



NCHRP 20-07, Task 357

Best Practices for Collecting, Processing & Managing Roadway Asset Inventory Data

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SCOM Meeting

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providing engineering solutions to improve pavement performance

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Topics

- Research Objectives
- Summary of Practice
- Introduction to the Guide
 - Materials Included
 - Highlights
- Future Directions



Research Objective

- To develop practical guidelines that can be used by practitioners to collect, process and manage roadway asset inventory data





Summary of Practice

- Advantages & Disadvantages of Common Data Collection Techniques
 - **Manual methods** are best for assets that can't be seen from the travel lanes. Traditionally, this method is labor intensive.
 - **Automated (mobile) techniques** allow collection of multiple assets at traffic speeds – but they must be visible from the traffic lane





Summary of Practice (Synthesis 470)

- Manual methods are most common for building asset inventories
- Manual methods may use handheld computers and GPS units
- After pavements & bridges, the most common asset inventories include (>20 of 28 states):
 - Culverts, overhead sign structures, signs, signals, variable message boards, impact attenuators, pavement markings, guardrail end treatments, & rest areas





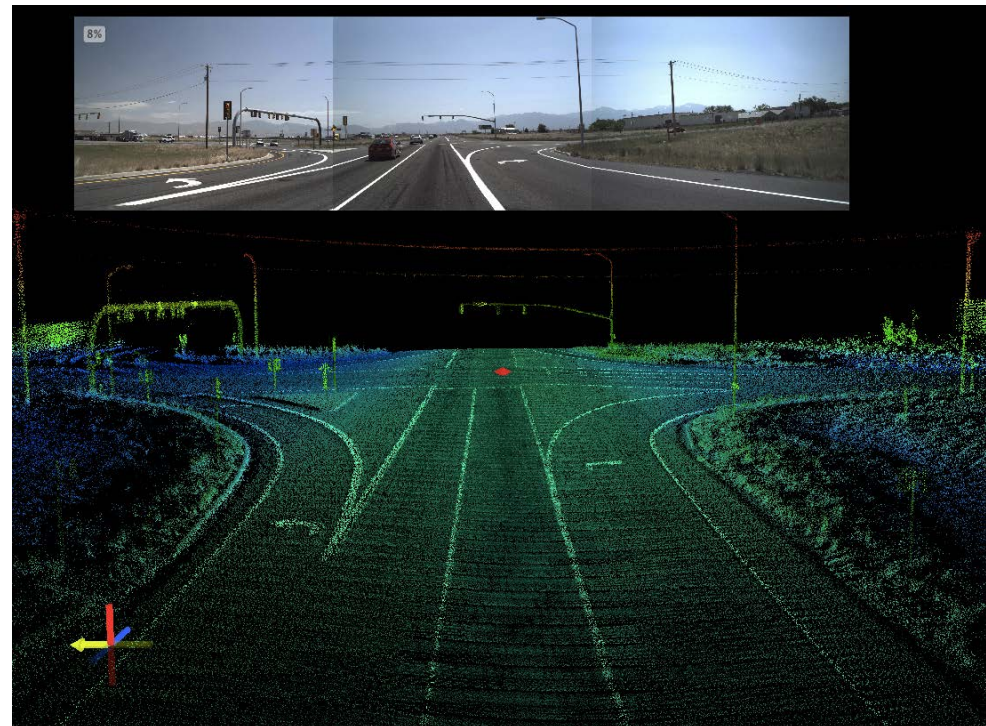
Summary of Practice - Trends

- Interest in performance-based decision making is increasing, so inventories will become more important
- Limited resources are available to collect data
- Agency staff need to develop new skills to take advantage of new technology
 - GIS training, database skills, communication expertise, working knowledge of computers
- Data must be highly reliable to be used to monitor contractor performance



Introduction to the Guide

- Included as the Appendix to the final report
- Can be printed as a stand-alone document
- Focused on three forms of technology:
 - Manual
 - Photogrammetry
 - LiDAR



Introduction to the Guide

- Organization
 - Chapter 1 – Introduction
 - Chapter 2 – Data Collection Methods
 - Chapter 3 – Guidelines
 - Chapter 4 – Future Directions
 - Appendix A – Sample Data Dictionary
 - Appendix B – Sample RFP Content



