

Connected Vehicle Pilot Deployment Program Independent Evaluation

Stakeholder Acceptance Evaluation Plan

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16. Abstract This document describes the approach to be taken by the Texas A&M Transportation Institute Connected Vehicle Pilot Deployment (CVPD) Evaluation Team, the Independent Evaluator of the Connected Vehicle Pilot Deployments, for assessing stakeholder acceptance/satisfaction associated with the CV Pilot Deployments. For the purposes of this document, a stakeholder is defined as those entities/agencies that are directly responsible of planning, designing, operating, and/or maintaining the systems or technologies associated with deployment or that financially or institutionally influence the decision making and sustainability of the deployment. The stakeholder evaluation is the plan that describes how the three CVPDs in New York City, Tampa, and Wyoming achieved the vision, goals, and desired mobility, environmental, and public agency efficiency impacts. The type of information gathered from stakeholders will include observations and experiences pertaining to technical challenges, adopted solutions, and lessons learned associated with deploying CV technologies at each sties. The results from the stakeholder assessment will be used to assess the long-term sustainability of the connected vehicle (CV) deployed applications as well as provide lessons learned to other entities seeking to deploy CV applications			
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Chapter 1. Introduction

The purpose of the stakeholder evaluation is to gather information to assess whether and how the three Connected Vehicles Pilot Deployments (CVPDs) in New York City (NYC), Tampa, and Wyoming achieved the vision, goals, and desired mobility, environmental, and public agency efficiency (MEP) impacts. In addition, the information gathered from stakeholders will include observations and experiences pertaining to anticipated or potential challenges (e.g., technical, institutional, financial), adopted solutions, and lessons learned. The results will be of benefit to the long-term sustainability of the connected vehicle (CV) deployed applications as well as to other entities seeking to deploy CV applications.

The stakeholder acceptance/satisfaction data collection will include both qualitative and quantitative methods: qualitative interviews, online survey, and workshops. Qualitative interviews are well-suited for examining and exploring contextual issues for each deployment, perspectives on vision, goals, and desired impacts, and concerns and challenges in advance of the start of the CV pilots. The survey allows for the quantification of outcomes (both desired and not desired) from a broader group of stakeholders across the sites. The workshops will bring together key stakeholders in each site to review and discuss the findings of the interviews, assess the outcomes of the CV pilot, and provide strategic and operational recommendations (and lessons learned) for subsequent activities.

Three CV pilots are being implemented in NYC, Tampa, and Wyoming:

- The NYC pilot aims to improve the safety of travelers and pedestrians in the city through a reduction in crash frequency and severity, management of vehicle speeds, and evaluation of CV implementation benefits in a dense urban environment. Applications to be tested include (1) vehicle-to-vehicle (V2V) safety applications, (2) vehicle-to-infrastructure (V2I) safety applications, and (3) V2I pedestrian applications. These will be deployed in Manhattan and Brooklyn. The pilot will equip taxis, Metropolitan Transit Authority (MTA) buses, United Parcel Service vehicles, New York City Department of Transportation (NYCDOT) fleet vehicles, NYC Department of Sanitation vehicles, and pedestrians.
- The Tampa pilot aims to improve the safety and mobility of automobile drivers, transit riders, and pedestrians in downtown Tampa through crash prevention and enhanced traffic flow. Applications to be tested include (1) V2V safety application, (2) V2I safety applications, and (3) V2I pedestrian applications. The pilot will equip privately owned vehicles, buses, streetcars, and pedestrians.
- The Wyoming pilot aims to improve driver safety along Interstate 80 by using V2V and V2I applications to provide advisories, roadside alerts, and dynamic travel guidance. The pilot will equip 400 fleet vehicles and commercial trucks.

Chapter 2. Target Stakeholders

For the purposes of this evaluation plan, a “stakeholder” is defined as those entities/agencies that are directly responsible for planning, designing, operating, and/or maintaining the systems or technologies associated with deployment or that financially or institutionally influence the decision making and sustainability of the deployment. Examples of stakeholders include city and/or state departments of transportation (DOTs), transit agencies, private fleet operators, etc. Stakeholders differ from End Users. For the purposes of this evaluation plan, end users are those individual vehicle operators in whose vehicles the equipment is installed and that receive information from applications that might influence their travel behavior on any given trip. Examples of end users would be vehicle operators, pedestrians, transit vehicle operators, etc.

Categories of Stakeholders

Six categories of stakeholders will be the target of the acceptance/satisfaction information gathering activities across the three CV pilots. These stakeholder groups are: (1) deployment managers, (2) deployment team members, (3) operating agencies, (4) fleet operators, (5) supporting agencies, and (6) policy makers (see descriptions in Table 2-1 below). Users of the CV applications are not considered stakeholders. Different data collection methods will be used to collect acceptance/satisfaction information from the stakeholder types due to varying roles in the CV pilots (see Table 2-2):

