No  - If Yes, # \_\_\_\_\_

Is an Act 250 permit required? Yes  No  - If Yes, # \_\_\_\_\_

Other permit(s) required? Yes  No  - If Yes, name and # of each \_\_\_\_\_

Date applicant expects work to begin \_\_\_\_\_ 20\_\_

Owner/Applicant: \_\_\_\_\_ Position Title: \_\_\_\_\_

(Print name above)

Sign in Shaded area:		Date:	
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Co-Applicant: \_\_\_\_\_ Position Title: \_\_\_\_\_

(Print name above)

Sign in Shaded area:		Date:	
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**INSTRUCTIONS:** -Contact the Development Review and Permitting Services Section (802,636,0037) or your local area Transportation Maintenance District Office to determine your issuing authority. The issuing authority will determine what plans, fee and other documents are required to be submitted with your Vermont Statutes Annotated, Title 19, Section 1111, permit application request.

**- Original signatures are required on an original Form. The Owner/Applicant and Co-Applicant (if applicable) declares under the pains and penalty of perjury that all information provided on this form and submitted attachments are to the best of their knowledge true and complete.**

**FEE:** -See **Fee Schedule** for applicable administrative processing and application review fee.

**PERMIT APPROVAL**

The work is subject to the restrictions and conditions on the reverse page, plus the Special Conditions stated on the attached page(s).

Date work is to be completed \_\_\_\_\_ Date work accepted: \_\_\_\_\_

By \_\_\_\_\_ Issued Date \_\_\_\_\_ By: \_\_\_\_\_ DTA or Designee

Authorized Representative for Secretary of Transportation



# Appendix D. MaineDOT Highway Opening Application

## Maine Department of Transportation Highway Opening Application

<b>Applicant Information:</b>		Date:
Name:	Phone:	Pager/Cell:
Address:	Town:	State: ZIP:

<b>Primary Contact Information:</b> <i>(Write "SAME" if the primary contact for on-site work will be the Applicant)</i>			
Name:	Phone:	Pager/Cell:	
Address:	Town:	State:	ZIP:

<b>Proposed Work Information:</b>		Highway Number (if known):
Town:	Road Name:	
Type of Work Proposed:	*Please attach a sketch plan*	
Who will perform the work?		
Anticipated work schedule:	Starting Date:	Completion Date:
If this work is for a utility, has an application for a <i>Utility Location Permit</i> been submitted? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Is this work intended to be performed under the Funding Agency Addendum requirements? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Have all existing utilities in the work area been notified of the proposed work and given an opportunity to comment? <input type="checkbox"/> Yes <input type="checkbox"/> No		
GPS Coordinates of Work Location: (Please enter coordinates in Decimal Degrees, WGS 1984)		
	Latitude (ex: 44.3074199)	Longitude (ex: -69.7775613)
Starting Point:		
Ending Point:		

<b>Impact &amp; Fee Information:</b>			
<i>Surface Type:</i>	<i>(A) Unit Cost:</i>	<i>(B) Estimated Area</i>	<i>Impact Value (A)x(B)</i>
<b>Paved Surface:</b> Bituminous Concrete or treated surface/shoulders <i>(Min. fee \$50, see below)</i>	\$50.00 per Sq. Yard	Sq. Yard(s)	\$
<b>Concrete Surface:</b> Portland Cement Concrete or Bituminous on concrete. <i>(Min. fee \$75, see below)</i>	\$75 per Sq. Yard	Sq. Yard(s)	\$
<b>All Other Surfaces:</b> Plain gravel surface or shoulder or area outside roadbed. <i>(Min. fee \$25, see below)</i>	\$5.00 per Sq. Yard	Sq. Yard(s)	\$
<b>Direct Buried Cable:</b> (Low-impact installation of cable outside of the traveled way/shoulder)	\$0.20 per Lineal Foot	Lineal Feet	\$
Other Work in addition to replacing pavement (Specify)			\$