4-Step Process

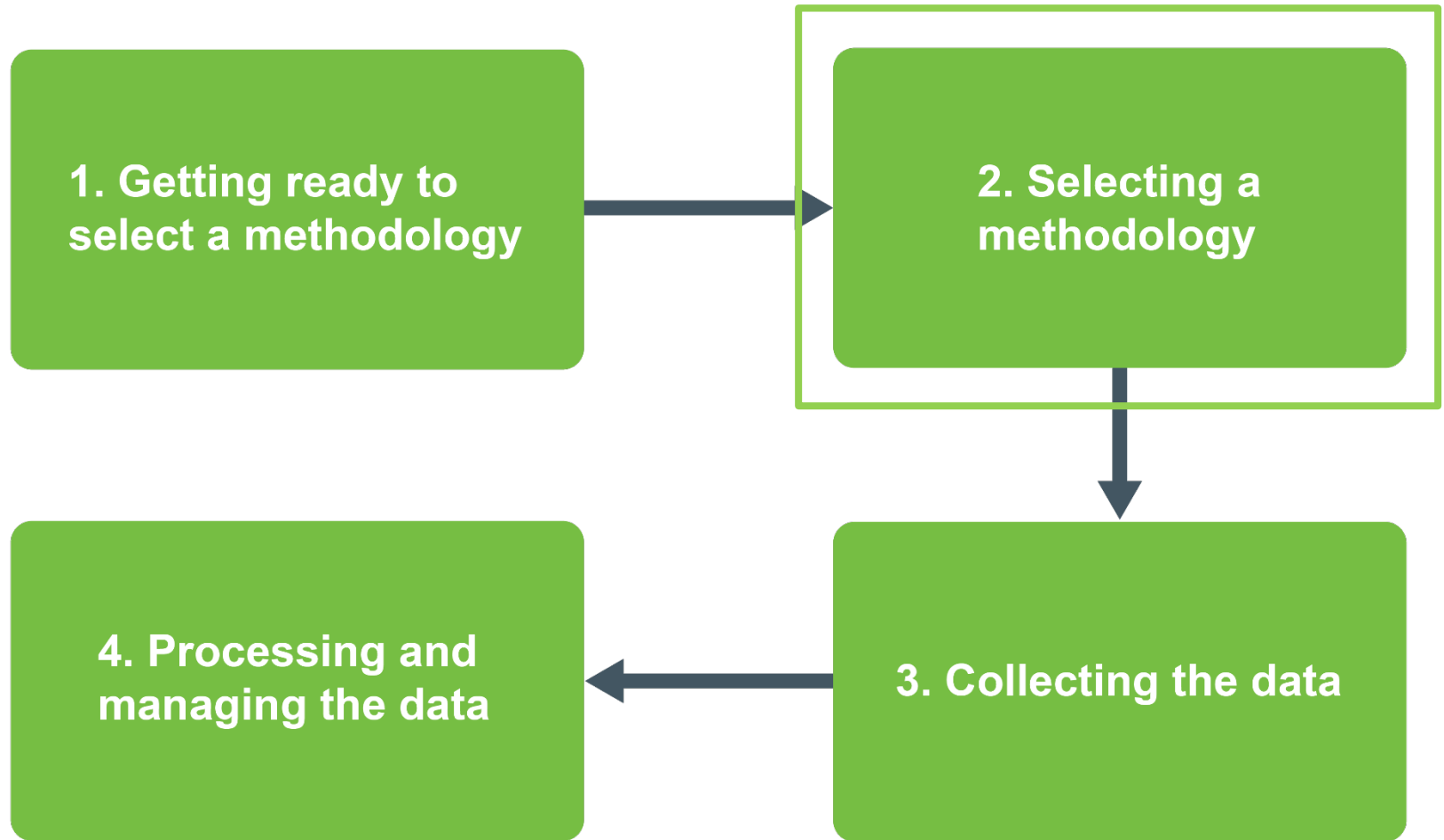


1. Getting Ready to Select a Methodology

- **Select assets to include** in the inventory
- **Determine constraints** on budget, available personnel, etc.
- **Identify users** and encourage higher participation
- **Develop data dictionary** and document attributes