- **Qualitative interviews** in the form of one-on-one, dyads, or triads will be conducted with deployment managers, deployment team members, operating agencies, and policy makers. Deployment managers, deployment team members, and operating agencies will be interviewed because these stakeholders are the most invested and involved in the pilots and will be able to provide rich feedback. Policy makers will be interviewed as well, given their status and potential influence on long-term sustainability. These interviews will be conducted at three points in time: (1) immediately subsequent to the planning/design stage (i.e., pre-deployment), (2) shortly after activation (i.e., near-term post-deployment), and (3) toward the end of the deployments (i.e., long-term post-deployment). Pre-deployment interviews will elicit vision, goals, and expectations. Post-deployment interviews serve to capture information about deployment experiences, outcomes, and satisfaction.
- **A post-deployment online survey** (rather than in-depth interviews) will be administered to fleet operators and supporting agencies because they are less involved in day-to-day pilot planning and execution. The survey will gather information on how well the pilot deployment program fulfilled these stakeholders’ goals and objectives.
- **Site-specific post-deployment workshops** will be held after interviews have been completed to foster additional dialog among deployment managers, deployment team members, and operating agencies. Workshops will capture distinct information. They will be used to foster cross-stakeholder dialog and discussion about challenges, solutions, and lessons learned. Workshops will also be used to confirm and clarify key findings.

Table 2-1. Stakeholder Group Types

Stakeholder Type	Description	Tampa (4)	NYC (5)	Wyoming (6)	Respondents
Deployment Managers	Lead deployment agency and decision makers	<ul style="list-style-type: none"> The Tampa Hillsborough Expressway Authority (THEA) 	<ul style="list-style-type: none"> NYCDOT 	<ul style="list-style-type: none"> Wyoming Department of Transportation 	<ul style="list-style-type: none"> Executive Management Project Managers
Deployment Team Members	Individual/agencies responsible for planning, development and/or implementation of the applications and technologies	<ul style="list-style-type: none"> BrandMotion University of South Florida Center of Urban Transportation Global 5 Communications Siemens Industry, Inc., Mobility Division HNTB 	<ul style="list-style-type: none"> TransCore Cambridge Systematics KLD Engineering Security Innovations New York University, University Transportation Research Center 	<ul style="list-style-type: none"> ICF Trihydro National Weather Service/ National Center for Atmospheric Research University of Wyoming Center for Advanced Transportation Technology (CATT) lab at U of Maryland McFarland Mgmt 3rd party application developers 	<ul style="list-style-type: none"> Project Managers Key Technical Leads (operations, development, engineering, information technology [IT])

Stakeholder Type	Description	Tampa (4)	NYC (5)	Wyoming (6)	Respondents
Operating Agencies	Involved in pre-deployment planning and development activities as well as day-to-day operations of the pilots once started. Also agencies involved in pass-through of funding	<ul style="list-style-type: none"> City of Tampa Traffic Engineering/Traffic Management Center Florida DOT, District 7 	<ul style="list-style-type: none"> MTA NYC Traffic Management Operators NYC Department of Information Technology 	<ul style="list-style-type: none"> System integrators and vendors Wyoming State Highway Patrol Wyoming Department of Transportation (WYDOT) – traffic, construction, maintenance, GIS/ITS, IT, Telecom WYDOT Traffic Management Center WYDOT Snowplow Operators Freight Operators 	<ul style="list-style-type: none"> Key Technical Leads (operations, development, engineering, IT) Fleet Managers
Fleet Operators	Agencies that will be installing and operating CV technologies in multiple vehicles	<ul style="list-style-type: none"> Hillsborough Area Regional Transit and Tampa Electric Company Streetcar Line 	<ul style="list-style-type: none"> NYC Department of Sanitation NYC Taxi and Limousine Commission United Parcel Service Taxi Garage Operators Metropolitan Transportation Authority (MTA) 		

Stakeholder Type	Description	Tampa (4)	NYC (5)	Wyoming (6)	Respondents
Supporting Agencies	May interact with or operations may be impacted by the pilot deployments	<ul style="list-style-type: none"> Hillsborough Metropolitan Planning Organization Hillsborough County City of Tampa Police Florida Highway Patrol (Tampa) Hillsborough County Sheriff's Office Tampa Bay Port Authority (Cargo and Cruise) 	<ul style="list-style-type: none"> New York City Transit New York State Truck Motor Association NYC Fire Department NYC Police Department Pedestrians for Accessible and Safety Streets Coalition 	<ul style="list-style-type: none"> Wyoming Trucking Association Private Truck Parking Services City managers, local traffic and law enforcement officials County Emergency Management Oil and Gas Industry Representatives Adjacent state DOTs 	<ul style="list-style-type: none"> Knowledgeable representatives (active in implementation activities/meetings)
Policy Makers	In a position to have influenced the selection of the pilot site or to decide something about the deployment in the future	<ul style="list-style-type: none"> THEA board of directors Mayor's Office 	<ul style="list-style-type: none"> Mayor's Office New York City Council 	<ul style="list-style-type: none"> State legislators 	<ul style="list-style-type: none"> Champion for the pilot within organization

Source: Texas A&M Transportation Institute.

