BEND MPO
Metropolitan Planning Organization

Technical Advisory Committee (TAC) Meeting

October 5, 2022

Agenda Item #1: Call to Order & Introductions – Tyler Deke

TAC members

- Sharon Smith, Bend La Pine Schools
- Henry Stroud, Bend Park & Recreation
- Robin Lewis, City of Bend
- Andrea Breault, CET
- Greg Bryant, resident
- Liza Hamada, resident
- Mike Beaulieu, COCC
- Brian Potwin, Commute Options
- Peter Russell, Deschutes County
- Dave Thomson, Deschutes BPAC
- Rick Williams, ODOT Region 4
- Casey Bergh, OSU Cascades

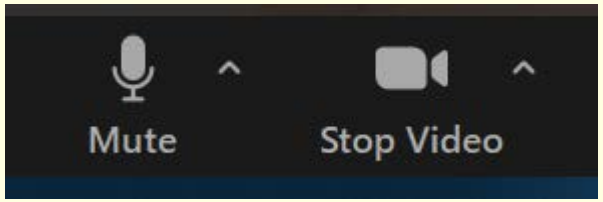
Bend MPO Staff

- Tyler Deke, Manager
- Andrea Napoli, Senior Planner
- Jovi Anderson, Program Coordinator

- Cameron Prow, TypeWrite II (recorder)
- Members of the public, visitors and presenters will be asked to introduce with name and entity.

Agenda Item #2: Remote Participation Guidelines – Jovi Anderson

- You will be on **mute** when you first join the meeting.
- Technical difficulties during the meeting? Raise Hand



- Please use the **raise hand** to speak next.
- If you join the webinar by phone, dial ***9** to raise/lower hand.
- This meeting will be **recorded** and is available as a live streaming event on YouTube. You can review this YouTube event on the City of Bend YouTube Channel.

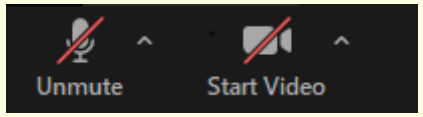


Image (Left) shows you are muted and camera is off.

Agenda Item # 3: Review and approve July 6, 2022 and August 3, 2022 draft meeting summaries

Recommended language for motion: I move approval of the July 6, 2022 and August 3, 2022 meeting summaries as presented

BEND MPO
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Agenda Item # 4: Mobility Hubs Feasibility Study Overview – Andrea Napoli

BEND MOBILITY HUBS FEASIBILITY STUDY - Overview

OCTOBER 2022

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
CASCADIA PARTNERS
CITY OF BEND
MPO Bend Metropolitan Planning Organization
COIC
Oregon Department of Transportation
cet

PRESENTATION OUTLINE

- What is a Mobility Hub?
- Why Mobility Hubs in Bend?
- Project Outline and Timeframe
- Objectives Developed
- Market Analysis
- Location Recommendations
- Mobility Hub Types and Features
- Implementation
- Public Engagement Summary
- Current and Next Steps

WHAT IS A MOBILITY HUB?

Primarily, **mobility hubs** are places where people can access multiple modes of transportation and easily make **connections between public transit and other mobility options**.

- Intended to make using transit easier/more efficient
- Scalable
- Strategic approach to manage personal vehicle demand, parking, emissions
- Can be implemented through public-private partnerships

WHY MOBILITY HUBS IN BEND?

Identified in:

2019 Bend Transportation System Plan (TSP)

2020 Cascades East Transit (CET) Transit Master Plan (TMP)

To use mobility hubs to:

- Move away from current 'hub-and-spoke' transit system
  - Create a more multi-centric network
    - Reduce pressure on Hawthorne Station
    - Increase efficiency: Fewer transfers needed, quicker/more direct trips
    - Improve access to transit: "Last-mile" options
- Increase transportation options in Bend
  - Reduce reliance on cars / single occupancy
    - Reduction of vehicle miles traveled (VMT) and GHG emissions

KEY QUESTIONS OF STUDY

Purpose: To explore the feasibility of mobility hubs in Bend and identify opportunities for implementation.

Lots of questions & needs…

- How have other **peer agencies** implemented mobility hubs?
- What is the current and future **market demand** for mobility hub services in Bend?
- What defines a **"successful"** mobility hub in Bend?
- What **"types" of mobility hubs and features** make sense in Bend?
- Assess near- and longer-term **opportunities**
- Develop **design guidance** and an **implementation strategy**
- Develop **performance measures** *(specific to a pilot project)*

PROJECT OUTLINE AND TIMEFRAME

Technical Advisory Committee (TAC) Representation

- Commute Options
- Environmental Center
- Council on Aging
- OSU-Cascades
- Bend Park and Rec Dist
- Deschutes Co Library
- Bend/La Pine School Dist
- People w/ disabilities
- Transit riders / advocates
- Older adults
- Low-income individuals
- Educational institutions
- Bicycle / pedestrian advocates
- Health and human services
- Cascades East Transit
- City of Bend
- Deschutes County

Extensive Public Engagement Efforts by CET

- 432 responses, online survey (7 in Spanish)
- 13 events reaching 500+ people in 5 priority hub locations
- 3 events focused on Spanish-speaking communities
- 5,000 people reached through shared social media posts
- 7 media outlets provided coverage
- 9 of 10 respondents support mobility hubs

OBJECTIVES DEVELOPED

The "framework" for defining what a successful mobility hub program in Bend should look like…