<b>Total Impact Value</b> (Sum of all Impact Values)	\$
<b>Permit Fee</b> (10% of Total Impact Value, OR, if the calculated Permit Fee is less than the highest minimum fee specified above for the surface type impacted, than the highest applicable minimum fee shall be used. (Example: if you impact a paved and a non-paved surface, the applicable minimum fee is \$50).)	\$

**Instructions for Payment:**

**If you are a licensed utility, a municipality or any other governmental entity AND the TOTAL IMPACT VALUE calculated above is \$5,000 or less,** please include payment in the amount of the Permit Fee with this application, made out to *Treasurer, State of Maine.*

**If you are NOT a licensed utility, a municipality or any other governmental entity, AND the TOTAL IMPACT VALUE calculated above is \$2,500 or less,** AND you will not be impacting the paved or concrete surface of the highway, please include payment in the amount of the Permit Fee with this application. If you ARE proposing to impact the paved or concrete surface of the highway, please include payment in the amount of the TOTAL IMPACT VALUE and all but 10% will be returned to you upon satisfactory completion of the work.

**If the TOTAL IMPACT VALUE exceeds \$5,000 for licensed utilities, municipalities or other governmental entities, OR \$2,500 for all other applicants,** a *SPECIAL OPENING PERMIT* as described in section II E of the *Rules, Regulations and Policies* shall also apply. In this circumstance, an escrow account will be established and there is no direct payment submitted with this application.

**Do you request refund of the entire permit fee contingent on a full width overlay per Section II, A. of the Special Opening Permits?**

**NOTICE TO APPLICANT:** the Applicant is hereby notified that, upon approval of this application, all work shall comply with the following requirements, as applicable: (1) all conditions specified in the Highway Opening Permit; (2) the Department's Highway Opening Rules, Regulations and Policies; (3) the Department's Utility Accommodation Rule (17-229 CMR 210); (4) all conditions of a Utility Location Permit issued pursuant to 17-229 CMR 210; and (5) local ordinances and federal and state laws. In the event of a conflict between any applicable requirements, the more stringent requirement shall govern unless otherwise directed by the Department. Specific attention is directed to the following requirements: (1) Work zone traffic control standards as defined by the Manual on Uniform Traffic Control Devices (MUTCD); (2) Occupational Safety & Health Administration (OSHA) trenching and excavation standards; and (3) 23 MRSA Section 3360-A. Protection of Underground Facilities (a.k.a. "The Dig Safe® Law") which requires notification to various entities at least three working days prior to making any excavation. Additional information may be found at: <http://muted.fhwa.dot.gov>, <http://www.osha.gov/SLTC/trenchingexcavation/>, and [www.digsafe.com](http://www.digsafe.com) respectively. **The applicant further agrees that, upon approval and issuance of a permit, the Department will be notified at least 48 hours in advance of the start of any work.** The Applicant shall be responsible for all final restoration of the affected area to the satisfaction of the Department of Transportation.

Applicant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Version 0721



## Appendix E. Design Sprint Agenda

### Day 1—June 6, 2022, 1:00 p.m.–4:30 p.m. | Establishing Mission + Targets

#### 1:00–1:15. Introductions and overview of the week:

- Review approach and logistics for the workshop and set the stage for the week.

#### 1:15–1:45. Review the Mission:

- **Mission:** Ensure consistency, transparency, and usefulness of NHDOT processes surrounding transit stops in the DOT-maintained ROW.
- Defining target scenarios: discuss examples of how transit agencies currently request stops.

- **Discussion:**

Existing challenges: What are the barriers to achieving a consistent process? What are the main challenges in ensuring that the new process is useful? What are the major gaps/issues with the status quo?

Acknowledge relationship of this process with larger project development/10-year plan and maintenance processes.

What questions do we need to answer during this sprint in order to achieve our mission?

What are NHDOT's primary goals for the placement/location of transit stops? (e.g., safety, cost-effectiveness, system efficiency, personal mobility)

#### 2:00–3:30. Visualize the challenge:

- **Target:** Identify, adapt, or develop tools to support review and approval of new transit stop requests from transit agencies. In design sprints, the target is the moment in a process that represents the greatest risk and/or opportunity for intervention.