Table 2-2. Data Collection Method by Stakeholder Type

Stakeholder Type	Pre-Deployment Interviews	Post-Deployment Interviews—Near-Term ¹	Post-Deployment Interviews—Long-Term ²	Survey	Workshop
Deployment Managers	X	X	X		X
Deployment Team	X	X			X
Operating Agencies	X		X		X
Fleet Operators				X	
Supporting Agencies				X	
Policy Makers ³	X		X		

Notes

1 Near-term post-deployment is 2–3 months after activation

2 Longer-term post-deployment is 9–12 months after activation

3 Champion may not be in office post-deployment; incumbent would be interviewed instead.

Source: Texas A&M Transportation Institute

In Table 2-2, deployment managers, deployment team members, and operating agencies are proposed to participate in the workshop in addition to the interviews because of their integral roles in the deployment planning and implementation. They will have the most practical data on challenges, solutions, and lessons learned. The deployment managers will have coordinated the pilot deployment, whereas the deployment team members will have developed applications and troubleshoot solutions, and the operating agencies will have been directly involved in the day-to-day operations of the pilots. The workshop will provide a unique environment for participants to reflect or react to the viewpoint of others with which they may disagree or of which they are unaware. Informants can build on the answers of others. The workshop facilitates a dynamic discussion among participants that enables all participants along with the research team to ask questions, which will in turn produce more information when compared with individual interviews. The research team can clarify clashes among participants and ask about diverse opinions.

Note that post-deployment interviews will be structured to assess whether the pilots achieved their vision, goals, and desired impacts at two points in time: (1) near-term post deployment would be a check-in interview shortly after deployment to get initial feedback, and (2) long-term post-deployment interview would be toward the end of deployment to gather comprehensive information. Post-deployment interviews with policy makers will be done in the long-term post-deployment time frame.

Confidentiality, Informed Consent, and Potential Risks

The data gathered in the qualitative interviews, online survey, and workshops will be kept confidential. Research participants can be identified by the Texas A&M Transportation Institute (TTI) CVPD Evaluation Team; however, only authorized team members will have access to the list of stakeholders that will be interviewed. The list will not be linked to any individual responses to questions posed in the qualitative interviews, online survey, or workshops. All personally identifiable information (PII) will be kept separate from data for analysis. Data will be kept on secure servers.

Informed consent procedures approved by the Texas A&M University Institutional Review Board (IRB) will be followed in conducting the interviews, online survey, and workshops. Participants will be sent the consent form via email prior to scheduling an interview appointment, starting the online survey, or participating in the workshops. Each prospective participant will have an opportunity to ask questions about the study and will be provided with ample time to make the decision about whether or not to participate.

There is minimal risk associated with this study. Even though the PII will be separated from the information gathered, there is the risk that an individual could be identified through his/her responses to questions. To minimize this risk, the TTI CVPD Evaluation Team will scrub any publically released reports or technical memoranda to ensure that a specific individual cannot be deciphered through his/her responses.

Chapter 3. Qualitative Interviews (Pre- and Post-Deployment)

The TTI CVPD Evaluation Team will conduct pre- and post-deployment interviews with deployment managers, deployment team members, operating agencies, and policy makers. The objectives of the pre-deployment interviews are to gather in-depth baseline information from deployment managers, deployment team members, operating agencies, and policy makers associated with each of the three CV pilots on vision, goals, and desired impacts, anticipated or potential challenges (technical, institutional, financial, etc.), and desired outcomes (short-term, mid-term, and long-term). This will enable the TTI CVPD Evaluation Team to delve deeply into important topics of the evaluation to provide a foundation for the post-deployment interviews, survey, and workshops. The interviews will be conducted in-person and via the telephone.

The TTI CVPD Evaluation Team will structure the post-deployment interviews to assess whether the pilots achieved their vision, goals, and desired impacts. The TTI CVPD Evaluation Team plans to conduct two iterations of the post-deployment interviews: (1) near-term post deployment would be a check-in interview shortly after deployment to get initial feedback, and (2) long-term post-deployment interview would be toward the end of deployment to gather comprehensive information. The TTI CVPD Evaluation Team will also document challenges, solutions, and lessons learned at two points in time, shortly after activation, and near the end of the pilot deployment

Identifying, Selecting, and Inviting Interviewees

The target stakeholders for interviews are deployment managers, deployment team members, operating agencies, and policy makers (see Table 3-1). The estimates in Table 3-1 are based on the specific target stakeholder entities identified in Table 2-1 for each site and an assumption that two or three persons will be interviewed from each entity.

The TTI CVPD Evaluation Team will select interviewees for the pre-deployment interviews with a purposeful sampling methodology. This involves identifying and selecting individuals or groups of individuals from target stakeholder entities that are especially knowledgeable about or have history with the CV pilot deployment. The TTI CVPD Evaluation Team will target information-rich cases for the most effective use of resources. The TTI CVPD Evaluation Team will first contact the deployment manager (lead agency) for each CV pilot who will be asked to identify the other individuals from each of the target stakeholder agencies to serve as interviewees. Using this method, the TTI CVPD Evaluation Team will develop a list of interviewees by stakeholder agency for each of the three CV pilots. As appropriate, the selected individuals also will be interviewed in post-deployment interviews.

Table 3-1. Approximate Numbers of Interviews by Stakeholder Type and Site

Stakeholder Type	NYC	Tampa	Wyoming
Pre-Deployment Total	29	20	29
Deployment Managers	3	3	3
Deployment Teams	12	10	16
Operating Agencies	15	6	9
Policy Maker	2	1	1
Near-Term Post Deployment Total	15	13	19
Deployment Managers	3	3	3
Deployment Teams	12	10	16
Long-Term Post Deployment Total	20	10	13
Deployment Managers	3	3	3
Operating Agencies	15	6	9
Policy Maker	2	1	1
Total Approximate Interviews per Site¹	64	43	61

¹ The research team expects to interview some people in dyads and triads so the actual number of interviews will be smaller and that is why an approximate total is shown.