Create a decentralized transit network


Increase transit accessibility and equity for all users

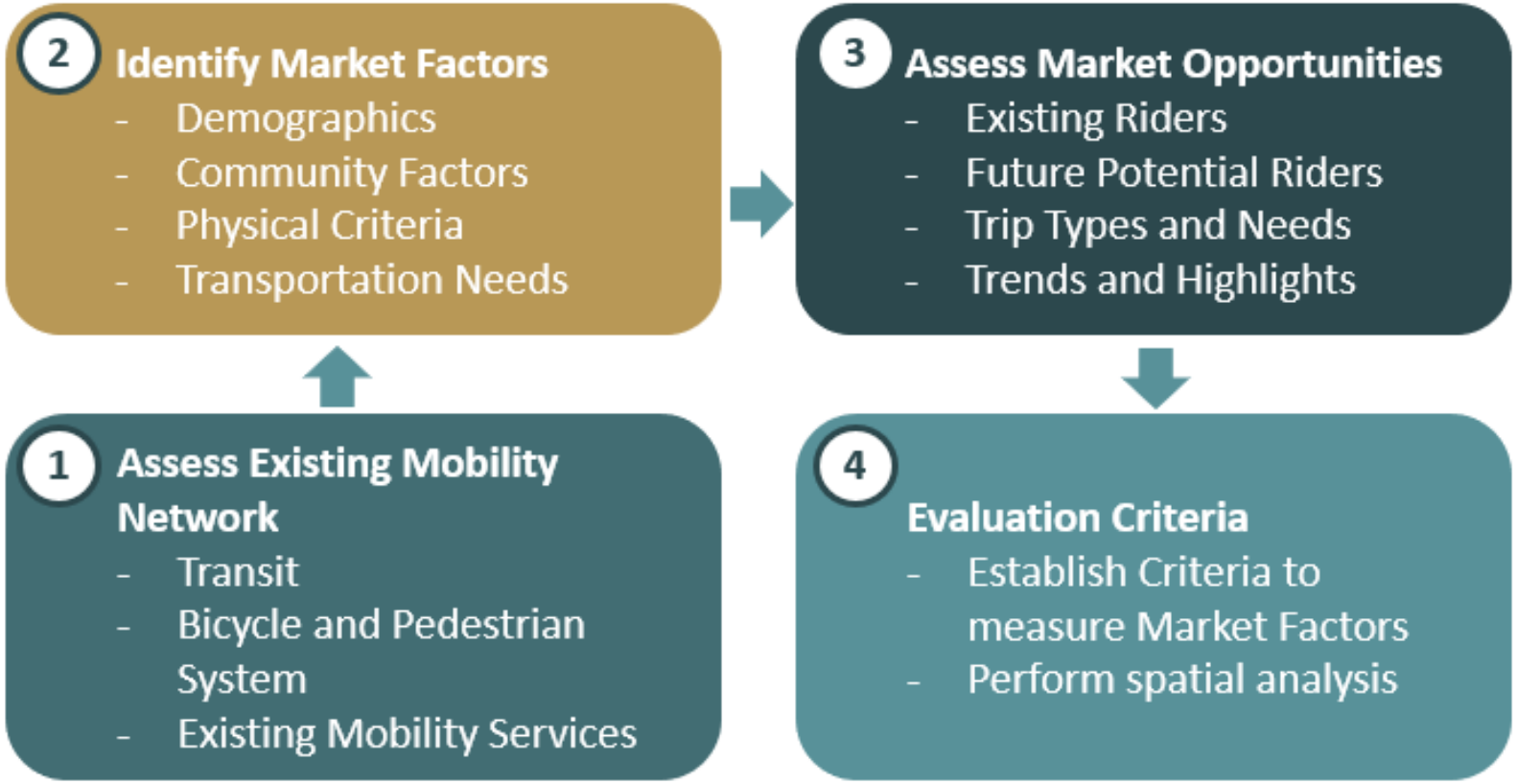

Focus on placemaking


Identify public/private partnerships


Create context-dependent, scalable, cost-effective hubs


Reduce reliance on single occupancy vehicles

MARKET ANALYSIS: METHODOLOGY



To assess current and future demand for mobility hubs and services.

MARKET ANALYSIS: OPPORTUNITIES

Types of Riders/Trips Most Likely to be Served by Mobility Hubs in Bend:

#1 All-purpose Riders and Equity Populations

#2 Tourism and Recreational Riders

#3 Intercity Trips

#4 “Choice” Commuters

#5 Students

#6 Major Employers

Potential partnerships/parties that may be interested in mobility hub development:

- *Large Employment Centers & Healthcare*
- *Developers*
- *Colleges/Universities*
- *Business & Neighborhood Associations*
- *Resort/Hospitality/Breweries/Venues*
- *Social Services*