- **Brainstorming exercise:**

Capture “How might we?” questions on post-it notes to frame challenges into opportunities for guidance and inspiration for sketching.

Potential questions: How might we advance public safety through a transit stop approval process? How might we support the needs of transit agencies in this process? How might we support the needs of transit riders in this process? How might we enhance NH's transportation network? How might we collect better information about transit stop locations and conditions? How might we better coordinate maintenance agreements?

- **Discussion:** Picking a starting point.

At what point in a new transit stop approval/implementation would it be most useful to intervene?

**3:30–4:30. Lightning demos or “dream kitchen ideas” for target:**

- Quickly share inspiration from outside sources.
- **Discussion:** What types of tool (or tools) would NHDOT or transit agencies need in order to successfully (i.e., appropriately, consistently, efficiently, effectively) manage this process?

*By the end of Day 1, we will have visualized what success means. The group will have agreed on a point (or points) of intervention in the transit stop approval process. Each person has begun to consider solution sketches for tools to support the process.*

## Day 2: June 7, 2022, 9:00 a.m.–3:30 p.m. | Sketching Exercises

**9:00–10:30. Four step sketch for the target:**

- Explain the four-step sketch process: Notes; Ideas; Crazy 8s; Solution Sketch.
- Everyone sketches their own concept for a tool supporting the new NHDOT process (facilitator monitors progress and helps where needed).

**10:30–10:45. Break.**

**10:45–12:15. Sticky decision:**

- Art museum/heat map: post the sketches on the wall; people review the sketches silently and post small dots next to the aspects of the design that they like.
- Speed critique: three minutes per sketch; the group discusses the highlights of each solution; stand out ideas and important objections are noted. Only THEN can the owner of the sketch comment/provide feedback/point out missed elements.
- Straw poll: Informal vote on favorite sketch.

**12:15–1:00. Break for lunch (provided).**

**1:00–2:00. Sticky decision continued—pick an emerging sketch (or two).**

Divide winning sketches from the “maybe later’s”; decide if there is an emerging prototype sketch. (Use Note and Vote and/or Rumble techniques to narrow down to a winning sketch. Save the other good ideas).

**2:00–3:30 Refine emerging sketches.**

Discuss responsibilities and tools (e.g., forms or online tools) required to support the emerging structure will operate, what topics emerge around workflow?

What needs have emerged that are in line with winning sketches? (Identify and discuss or save for discussion Day 3.)

Cross check the winning sketch(es) against the sprint questions and “How Might We” notes.

### **3:30–4:30. Feedback from “testers.”**

- Meet with group of “testers” to generate feedback on the emerging prototype for first target.
- Basic questions for testers: Does the process and/or tool prototype make sense? Is anything missing? Does this surface any questions for the sprint team?

*Success at the end of Day 2 means achieving one or more sketches of required tool(s) to support NHDOT in managing a transit stop approval process.*

## **Day 3: 9:00 a.m.–1:00 p.m. | Stitching it all Together**

### **9:00–10:00. Aligning staff to support the workflow.**

- Which staff are needed to support the emerging workflow? (Use ‘note and vote’ technique using heat mapping to determine needs/wants/neither need nor want.)

### **10:00–10:15. Break.**

### **10:15–12:15. Small group discussion/recommendations.**

- Divide in two small groups and come up with recommendations.

**Group 1:** Shelley Winters, Bureau of Rail & Transit (Decider); Bill Oldenburg, Commissioner’s Office (Policy); Lynne York, Bureau of Finance & Contracts (Eligibility).

**Group 2:** Fred Butler, NHDOT Bureau of Rail & Transit (SME); Roger Appleton, NHDOT Highway Maintenance (Facilities); Michael Williams, COAST (Service).

- Cross check against recommendations/suggestions/observations made on days 1 and 2.
- As a group decide on best next steps for these recommendations. Identify who might own the next step and timeline.

### **12:15–1:15 Stitching it all together and next steps.**

Revisit the products of the target 1 and tighten it up / rewrite or sketch as needed to ensure a transferable format.

Reality check: Cross check emerging concepts against top existing challenges.

Identify next steps and items requiring additional follow up.