Source: Texas A&M Transportation Institute

The TTI CVPD Evaluation Team will send email invitations to selected individuals to participate in the interviews. The email will contain information about the study purpose, the interview method, content, and duration. An informed consent document will be an attachment to the email invitation. The participant will be asked to reply in the affirmative, after which a suggested date and time for the interview will be communicated.

The TTI CVPD Evaluation Team will conduct interviews with one interviewee at a time or in small groups of two or three individuals representing a single stakeholder entity. Interviews will be either in-person or via telephone.

Interview Guide

A semi-structured interview format will be used. In semi-structured interviewing, a guide is followed, with questions and topics that must be covered. An interviewer has some discretion about the order in which questions are asked, but the questions are standardized, and probes may be provided to ensure that the researcher covers the correct material. This kind of interview collects detailed information, which is needed for the stakeholder assessment, but in a way that is somewhat conversational.

The pre- and post-deployment interview guides will contain a few of the same questions but the majority of the questions will be different. The interview guides will be tailored to the specific target respondent; however, it is anticipated that many of the questions will be pertinent to all stakeholder types. It is also

anticipated that some of the questions will need to be modified based on the context, circumstances, or characteristics of each specific deployment. Many of the interview questions will be modeled after the American Association of State Highway and Transportation Officials' Transportation System Management and Operations Capability Maturity Model (CMM) Guide such that questions will be structured to obtain stakeholder input on the six agency capability maturity dimensions in the CMM: business processes, systems and technologies, performance measurement, culture, workforce development and collaboration. CMM dimensions will not be asked of policy makers.

All interviews will begin with an explanation of the evaluation purpose, scope and sponsors, and a description of the purpose and process for the stakeholder interviews. The confidentiality of the collected information will be highlighted (i.e., responses will not be attributed to specific individuals) and the need for IRB/Human Subject Protection requirements. Following this introduction, the main body of the interview will begin.

The proposed topics of the interview are shown along with representative questions. The complete interview guide will be developed in a subsequent task.

Implementing Interviews

The first five interviews for each pilot site will serve as a rolling pilot to test the question wording for clarity and efficacy. The rolling pilot will be conducted among different types of stakeholders. A set of evaluative questions will be asked of the interviewees after the interview is completed. Sample questions are shown in bullets below:

- How relevant were the questions?
- Were the questions clear and understandable?
- Were there any biased questions?
- What questions should I have asked (that is, possible missed questions)?

The questionnaire could be tweaked after such interviews.

The questions will be sent to the individuals in advance of the interviews to help facilitate discussion. Two members of the TTI CVPD Evaluation Team will participate in each interview. One individual will lead the interview, ask the questions, and facilitate the discussion. The second individual will take notes using a laptop computer and record the session if the interview agrees. The Informed Consent Form will address this request and specify that recording of the session will be voluntary. At the appointed time, the interview will take place. The durations of the interviews will vary:

- Pre-deployment interviews with deployment managers, deployment team members, and operating agencies will last no more than 60 minutes, depending on the time availability of the individual stakeholder.
- Pre-deployment Interviews with policy makers will last no more than 45 minutes, depending on time availability.
- Near-term post-deployment interviews will last about 30 minutes.
- Long-term post-deployment interviews will last no more than 90 minutes.

After internal review, the interview summary will be emailed to the participant for his/her review and approval.

Table 3-2. Proposed Interview Topics and Sample Questions

Topics	Sample Questions
Role in CV Pilot, Vision, Goals	<p>PRE: What is your agency's goal(s) in participating in the CV pilot? What would constitute success in terms of vehicle-to-device (V2X) deployment? What are your top three goals for V2X?</p> <p>POST: Has your view of what constitutes success changed during the planning and pre-deployment process? If so, in what way and why?</p>
Business Processes	<p>PRE: Is the CV pilot program reflected in the overall multimodal transportation and business plans of all participating public agencies? Have multiyear budgets been developed for pilot implementation?</p> <p>POST: In your opinion, was consensus reached among the various stakeholders in terms of CV goals, expectations, and priorities? If yes, how was this achieved?</p>
Systems and technology	<p>PRE: Does the region(s) have systems operational concepts and architectures for the CV pilot applications? Are appropriate levels of cyber-security incorporated into system design?</p> <p>POST: What was the system design to permit rapid identification of system degradations and failures? How well did it work? What lessons were learned during deployment for future applications?</p>
Collaboration	<p>PRE: Has a formal process for collaborative planning/programming among state DOT, local government and metropolitan planning organization been put in place?</p> <p>POST: Has a formal agreement been put in place for long-term relationships among stakeholders? Probe to address funding responsibilities, business models, future CV system operation, expansion, and replication.</p>
Performance Measures	<p>PRE: What MEP impacts did you expect to be realized when you decided to participate in the CV pilot? Have CV pilot performance measures have been identified to evaluate whether pilot is operating as it should?</p> <p>POST: Were performance data used during deployment directly for after-action debriefings and improvements? Have outcome MEP measures been monetized for cost/benefit analysis and to inform financial sustainability?</p>
Culture	<p>PRE: Has a champion for the CV pilot been identified within the organization? Does the organization as a whole support the CV pilot? What factors have been identified as organizational concerns? Benefits?</p> <p>POST: Has senior management solidified a CV business case? Is this being communicated to policy makers and the public?</p>
Workforce Development	<p>PRE: Have position descriptions for CV pilot (knowledge/skills/abilities) been developed for key staff? Have these been instituted into recruitment and promotion processes?</p> <p>POST: Have position description for CV responsibilities been institutionalized? Are sufficient people trained to manage, operate, and operate the CV system going forward? Is staffing capable of evolving to meet demands of a changing mix of technologies and modes?</p>
Technical Challenges	<p>PRE: What do you think the biggest technical or technology-related challenges will be during the implementation process? Do you think dedicated short-range communication (DSRC) is ready for deployment? Are you considering or prefer alternatives to DSRC? Are you familiar with the V2X security technology and the credential management system being deployed? Does it address hacking and privacy concerns?</p> <p>POST: Did any hacking or privacy incidents occur during deployment? How were these handled?</p>