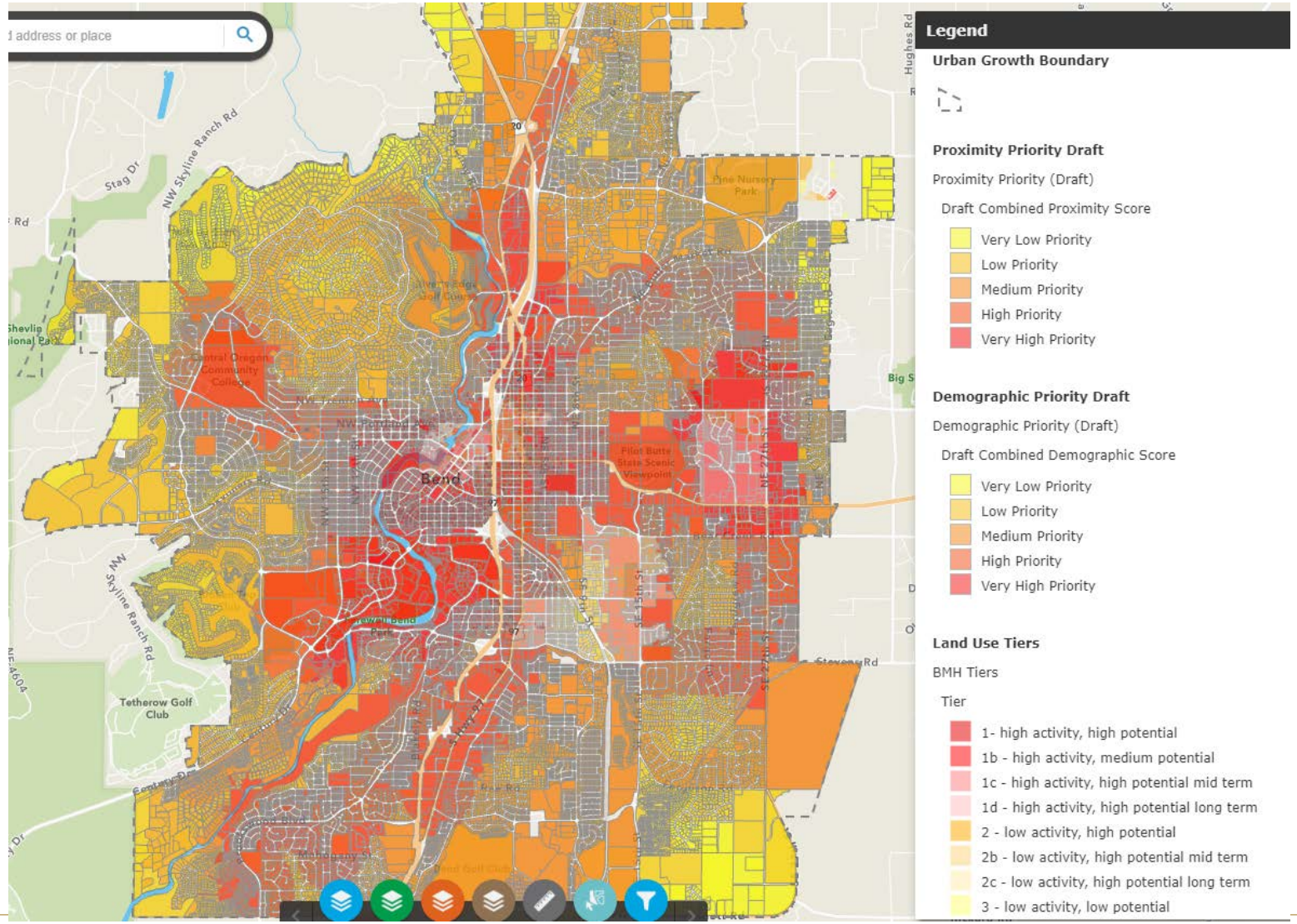
MARKET ANALYSIS: LOCATION IDENTIFICATION

Evaluation criteria developed to identify locations…

Transportation Network Factors	Community Factors	Land Use and Development Potential
• Proximity to existing or planned transit service • Access to bike/ped system	• Population density • Employment density • Low income HHs • HHs w/out a vehicle • Older adults	• Existing or projected density • Levels of current activity • Zoning • Redevelopment potential

MARKET ANALYSIS, CONT.

When applying scores to the criteria…

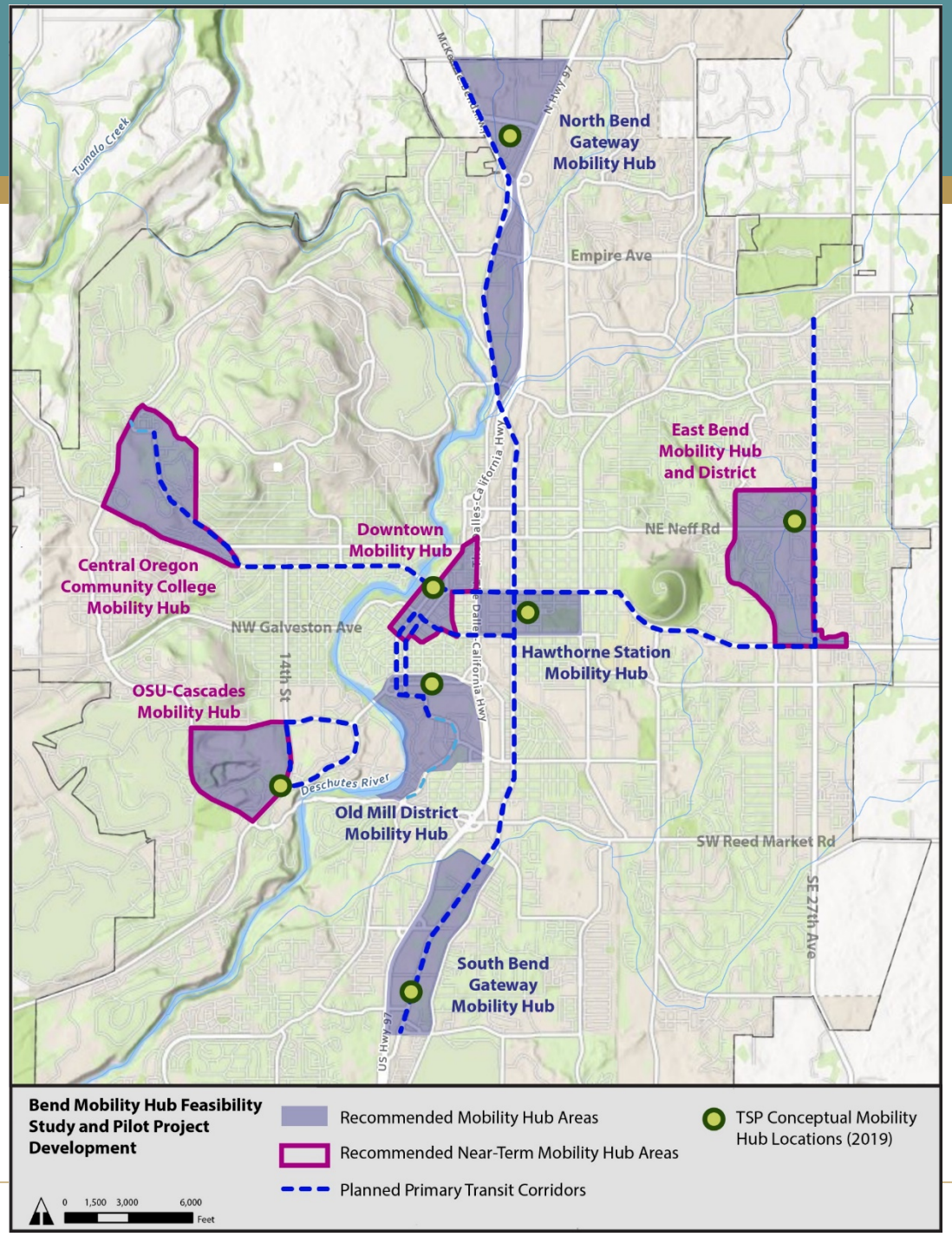


LOCATION RECOMMENDATIONS

~ 2 – 5 years: Near-term / Priority Areas

~ 5 – 10 years: Longer-term Areas

Note: Flexibility is key to seizing opportunities. **Prioritization should not preclude developing a mobility hub "out of order"** if a land acquisition or funding opportunity arises.