4-Step Process





2. Selecting a Methodology

- Determine asset visibility from the roadway surface
- Identify accuracy requirements
- Determine agency maturity to fully utilize the data provided
- Consider safety standards
- Evaluate resources to collect & maintain data
- Identify other data collection efforts

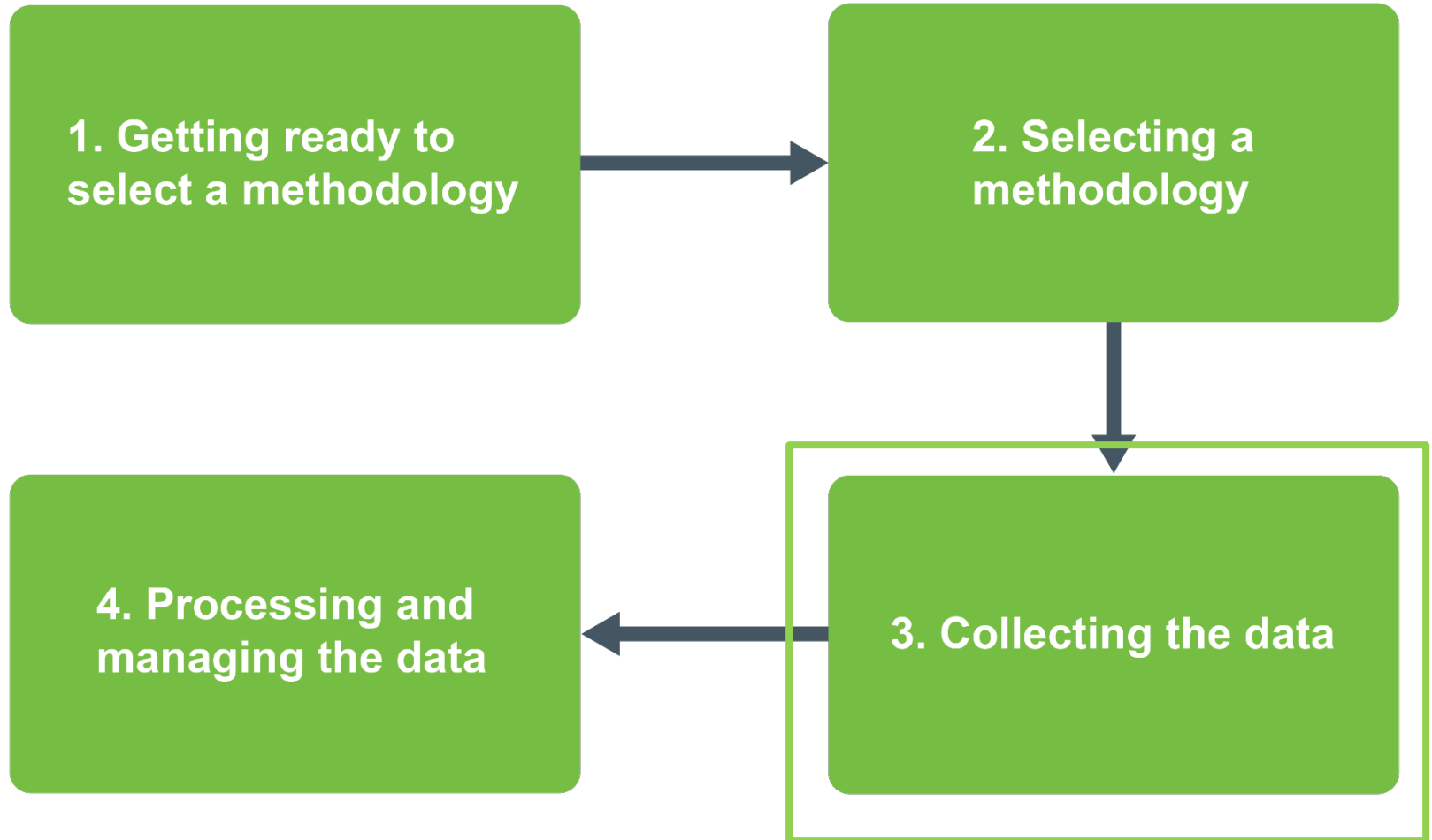


Do We Have A Clear Winner?