Topics	Sample Questions
Institutional Challenges	<p>PRE: It is often heard that there are no real technical barriers to deploying CV but the non-technical issues can be considerable. Are there any specific institutional issues that will need to be addressed during implementation? Does your staff have necessary training to deploy, integrate, and use V2X technology?</p> <p>POST: What institutional challenges were confronted during deployment? How were these addressed? What are lessons learned for future deployments? Were deployment plans sufficient to manage the implementation effectively? What needed modifications did you encounter?</p>
Resource Challenges	<p>PRE: Is the cost of V2X equipment reasonable? Do you have the resources to deploy and manage a V2X?</p> <p>POST: What were the lessons learned in terms of equipment costs to inform future deployments?</p>
Policy Challenges	<p>PRE: Are any specific policy or political issues that had to be addressed to deploy V2X? If so, how were they addressed by the partners, including your agency/jurisdiction?</p> <p>POST: What policy challenges, if any, will influence long-term sustainability of the CV program?</p>
Outreach	<p>PRE: Has your agency planned outreach activities to engage policy makers, the public, and other groups in the V2X deployment?</p> <p>POST: How many and what types of outreach activities were conducted during the deployment? Which were most effective? How would you characterize current public and policy maker acceptance of a CV program?</p>

Source: Texas A&M Transportation Institute

Interview Analysis Methods

Immediately following the interviews, the interviewers will review the interview notes and tape recordings and document any major comments. The interviewers will summarize the responses of each stakeholder to every question. TTI will use the NVivo software (software that is owned by TTI that supports qualitative data analysis) to help organize, analyze, and summarize interviews. The TTI CVPD Evaluation Team will summarize the categories of the results in a detailed analysis plan. The TTI CVPD Evaluation Team will use subcategories to provide more detail on the various topics covered in the interviews. The TTI CVPD Evaluation Team will prepare a preliminary report highlighting the common themes emerging from the interviews, as well as unique perspectives. The summary report will be organized by the interview questions, with a final section presenting overarching themes.

Schedule for Interviews

Table 3-3 shows the tentative schedule for conducting interviews at each deployment site. The TTI CVPD Evaluation Team will adjust this schedule as the sites begin their deployment phases. The interviews will be conducted over a period of 4–6 weeks per pilot site in the pre-deployment and in the two post-deployment stages. The interview schedule for the near-term post-deployment interviews will account for the fact that the three sites have different activation schedules.

Table 3-3. Estimated Interview Schedule (As of May 26, 2017)

Interview Type	NYC	Tampa	Wyoming
Expected Activation			
• Without CV	5/1/18–7/31/18	11/1/17–4/30/18	6/1/17–1/31/18
• With CV	8/1/18–10/31/19	5/1/18–10/31/19	11/1/18–5/31/19
Pre-Deployment Interviews	4/18	10/17	12/17
Near-term Post-Deployment Interviews	9/18	6/18	12/18
Long-term Post-Deployment Interviews	9/19	9/19	4/19

Source: USDOT/FHWA

Chapter 4. Post-Deployment Survey

The objective of the post-deployment survey is to gather information from important, but less engaged in day-to-day operations, stakeholders on whether and how the three CV Pilot deployments achieved the vision, goals, and desired MEP impacts. The timing of this survey is long-term post-deployment. The survey will also quantify technical challenges, adopted solutions, and lessons learned. It will be administered as an online survey, accessed through a link in a recruitment email. TTI will coordinate with the local site to determine whether the survey can be administered directly by TTI or is required to be administered through the local sites.

Sampling Survey Respondents

A purposeful sampling methodology will be employed to select survey respondents. This involves identifying and selecting individuals or groups of individuals from each stakeholder group that are especially knowledgeable about or have history with the CV pilot deployment. The TTI CVPD Evaluation Team will target information-rich cases for the most effective use of resources.

The TTI CVPD Evaluation Team will ask the deployment manager to identify up to 10 individuals from fleet operators or operating agencies to be surveyed. The Team will compile a sample list of these individuals for each pilot site. This list will serve as the sampling frame for the survey. Table 4-1 presents the estimates of recruited respondents at each site. The estimates in Table 4-1 are based on the stakeholders identified in Table 2-1 for each site. We expect a 50 percent response rate.