MOBILITY HUB TYPOLOGIES & FEATURES

Types: Specific to Bend, based on the location's surroundings.

Typology	Context	Location
Major Hub	Employment Hubs and Retail/Shopping Districts	Downtown, Hawthorne Station, Old Mill District
Secondary Hub	Institutional and Emerging Urban Districts: large trip generators with high levels of peak-hour activity	OSU Cascades Campus, COCC Campus, East Bend (St. Charles/Forum Shopping Center)
Gateway Hub	Regional Entry Points into Bend's Transit System	North Bend Cascade Village Mall / Bend River Promenade area and South 3rd district

Features: Based on type, context, location.

PHASING OF FEATURES + ELEMENTS

Lower Investment → Higher Investment

Phase 1

- Info kiosk, signage, and wayfinding
- Benches, trash can, and bicycle racks
- (2-4) on-street flex mobility spaces for **dockless bikeshare or scooter share**
- (2-4) on- or off-street flex mobility spaces for **TNC and taxi pick-up/drop-off**

Phase 2

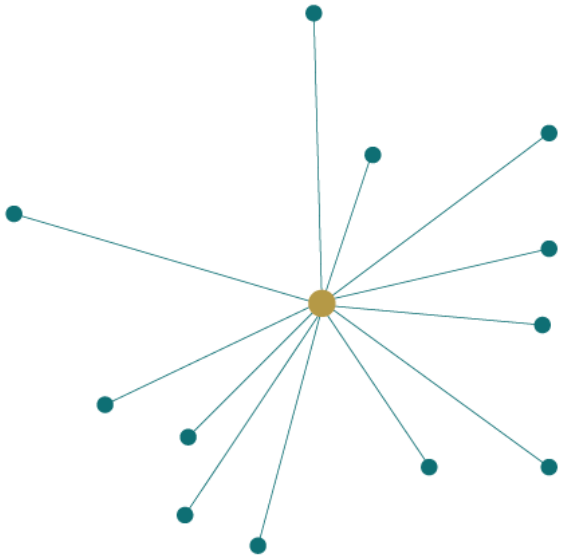
- **Expanded on and off-street flex mobility spaces** for bikeshare, scootershare, TNC, and taxi
- Covered shelters, improved lighting, fare purchase kiosks
- Secure bike lockers
- **Placemaking elements** including trees, public art, landscaping, food carts, interactive games

Phase 3

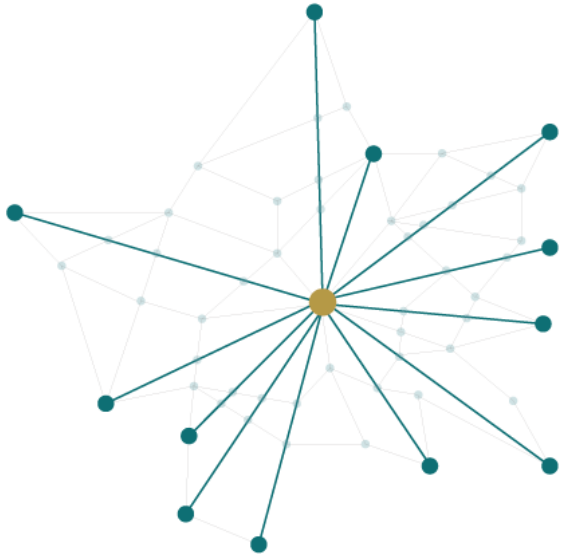
- **Transit/customer service center**- building with restrooms, indoor waiting areas, USB charging ports, WiFi
- **Transit:** Bus pads or bays, transit frequency/service upgrades
- Minimum of (6) dedicated on-street parking spaces for flex mobility **(bike and scooter share)**
- Minimum of (6) off-street parking spaces for dedicated flex mobility space **(TNC and taxi drop-off/pick up)**
- Electrification to support **real-time information displays** and **EV charging**
- (4-6) EV charging stalls