	Manual	Photogrammetry	Mobile LiDAR
Equipment	No specialized equipment	ROW cameras	Dedicated equipment, software and training
Type of assets inventoried	All, including drainage structures	Only assets visible from roadway	Only assets visible from roadway, within range
Accuracy	± 5-10 ft.	± 1-3 ft.	± 3-5 in.
QA and adding new elements	Requires re-survey	Images can be reused	Spatial data can be reused
Collection speed	Slow	Traffic speeds	Traffic speeds
Safety	High exposure	Low exposure	Low exposure
File size		Manageable	Large files



4-Step Process



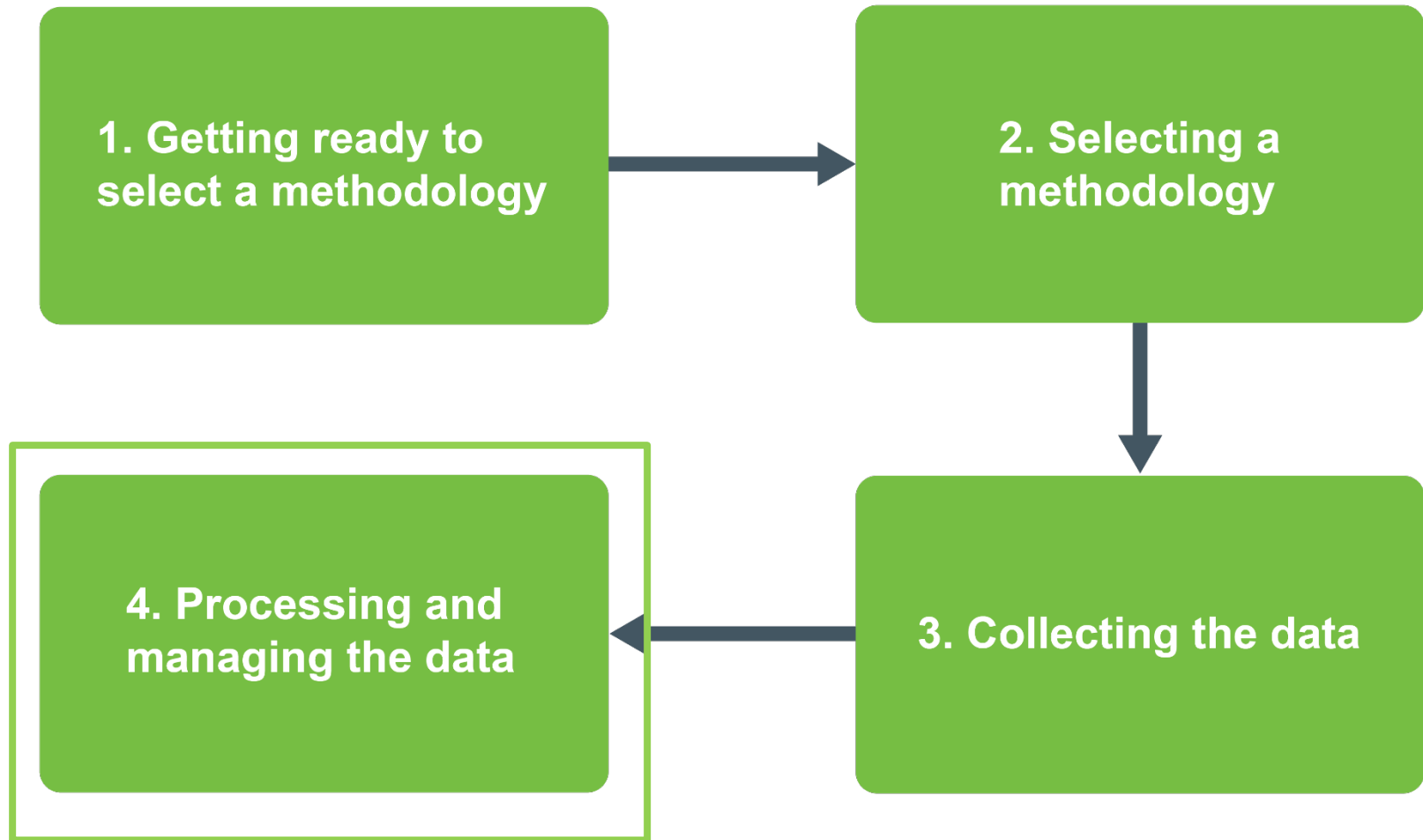


3. Collecting the Data

- Secure equipment or vendor
- Develop data collection protocols for resolution, accuracy, repeatability, acceptance testing, etc.
- Conduct training and calibration for better quality control
- Conduct acceptance testing to help identify malfunctioning equipment, anomalies, completeness, and reasonableness of data



Guidelines for Developing or Updating a Roadway Asset Inventory





4. Processing and Managing Data

- **Develop in-house expertise** to understand capabilities and limitations of technology
- **Formulate processing procedure** and limit time at workstations to 2-hour slots
- **Provide users access to data** in an easily useable format
- **Address organizational issues** to promote the greatest use of the data
- **Implement data governance standards**
- **Plan for inventory updates**



Introduction to the Guide - Highlights

- Includes tips from practitioners

While the Utah DOT uses LiDAR for collecting most of its roadway asset data, its inventory of drainage assets and underground utilities was established by part-time interns using manual data collection techniques.

Agencies using automated data collection vendors have found it helpful to establish a contract period that covers at least two data collection cycles to help ensure consistency. For instance, an agency may establish a contract for one data collection cycle with an option to renew the contract for another cycle if the agency is satisfied with the vendor's performance.



Introduction to the Guide - Highlights

- Summarizes considerations for each of the three methodologies