Table 4-1. Sampled Survey Respondents by Stakeholder Type and Site

Stakeholder Type	NYC	Tampa	Wyoming
Fleet Operators	40	20	20
Supporting Agencies	30	60	60
Total Respondents per Site	70	80	80

Source: Texas A&M Transportation Institute

Online Survey Questionnaire

A draft of the survey questionnaire will be prepared in a subsequent task. This draft will be refined in a later stage through a review and discussion among the TTI CVPD Evaluation Team of the findings from the pre-deployment qualitative interviews. The team will also conduct a review of social media sites (i.e., Google) to identify relevant news stories or participant postings that happened during the pilot implementation. These reviews will serve as an opportunity to identify additional topics for survey questions.

The questionnaire will contain items requiring close-ended (with response codes) and open-ended (textual) responses. The TTI CVPD Evaluation Team will tailor the online survey to the specific target respondent. The Team will use a survey technique known as branching to ensure that each survey respondent is asked only relevant questions.

The survey introduction will present the purpose of the stakeholder online survey. The introduction will highlight the confidentiality of the collected information (i.e., responses will not be attributed to specific individuals) and explain the need for IRB/Human Subject Protection requirements. Following the introduction, the respondent will begin the main body of the survey.

The first questions will capture some information about the survey respondent, including stakeholder type and connection to the CV pilot (category of position).

Table 4-2 shows the proposed topics of the survey in along with representative questions. The Survey Guide (to be developed subsequent to acceptance of the Stakeholder Evaluation Plan) will contain the complete survey questionnaire.

Table 4-2. Online Survey Topics

Topics	Sample Questions
Role in CV Pilot, Vision, Goals	What was your agency's role, and your personal role in deploying and operating the CV pilot? What benefits did you expect to be realized when you decided to participate in the pilot? Have these expectations changed at all during the deployment and operation of the various applications? If so, what has changed and why? Have your expectations been realized?
Objectives	What is your agency's objective(s) in participating in the pilot? How well did the CV pilot meet the stated objectives? When initially implemented, how did the pilot meet the stated objectives? What would constitute success for you and your agency? Has your view of what constitutes success changed during the deployment and operation of the various projects? If so, in what way and why? What is your overall assessment of the outcome of this pilot?
Deployment Management	How well did the pilot implementation match what was initially proposed? How satisfied are you with your involvement in the pilot planning? Pilot implementation? Were there unanticipated changes to scope, cost, schedule, or quality (safety)? How were these managed? How well were you or others in your organization involved in the risk identification and mitigation planning process?
Communications Management	How effective were the informational materials available to orient pilot stakeholders? How satisfied were you with the kick-off meetings you participated in? How well was project status communicated throughout your involvement in the pilot? How effectively were stakeholders involved in the pilot?
Outreach	Did your agency conduct outreach activities to engage policy makers, the public, and other groups in the V2X deployment? What activities? How effective?

Source: Texas A&M Transportation Institute

Implementing the Survey

Upon finalization of the sample list and online questionnaire, a recruitment email containing the survey URL will be sent to selected respondents in each target stakeholder entity per site. This will serve as a rolling pilot to test the questionnaire wording for clarity and efficacy. The rolling pilot will be conducted among the two different types of stakeholders. The same evaluative questions identified in Chapter 3 will be used to elicit feedback from the respondents. These questions will be added to the end of the questionnaire for these pilot surveys only. The questionnaire could be tweaked after such reviewing the captured data. After this, the recruitment email will be sent to all persons on the sample list.

The survey will be live for a 4-week period and will be monitored closely throughout. At the onset of week 2, a reminder email will be sent requesting participation from those that have not yet taken the opportunity to complete the survey. If necessary, a second reminder will be sent to ensure a response rate of at least 50 percent, with all target stakeholder entities having at least one completed survey.

Survey Analysis Methods

Upon conclusion of the data collection period, the TTI CVPD Evaluation Team will extract and process the data, ensuring that the final analytical data set is logical and free of error. Since the many of the responses captured in the survey will be open-ended textual responses, the team will initially utilize the analysis software called NVivo (software that supports qualitative and mixed methods research and is designed to assist with organization and analysis of unstructured open-ended survey responses). The TTI CVPD Evaluation Team will analyze the data having response codes using SPSS software. Data analysis will be primarily descriptive. However, inferences about stakeholder acceptance/satisfaction will be drawn in the reporting of survey results.

Survey Schedule

The survey schedule will be determined based on the anticipated progress of the pilot sites. It is anticipated that the TTI CVPD Evaluation Team will administer one survey toward the end of the deployment period (see Table 3-3 for the long-term deployment estimates of schedule).

Chapter 5. Post-Deployment Workshops

One post-deployment workshop per site will be conducted. The purpose of the workshop is to foster additional dialog among the deployment managers, deployment teams, and operating agencies concerning the lessons learned and major takeaways from planning and implementing the deployments. The common themes identified in the post-deployment interviews will be used to frame the group discussion, which will explore these and other topics in more detail. The workshop will also be used to gather information needed to conduct the Financial and Institutional Assessments (see Task C scope of work).