IMPLEMENTATION: PHASING

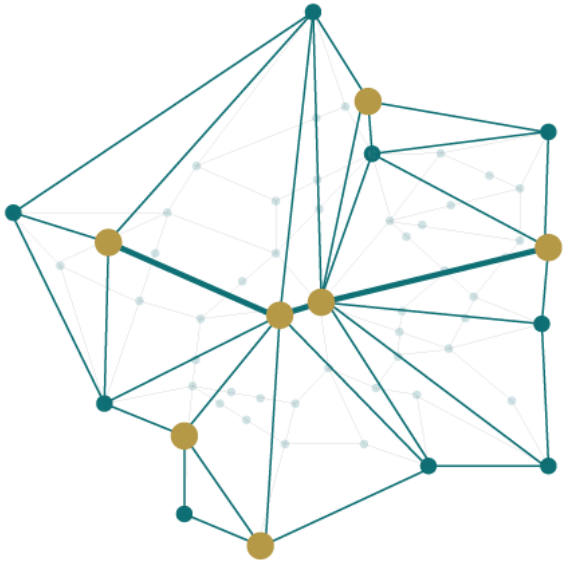
IMPLEMENTATION: NETWORK DEVELOPMENT



Existing Transit Network
"Hub and Spoke" Configuration



Existing Transit Network
+
Bend Neighborhood Mobility Points



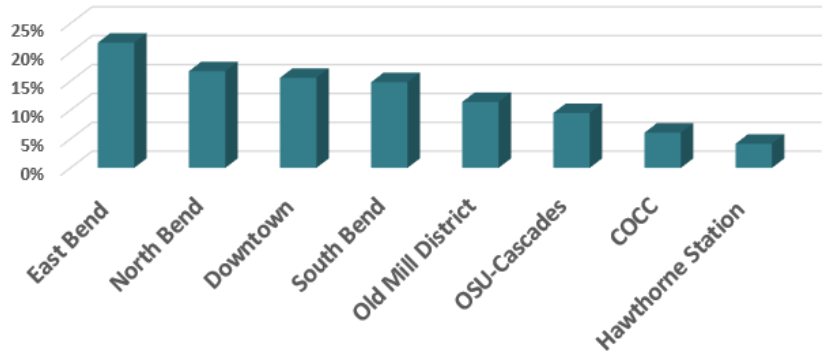
Future Mobility Hub Network
Multicentric & Interconnected

- **Major Hubs**
- **Secondary Hubs**
- **Mobility Points**

PUBLIC ENGAGEMENT SUMMARY

From In-person Events:

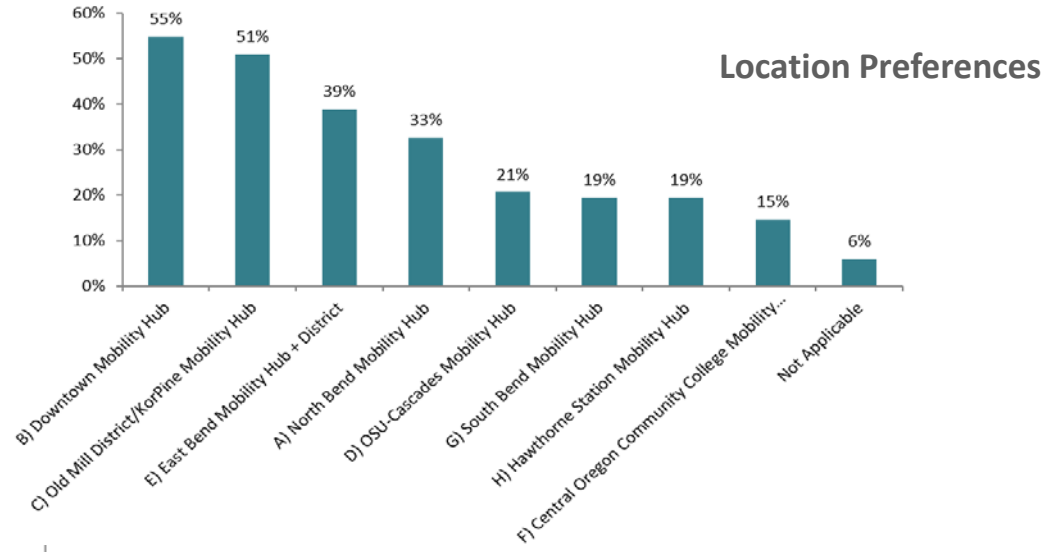
Location Preferences *(263 total responses)*

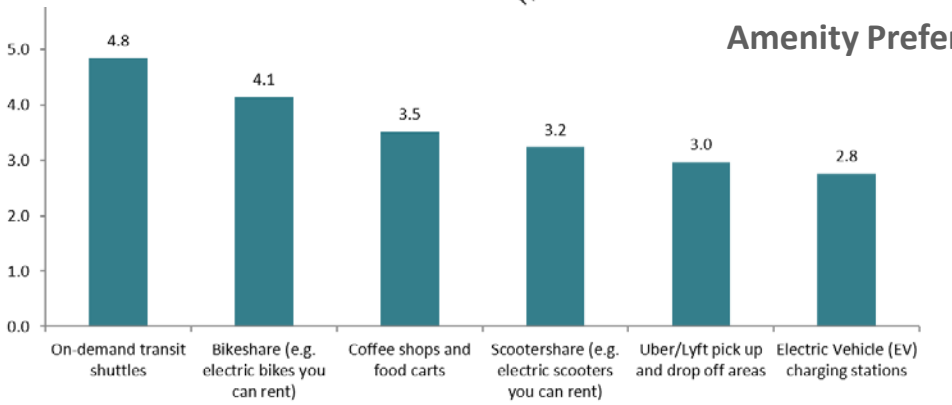


Top 10 Amenity Preferences *(835 total responses)*

1. Covered shelters
2. Real-time transit info
3. Secure bike parking
4. Food trucks/coffee
5. Pedestrian improvements
6. Benches
7. Wayfinding and route info
8. Improved lighting
9. Indoor transit center
10. Bikeshare

From Online Survey *(432 surveys submitted):*





CURRENT & NEXT STEPS

- **Pilot Project Development**
  - CET currently in discussions with City for potential downtown pilot location
    - If feasible, then begin outreach to neighboring property owners
- **Incorporate Results of Study**
  - Currently drafting amendments to City of Bend Development Code and Comprehensive Plan
  - Study to be amended into CETs TMP as technical appendix
- **Pursuing First Major Mobility Hub Site**
  - CET has funding available to purchase Phase 2/3 site by 2024
    - Realtor retained
  - Continuing and future discussions with developers / property owners

Thank you!

Questions?

Andrea Napoli, AICP
Bend MPO Project Manager
anapoli@bendoregon.gov

Derek Hofbauer
COIC Outreach + Engagement Administrator
dhofbauer@coic.org

CET is hosting the project webpage on the CET website:

https://cascadeseasttransit.com/about/bend-mobility-hub-feasibility-study/

Agenda Item # 5: CET Electric Technology Feasibility Study Overview – Derek Hofbauer, CET

Creating connections.