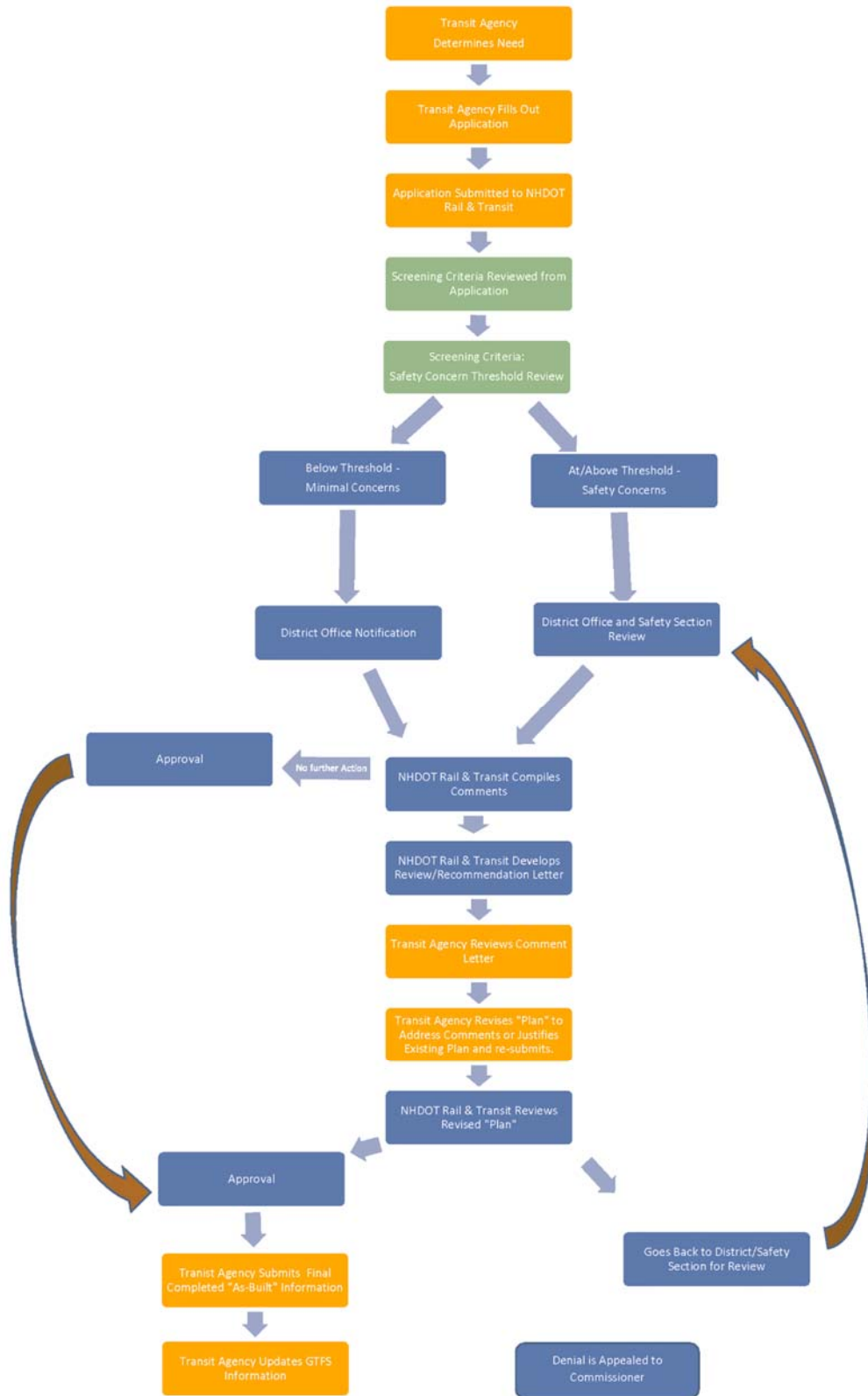
Check to make sure everything flows from mission and that we have agreement on next steps.