Recruiting Workshop Participants

Workshop participants will represent the deployment managers, deployment team members, and operating agencies from each site. It is expected that 20–30 persons will participate in the workshops. Some, but not all, will be individuals who have participated in the interviews. The TTI CVPD Evaluation Team will coordinate with the deployment managers in identifying persons to be invited to the workshops.

Workshop Format

It is envisioned that these workshops would be ½- day-to-a-day in duration. The TTI CVPD Evaluation Team would develop open-ended questions designed to facilitate and guide the discussion in the workshop. Table 5-1 highlights some of the potential topics to be covered in these workshops.

Source: Texas A&M Transportation Institute

Figure 5-1 provides a proposed format for these workshops. Core members of the TTI CVPD Evaluation Team will lead these workshops in-person. Other TTI CVPD Evaluation Team members will participate via web-conference.

Table 5-1. Workshop Topics

Topics	Sample Questions
Role in CV Pilot, Vision, Goals	<p>What was your agency's role, and your personal role in deploying and operating the CV pilot?</p> <p>What benefits did you expect to be realized when you decided to participate in the pilot? Have these expectations changed at all during the deployment and operation of the various applications? If so, what has changed and why? Have your expectations been realized?</p>
Pilot Effectiveness	<p>What is your agency's objective(s) in participating in the pilot? How well did the CV pilot meet the stated objectives? When initially implemented, how did the pilot meet the stated objectives? What would constitute success for you and your agency? Has your view of what constitutes success changed during the deployment and operation of the various projects? If so, in what way and why? What is your overall assessment of the outcome of this pilot?</p>
Deployment Management	<p>How well did the pilot implementation match what was initially proposed? How satisfied are you with your involvement in the pilot planning? Pilot implementation? Were there unanticipated changes to scope, cost, schedule, or quality (safety)? How were these managed? How well were you or others in your organization involved in the risk identification and mitigation planning process?</p>
Communications Management	<p>How effective were the informational materials available to orient pilot stakeholders? How satisfied were you with the kick-off meetings you participated in? How well was project status communicated throughout your involvement in the pilot? How effectively were stakeholders involved in the pilot?</p>
Technical Challenges	<p>What do you think were the three biggest technical or technology-related challenges in pilot implementation? Were these challenges effectively addressed? How were they addressed? What lessons learned can be drawn from these challenges?</p>
Institutional Challenges	<p>How effective were the efforts to prepare you and your organization for the impact of the pilot implementation? In what ways have the capabilities of your organization (related to CV applications) matured because of the pilot? What were the two biggest institutional challenges? Were these challenges effectively addressed? How were they addressed? What lessons learned can be drawn from these challenges? With what other stakeholders did your organization most collaborate during the pilot? Do you expect continued collaboration with these organizations? For what purposes?</p>
Resource Challenges	<p>What were the two biggest resource challenges? Were these challenges effectively addressed? How were they addressed? What lessons learned can be drawn from these challenges? Has your organization developed a strategy for sustainability? How was the decision on how to allocate needed financial or other resource investments in the pilot made? Does the approach match your ideas on how the allocation should have been done?</p>
Policy Challenges	<p>Were there any specific policy or political issues that had to be addressed to deploy V2X? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? How will these issues be handled going forward?</p>
Outreach	<p>Did your agency conduct outreach activities to engage policy makers, the public, and other groups in the V2X deployment? What activities? How effective?</p>

Source: Texas A&M Transportation Institute

1. Welcome and Self Introductions – 15 minutes
2. Purpose of Workshop – 15 minutes
3. Summarize Key Findings from Interviews then Discuss
 - Expectation and Satisfaction – 30–60 minutes
 - Technical Challenges and Solutions – 30–60 minutes
 - Institutional Arrangements – 30–60 minutes
 - Financial Arrangements – 30–60 minutes
 - Lessons Learned – 30–60 minutes
 - Sustainability Activities – 30 minutes
4. Expectations for Future Operations – 30 minutes
5. Concluding Remarks and Final Thoughts – 15 minutes

Source: Texas A&M Transportation Institute

Figure 5-1. Potential Format for Stakeholder Workshops

Workshop Analysis Methods

The workshop discussion will be summarized immediately following each workshop. These workshops will be led in-person workshop by core members of the TTI CVPD Evaluation Team. Other TTI CVPD Evaluation Team members will participate via web-conference.

Workshop Schedule

The workshop schedule will be determined based on the anticipated progress of the pilot sites. It is envisioned that one workshop per site will be held after the long-term post-deployment interviews in each site. This workshop would focus on issues associated with operating and maintenance the deployment and cover topics such as equipment and application reliability, changes in operations and maintenance policies, practices, and procedures, changes in financial and institutional arrangements, etc. At this workshop, stakeholder will be asked to discuss changes they have made to their ongoing financial and institutional arrangements for sustaining the deployments into the future. It is anticipated that this workshop would be performed in summer 2019 depending on activation schedule.

Chapter 6. Summary of Data Collection Approach

Table 6-1, Table 6-2, and Table 6-3 summarize the data collection approach for the stakeholder acceptance evaluation plan for NYC, Tampa, and Wyoming CVPDs, respectively.