CET Electric Technology Feasibility Study Key Findings

Bend MPO Technical Advisory Committee

October 5, 2022

cet

Operated by COIC

WHY CONDUCT AN ELECTRIC TECHNOLOGY FEASIBILITY STUDY?

- CET is seeking opportunities to reduce reliance on fossil fuels and transition to alternative fuel sources
- The development of new mobility hubs in Bend and the redesign of the Hawthorne Station parking lot present opportunities to explore electric vehicle charging station infrastructure
- CET can become more competitive with grant applications by incorporating low or no-emission vehicles into its fleet

Photo credit: Bend Bulletin

PROJECT OVERVIEW

- Project Objectives
  - Develop CET's first strategic roadmap toward fleet electrification

- Project Approach
  - Analyze CET's transit service.
  - Determine which of CET's blocks are feasible with either battery electric 35' buses or cutaways (15' buses) in the operating conditions anticipated in CET's service environment.
  - Conduct a high-level financial analysis of transitioning those feasible blocks to battery electric technology.

FACTORS AFFECTING ZERO EMISSION BUS (ZEB) RANGE

- **Route characteristics:** speed, stops, grade

- **Ridership**

- **Climate: Heating and cooling**

- **Battery degradation**

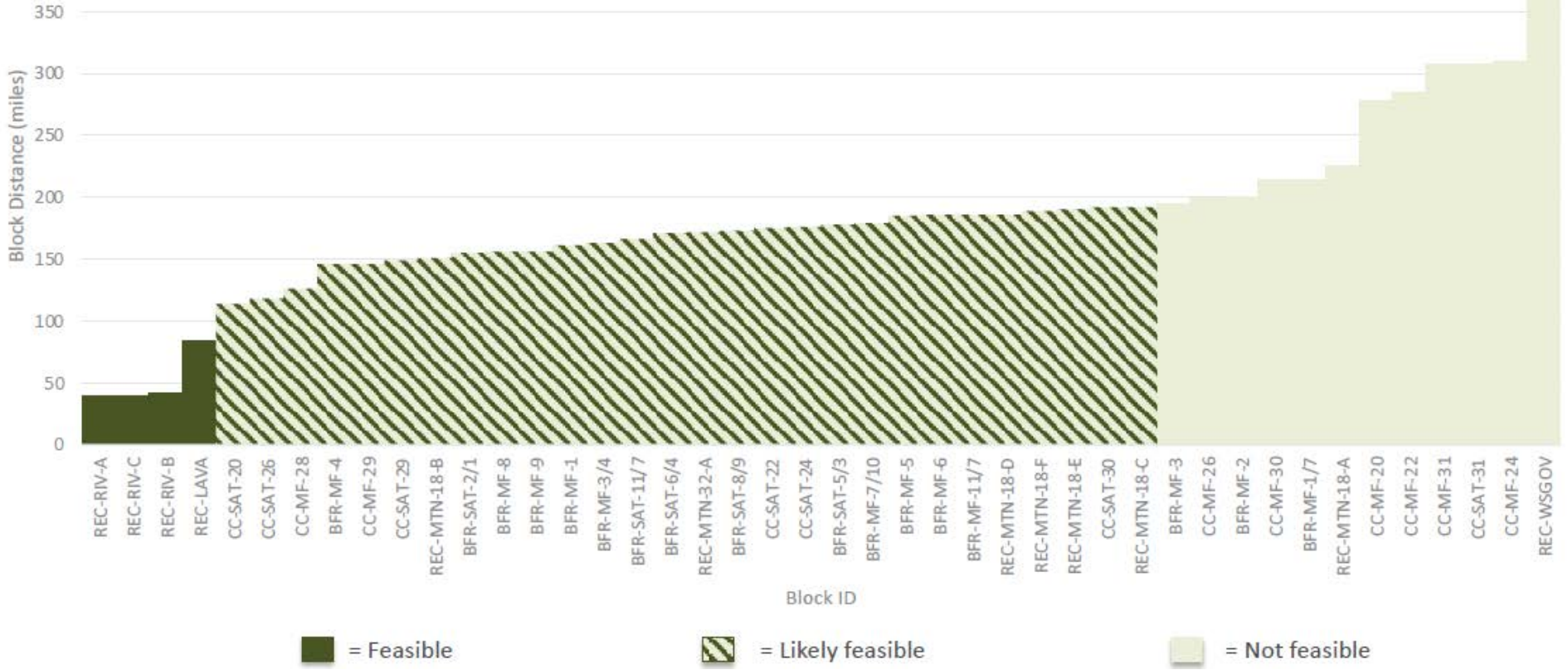
- **Operator**

ANALYSIS SCENARIOS

- CTE modeled all of CET's service blocks to assess the feasibility of the blocks running with battery electric buses.
- CTE modeled 3 main scenarios:
  - Overnight depot plug-in charging only
  - Overnight depot plug-in charging + midday depot plug-in charging with electric heat
  - Overnight depot plug-in charging + midday depot plug-in charging with diesel heat