- Includes tips to “accelerate the learning curve”

Fair degree of accuracy (\pm a few ft.)
Labor intensive
Safety issues with personnel in the field
Quality control activities require additional personnel in field
Best option for inventorying assets not visible from the road
Does not require specialized technical expertise or equipment
Most applicable when collecting a limited amount of data

Manual Survey

Good accuracy (\pm 1ft.)
Not labor intensive
Requires specialized equipment
Operates at traffic speeds
Can only be used to inventory assets visible from the road
Easily used in conjunction with automated pavement condition surveys
Data can be used by multiple Divisions within an agency
Quality control activities can be done at a workstation
Requires some technical expertise

Photogrammetry

High degree of accuracy (\pm 3in.)
Not labor intensive
Requires specialized equipment
Operates at traffic speeds
Can only be used to inventory assets visible from the road
Provides features for estimating asset dimensions
Easily used in conjunction with automated pavement condition surveys
Data can be used by multiple Divisions within an agency
Quality control activities can be done at a workstation
Provides greatest benefit when data are used by multiple Departments
Requires specialized technical expertise
Generates large data files that must be managed

Mobile LiDAR



Future Directions

- Data collection activities will serve multiple purposes
- Automated inventories are becoming more common
- Mobile LiDAR is most beneficial when an agency can use it in conjunction with other agency needs
- Emerging technologies are under development that may influence future data collection efforts



For a Copy of the Guide

Go to the AASHTO
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Select Research

Select NCHRP Project 20-7

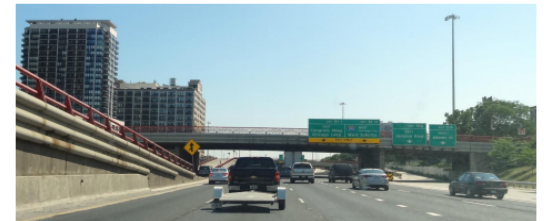
Go to Completed Tasks

Select Task 357

NCHRP Project 20-07/Task 357

A GUIDE TO COLLECTING, PROCESSING, AND
MANAGING ROADWAY ASSET INVENTORY DATA

FINAL VERSION



June 2015

The information contained in this report was prepared as part of
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