*Success at the end of Day 3 means agreement that there is a tool or set of tools capable of addressing the Target. If this is a new tool, the group has developed a basic prototype and established a workflow for utilizing the tool. There is agreement on key responsibilities and next steps required to implement the process/tool and identified workflow.*





# Appendix F. Draft Transit Stop Approval Process





## Appendix G. Draft Transit Stop Request Form

### G.1 Transit Stop Installation or Improvement Request Form

#### How to use this document

The purpose of this form is to collect information that will help NHDOT evaluate requests for new transit stops or transit stop upgrades in the DOT right-of-way. This form is not intended for use with stops with infrastructure components that require roadway interventions.

#### Instructions:

- Attach the 3 following photos to your submission: aerial view of the site, approach lane view of the site, and opposing lane view of the site.

Section B2 (“Project Type”) defines requests as “basic” or “stop with infrastructure” requests. If you are applying for a stop with infrastructure, you must fill out all sections including **Section 1**. You can find information on traffic volume at your proposed stop location using the NHDOT Transportation Data Management System tool.

**\*Fill out for stop with infrastructure requests ONLY\*** If you are applying for a basic stop, you may omit **Section 1**. You can find information on traffic volume at your proposed stop location using the NHDOT Transportation Data Management System tool.

- **\*Fill out for stop with infrastructure requests ONLY\***
- Questions? Contact Fred Butler, NHDOT Public Transportation Administrator, at 603-271-2565 or

#### A. Contact Information

1. Agency Name:	<input type="text"/>	2. Date:	<input type="text"/>
3. Contact Name:	<input type="text"/>	4. Job Title:	<input type="text"/>
5. Office Address:	<input type="text"/>		
6. Email:	<input type="text"/>	7. Phone:	<input type="text"/>

## B. Project Location

1. Nearest Municipality:	<input type="text"/>	2. County:	<input type="text"/>
3. Latitude: <sup>1</sup>	<input type="text"/>	4. Longitude:	<input type="text"/>
5. Primary Road:	<input type="text"/>	6. Nearest Cross Street:	<input type="text"/>

<sup>1</sup> [Google Maps](https://support.google.com/maps/answer/18539?hl=en&co=GENIE.Platform%3DDesktop) is one simple way to determine latitude and longitude of the stop location: <https://support.google.com/maps/answer/18539?hl=en&co=GENIE.Platform%3DDesktop>.

## C. Project Type

1. What type of stop is being requested? (Select one)

<b>Basic Stop</b>	<input type="checkbox"/> Sign on Existing Post	<input type="checkbox"/> Sign on New Post
<b>Stop with infrastructure</b>	<input type="checkbox"/> Infrastructure with little/no roadway impacts	<input type="checkbox"/> Infrastructure with roadway impacts

2. What is to be installed? (Select all that apply)

Sign  
  Shelter  
  Bench  
  Lighting  
  Pull-off  
  Bike Rack

Other (describe below)

## D. Site Characteristics

1. Speed limit (mph):	<input type="text"/>	2. Shoulder width (ft):	<input type="text"/>
3. Shoulder type:	<input type="checkbox"/> Paved	<input type="checkbox"/> Gravel	<input type="checkbox"/> Other
4. Number of lanes:	<input type="text"/>	5. Traffic volume (AADT): <sup>1</sup>	<input type="text"/>
6. Traffic pattern (describe):	<input type="text"/>		
7. Any other impacting features (describe):	<input type="text"/>		

<sup>1</sup> You can find information on traffic volume at your proposed stop location using the [NHDOT Transportation Data Management System tool](#).

### **\*Fill out for stop with infrastructure requests ONLY\***

	Check if condition applies
8. Presence of sidewalk access to bus stop.	<input type="checkbox"/>
9. Nearest crosswalk is within 1/8 mile of bus stop.	<input type="checkbox"/>
10. Presence of drainage structures, culverts, or manhole covers at location where bus maneuvers in/out of stop.	<input type="checkbox"/>