Table 6-1. Summary of Data Collection Approach – NYC

Data Collection Activity	Purpose	Timeline (Expected Date)	Target Group (Number of Entities)– Number of Persons
Pre-Deployment Interviews	Vision, goals, and expectations. Gather financial and institutional preparedness.	Prior to activation (4/18)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (5)–12 • Operating Agencies (6)–15 • Policy makers (2)–2 • Total = 29
Near-Term Post-Deployment Interviews	Early deployment experiences, challenges, solutions.	1–3 months after activation (9/18)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (5)–12 • Total = 15
Long-Term Post-Deployment Interviews	Vision, goals, and desired MEP impacts achieved. Experiences/observation pertaining to challenges (e.g., technical, institutional, financial), adopted solutions, lessons learned. Satisfaction with pilot outputs/outcomes.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Operating Agencies (6)–15 • Policy makers (2)–2 • Total = 20
Workshop	Cross-stakeholder dialog concerning the lessons learned and major takeaways. Information for Financial and Institutional Assessments.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (5)–12 • Operating Agencies (6)–15 • Total = 30
Survey	Data from important, but less engaged in day-to-day operations stakeholders on whether and how achieved the vision, goals, and desired MEP impacts.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Fleet Operators (4)–40 • Support Agencies (3)–30 • Total = 70

Source: Texas A&M Transportation Institute

Table 6-2. Summary of Data Collection Approach – Tampa

Data Collection Activity	Purpose	Timeline (Expected Date)	Target Group (Number of Entities)– Number of Persons
Pre-Deployment Interviews	Vision, goals, and expectations. Gather financial and institutional preparedness.	Prior to activation (10/17)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (4)–10 • Operating Agencies (2)–6 • Policy makers (1)–1 • Total = 20
Near-Term Post-Deployment Interviews	Early deployment experiences, challenges, solutions.	1–3 months after activation (6/18)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (4)–10 • Total = 13
Long-Term Post-Deployment Interviews	Vision, goals, and desired MEP impacts achieved. Experiences/ observation pertaining to challenges (e.g., technical, institutional, financial), adopted solutions, lessons learned. Satisfaction with pilot outputs/outcomes.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Operating Agencies (2)–6 • Policy makers (1)–1 • Total = 10
Workshop	Cross-stakeholder dialog concerning the lessons learned and major takeaways. Information for Financial and Institutional Assessments.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (4)–10 • Operating Agencies (2)–6 • Total = 19
Survey	Data from important but less engaged in day-to-day operations stakeholders on whether and how achieved the vision, goals, and desired MEP impacts.	9–12 months after activation (9/19)	<ul style="list-style-type: none"> • Fleet Operators (2)–20 • Support Agencies (6)–60 • Total = 80

Source: Texas A&M Transportation Institute

Table 6-3. Summary of Data Collection Approach – Wyoming

Data Collection Activity	Purpose	Timeline (Expected Date)	Target Group (Number of Entities)– Number of Persons
Pre-Deployment Interviews	Vision, goals, and expectations. Gather financial and institutional preparedness.	Prior to activation (12/17)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (11)–16 • Operating Agencies (3)–9 • Policy makers (1)–1 • Total = 29
Near-Term Post-Deployment Interviews	Early deployment experiences, challenges, solutions.	1–3 months after activation (12/18)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (11)–16 • Total = 19
Long-Term Post-Deployment Interviews	Vision, goals, and desired MEP impacts achieved. Experiences/observation pertaining to challenges (e.g., technical, institutional, financial), adopted solutions, lessons learned. Satisfaction with pilot outputs/outcomes.	9–12 months after activation (4/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Operating Agencies (3)–9 • Policy makers (1)–1 • Total = 13
Workshop	Cross-stakeholder dialog concerning the lessons learned and major takeaways. Information for Financial and Institutional Assessments.	9–12 months after activation (4/19)	<ul style="list-style-type: none"> • Deployment Managers (1)–3 • Deployment Team Members (11)–16 • Operating Agencies (3)–9 • Total = 28
Survey	Data from important but less engaged in day-to-day operations stakeholders on whether and how achieved the vision, goals, and desired MEP impacts.	9–12 months after activation (4/19)	<ul style="list-style-type: none"> • Fleet Operators (2)–20 • Support Agencies (7)–70 • Total = 90

Source: Texas A&M Transportation Institute

Chapter 7. References

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List of Acronyms

<i>CMM</i>	Capability Maturity Model
<i>CV</i>	Connected Vehicle
<i>CVPD</i>	Connected Vehicle Pilot Deployment
<i>DOT</i>	Department of Transportation
<i>DSRC</i>	Dedicated Short-Range Communication
<i>IRB</i>	Institutional Review Board
<i>IT</i>	Information Technology
<i>MEP</i>	Mobility, Environmental, and Public Agency Efficiency
<i>MTA</i>	Metropolitan Transit Authority of New York
<i>NYC</i>	New York City
<i>NYCDOT</i>	New York City Department of Transportation
<i>PII</i>	Personally Identifiable Information
<i>THEA</i>	Tampa Hillsborough Expressway Authority
<i>TTI</i>	Texas A&M Transportation Institute
<i>V2I</i>	Vehicle-to-Infrastructure
<i>V2V</i>	Vehicle-to-Vehicle
<i>V2X</i>	Vehicle-to-Device
<i>WYDOT</i>	Wyoming Department of Transportation

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