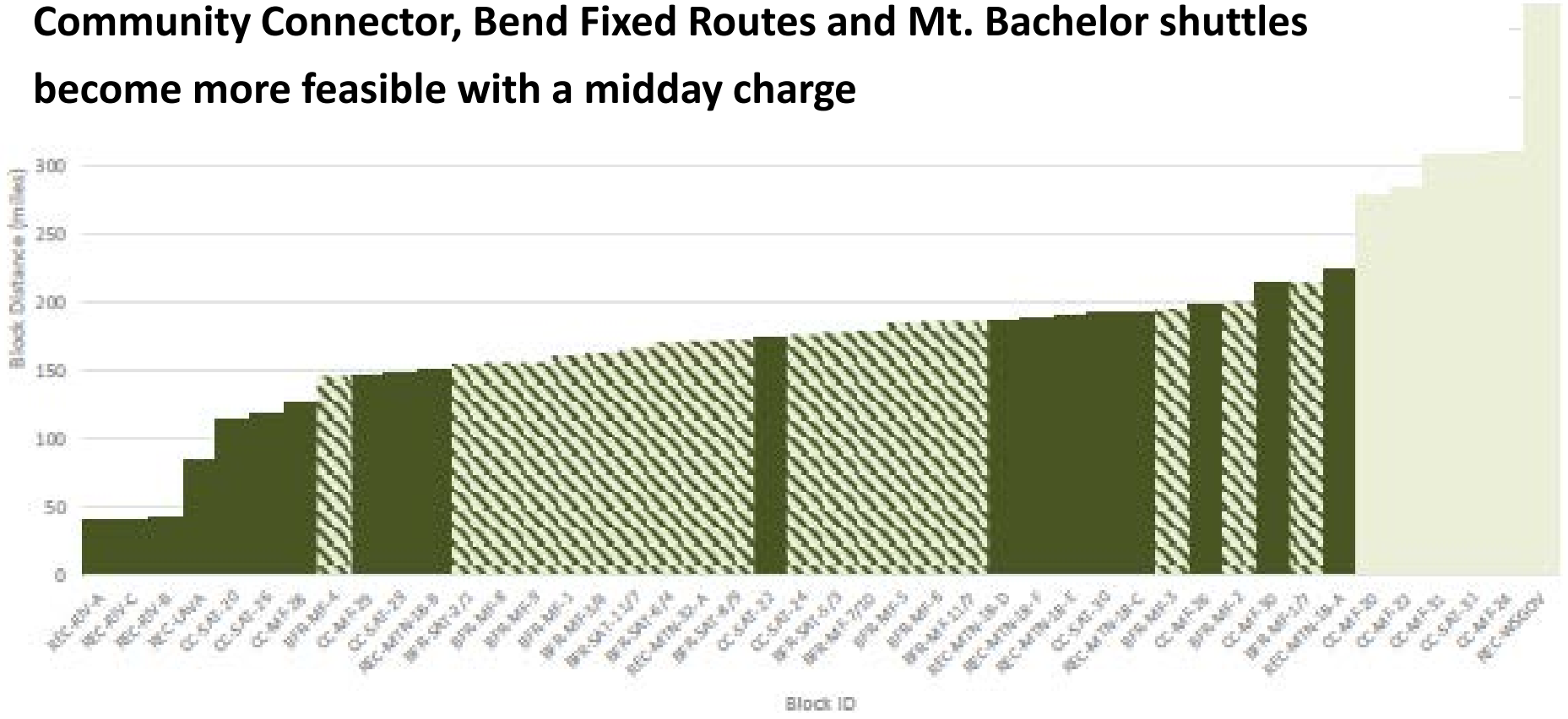
OVERNIGHT CHARGE FEASIBILITY BLOCKS FOR LARGE BUSES (35 FEET)

- **Ride the River and Lava Butte recreation services are the most feasible**
- **Shorter Community Connector and Bend Fixed Routes are likely feasible**
- **Longer Community Connector, Bend Fixed Routes and Mt. Bachelor shuttles are not feasible**



OVERNIGHT + MIDDAY CHARGE FEASIBILITY BLOCKS FOR LARGE BUSES WITH ELECTRIC HEAT

Community Connector, Bend Fixed Routes and Mt. Bachelor shuttles become more feasible with a midday charge

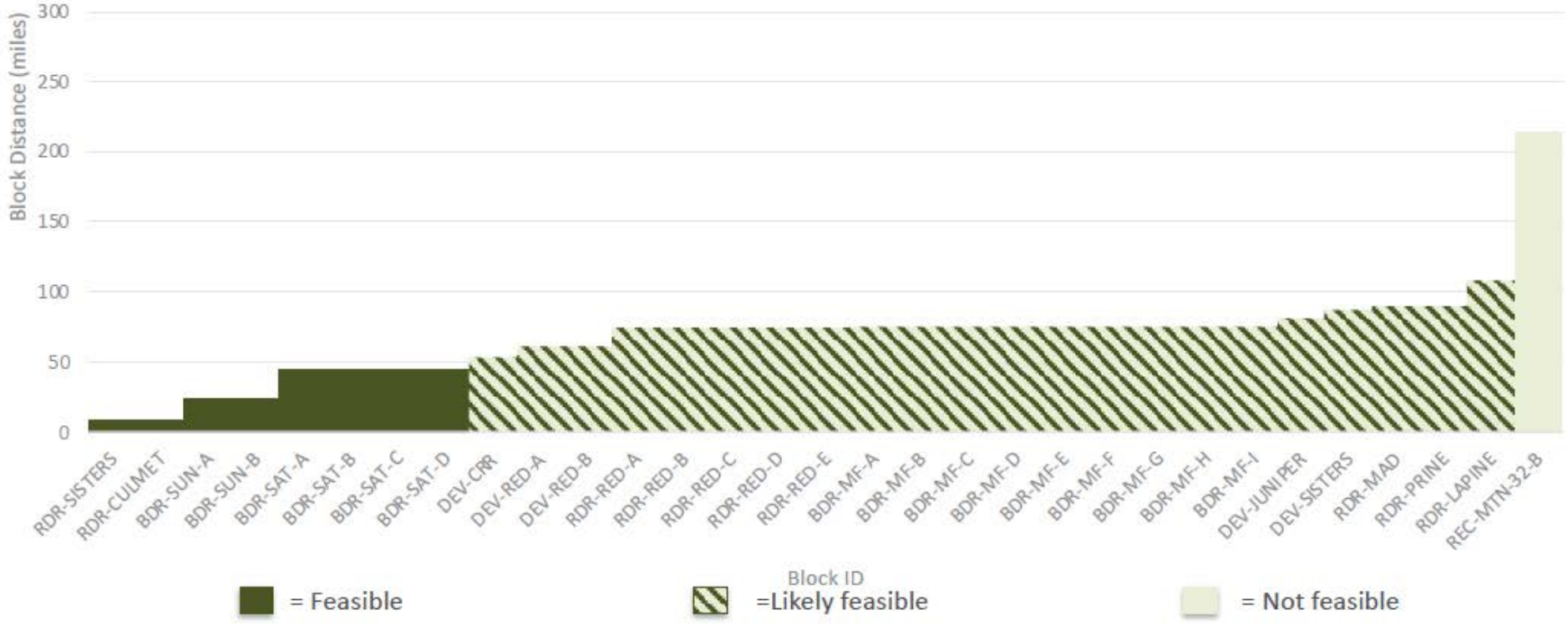


*Feasible = feasible under strenuous conditions

*Likely feasible = feasible under nominal conditions, but not all strenuous conditions