## E. Service Description

1. Bus route(s):	<input type="text"/>		
2. Span of service:	<input type="text"/>	3. Frequency of service	<input type="text"/>
4. Distance to next stop:	<input type="text"/>	5. Distance to previous stop:	<input type="text"/>
6. Unique characteristics of bus stop spacing (describe)	<input type="text"/>		
7. What needs does this stop address? (Select all that apply)			
<input type="checkbox"/> Access	<input type="checkbox"/> Safety	<input type="checkbox"/> Transit agency operational efficiency	<input type="checkbox"/> Other (describe below)
<input type="text"/>			

## Appendix H. Draft Policy Statement

### **Draft List of Presumptions, Assumptions, and Expectations Transit Stops in DOT ROW Project—Policy Piece**

The process described in this policy statement is designed to ensure consistency, transparency, and usefulness of NHDOT's approval of transit stops in the DOT ROW. The following statements seek to align expectations on the purpose of this process, roles and responsibilities, and transit's role in the state more broadly.

#### H.1 Transit in New Hampshire ...

- Has a presumed right to pick up and drop off passengers on roadways where pedestrian access also is permitted.

#### H.2 This screening tool/process is ...

- Focused on bus movements; it is not intended to address pedestrian actions before or after using public transit.
- Intended to address only requests for new stop locations or for existing stop locations that require amenity improvements. Older stops will be “grandfathered” in.
- Not intended to address stops that involve a roadway redesign effort. More complicated stops will be included in the 10-Year Plan or as part of a corridor project.

#### H.3 Transit agencies will ...

- Be responsible for funding, installing, maintaining, and obtaining permits/dig safe (in the case of pole/shelter installation) for new stops or stop improvements through this approval process.
- Conduct a services needs analysis and determine that the stop request is safe and advances mobility and/or access prior to submitting a request.
- Be in conversation with any relevant municipalities, especially if sidewalk maintenance is required.





## Appendix I. UI/UX Analysis

This section provides an overview of NHDOT's [Transportation Data Management System tool](#) for user interface (UI) and user experience (UX) qualities. This analysis is intended to inform an understanding of the supports transit agencies may require and/or system improvements NHDOT could make to better enable transit agencies to access and use the data as part of the new transit stop request form.

The sections below summarize UI/UX observations by two categories: search function and general comments.

### I.1 Search Function

- Fields in the search form do not populate the dropdown menu until users begin to type, and only then if the letter typed matches the first letter of an available option. Options should be visible as soon as the field has been focused.
- It is unclear what the “Location ID” field is asking for. The field should offer additional description of the information requested in this field or the field should be renamed for clarity.
- The “Locate Selected Community” and “Locate Selected County” icons should be disabled until the user completes those fields. This would help make clearer the user what these icons do (e.g., to locate the county selected by the user).
- There is no clear way to return to the Quick Search form from the search results. The user can return to the Quick Search by clicking “Home,” but this is not intuitive. It would be clearer if search results appeared in a new Search Results tab.
- There is a lag between pressing “Search” and results loading, and it is not clear that anything is occurring. It would be clearer to add a message or icon indicating that the results are loading.
- NHDOT may wish to consider whether it is necessary to offer the “Quick Search,” “Advanced Search,” and “Build Search” options. At least two of these might be able to be combined.
- It is unclear what the “Locate” and “Locate All” tabs do, particularly because they are sited in the navigation pane. These tabs could be labeled more clearly or perhaps grouped with other buttons and tools over the map.

### I.2 General User Interface (UI)

- The UI is somewhat cramped; white space between elements and consistent spacing would improve this. Type face and font size should be consistent.
- The UI is overly tabular; NHDOT may wish to consider whether some elements might be easier to use/read broken out of a table format, particularly the forms.
- The top navigation tabs could make clearer which is the active page; currently, “Home” appears to be active regardless of stage in the search process.

- There are two sets of “Tools”: the “Tools” box in the upper right of the map and the “Tools” tab in the left-hand panel. This could be clarified by renaming the map box “Map Settings.”
- The “Tools” tab contains only a link, and clicking that link replaces the left-hand panel with a “Build Search” form. The build search function should be visible only within the tab, and the tab could be called “Build Search” given that this is the only tool within the tab.
- The position, ruler, and print buttons on the map are small and challenging to read. These tools could be larger and/or grouped with other elements.