OVERNIGHT CHARGE FEASIBILITY BLOCKS FOR MID-SIZE CUTAWAY BUSES

Smaller vehicles operating on shorter Community Connector Routes, Bend and Redmond Dial-A-Ride routes, and Redmond Deviated Flex Routes are feasible with an overnight charge



Assumes HVAC is operating 50% of the time in service for all Demand Response and Deviated Flex blocks

ELECTRIC BUS FEASIBILITY SUMMARY

	With Electric Heat			With Diesel Heat		
Route Type	Overnight Charge Only	Overnight + Midday Depot Charge	Overnight + Midday Depot High-Power Charge	Overnight Charge Only	Overnight + Midday Depot Charge	Overnight + Midday Depot High- Power Charge
Bend Fixed Routes[1]	0 of 17	0 of 17	2 of 17	0 of 17	0 of 17	14 of 17
Community Connectors	0 of 15	9 of 15	10 of 15	0 of 15	10 of 15	12 of 15
Recreational Services[2]	4 of 13	10 of 13	12 of 13	4 of 13	11 of 13	12 of 13
Deviated Flex Routes[3]	0 of 4	0 of 4	0 of 4	0 of 4	0 of 4	0 of 4
Bend Dial-a Ride	6 of 15	6 of 15	6 of 15	6 of 15	6 of 15	6 of 15
Rural Dial-a-Ride[4]	2 of 11	2 of 11	2 of 11	2 of 11	2 of 11	2 of 11

WHAT DOES THIS MEAN FOR CET?

- The majority of CET's current Community Connector and Recreational Services blocks would be a good starting point for BEB deployment.
- Blocks running cutaways will be more difficult to transition to BEB right now.
  - BEB technology is improving.
  - Block changes could be made to better support electric cutaways.
- On-route charging could increase feasibility of CET's blocks, but more details on the Mobility Hub transition is needed for clarity.

STUDY RECOMMENDATIONS

- The majority of CET's current Community Connector and Recreational Services blocks would be a good starting point for BEB deployment.

- Blocks running cutaways will be more difficult to transition to BEB right now.
  - BEB technology is improving.
  - Block changes could be made to better support electric cutaways.

- On-route charging could increase feasibility of CET's blocks, but more details on the Mobility Hub transition is needed for clarity.

NEXT STEPS

- Research alternative fuel types for CET vehicles:
  - Compressed Natural Gas (CNG)
  - Renewable Natural Gas
  - Propane
- Seek grant opportunities to assess facility needs for EV charging infrastructure and/or alternative fuels storage systems
- Coordinate with community partners to assess EV utilization for shuttles and microtransit services like Ride Bend

RIDE BEND

CAPITAL COSTS

- CET's total active fleet is 70 vehicles (37 are 35' buses, 33 are 15' buses) operating a total of 1,811,128 miles per year.
- Assumes each vehicle in CET's fleet is replaced once with either a ZEB or internal combustion engine (ICE) bus.
- Assumes the replacement of ICE buses with ZEBs on currently feasible blocks.

	# ZEB		Total ZEB Miles	Bus Costs		Fueling Infrastructure Costs		Total Capital Costs
	# of 35'	# of 15'		ZEB	ICE	ZEB	ICE	
Baseline Fleet (No ZEBs)	--	--	--	--	$12.1M	--	--	**$12.1M**
BEB Overnight Charge Only + ICE Fleet	4	4	34,450	$4.3M	$10.7M	$742,500	--	**$15.7M**
BEB Overnight + Midday Charge (Electric Heat) + ICE Fleet	11	4	400,204	$10.0M	$9.2M	$2.2M	--	**$21.4M**
BEB Overnight + Midday Charge (Electric Heat) + ICE Fleet	13	4	468,147	$11.9M	$8.8M	$2.2M	--	**$22.9M**
FCEB + ICE Fleet	31	--	1,129,828	$33.4M	$5.3M	$6.0M	--	**$44.7M**

LIFECYCLE COSTS

- Assumed 12 year life for 35' buses and 7 year life for 15' buses.
- 19,655,967 lifecycle miles
- Lifecycle costs include capital, fuel, maintenance, and mid-life overhaul costs

	# ZEB		Lifecycle Costs				Total Cost per Mile
	# of 35'	# of 15'	Bus Capital Costs	Infrastructure Capital Costs	Fueling Costs	Maintenance Costs	
Baseline Fleet (No ZEBs)	--	--	$12.1M	--	$10.0M	$10.9M	**$1.68/mile**
BEB Overnight Charge Only + ICE Fleet	4	4	$15.0M	$742,500	$10.1M	$10.6M	**$1.85/mile**
BEB Overnight + Midday Charge (Electric Heat) + ICE Fleet	11	4	$19.2M	$2.2M	$9.6M	$8.8M	**$2.02/mile**
BEB Overnight + Midday Charge (Electric Heat) + ICE Fleet	13	4	$20.7M	$2.2M	$9.8M	$8.6M	**$2.10/mile**
FCEB + ICE Fleet	31	--	$38.7M	$6.0M	$15.2M	$11.3M	**$3.62/mile**

Agenda Item # 6: Member Roundtable

Agenda Item # 7: Public Comment

Agenda Item # 8: Next TAC meeting

- The next TAC meeting is scheduled for November 2nd at 10 am

Agenda Item # 9: Adjourn