

AGENDA
RTAC Priority Corridor Subgroup
September 29, 2009
8:00 – 11:00
COMPASS
800 S Industry Way
Meridian, Idaho

- 1. Operating Cost Methods and Findings**
- 2. Transit Oriented Development Assessment**
- 3. Updated Technical Matrix**
- 4. Evaluation Ranking Results**
- 5. Committee Discussion and Recommendation**

Materials included in the 9-29-09 packet:

Pg 1 – Operating cost methodology

Pg 3 – Operating cost spreadsheet – 2 methods (see methodology for description)

Pg 5 – TOD qualitative assessment

Pg 7 – Revised Technical Evaluation Matrix

Pg 9 – Evaluation Ranking Methods

Pg 15 - Ranking Matrix by Measure

Pg 16 – Weighted Scoring Matrix

**Boise Treasure Valley Phase 1 Alternatives Analysis
Operating and Maintenance Cost Estimate
September 21, 2009**

Introduction

Operating and maintenance (O&M) cost for high capacity transit (HCT) often do not receive the same level of scrutiny at the planning stage as do capital cost estimates. However, at this early planning stage, the range of potential O&M costs associated with the various HCT modes should be understood. In addition to differences in the cost to operate various HCT modes, the other key factor affecting O&M cost is the amount of service provided.

The amount of service has two components; the headway (or frequency) of the service and the span of service (the number of hours per day). Headways can be determined based on a local policy that directs a certain level of service be provided, or based on the number of runs per hour that are required to provide adequate capacity (often more frequent during the peak hours). The span of service is also a policy-based decision, where the transit provider determines when service will start and end, usually balancing community needs and desires and funding availability.

For this early planning phase, the O&M cost estimate, similar to the capital cost estimate, should be considered as a rough, order-of-magnitude estimate that can help to compare among the alternatives and provide an early sense of issues related to HCT implementation and operation.

Major Assumptions

The O&M cost estimate requires a range of inputs and assumptions. The following describes the source and rationale for the inputs and assumptions.

- Operating cost per hour (BRT) – The BRT operating cost was derived from an estimated average cost per hour for VRT buses (\$75) +10% for BRT-Mixed Traffic and +20% for BRT-Exclusive. The cost increases for BRT were estimated based on discussion with Lane Transit District relating to their BRT cost experience.
- Operating cost per hour (Light Rail and Commuter Rail) – These cost per hour assumptions are national averages based on data in the Federal Transit Administration – National Transit Database (2007). The costs were escalated from 2007 to 2009 using an estimate of the Consumer Price Index.
- Capacity per vehicle – The vehicle capacities are based on 80% of the total (seated and standing) capacity for typical bus and rail vehicles. The BRT is assumed to use articulated buses.
- Frequency per hour/Round trip runtime/Round trip miles/Average speed are all based on the definition of the alternatives prepared for the COMPASS modeling.

- Peak vehicles required are a calculation of how many vehicles would be required to provide the defined frequency with the round trip runtime.
- Daily factor to estimate hours per day – this defines the span of service. Sixteen hours was used to describe a service day that runs from 5:30 A.M. to 9:30 P.M. In reality, service would likely operate until approximately 12:00 A.M., however headways would likely taper off after 6:30 P.M. so that the 16 hour multiplier adequately accounts for a full day of service.
- Operating cost annualization factor – this is the factor applied to the daily cost in order to calculate the cost of a full year of service. As this is less than 365, it accounts for a lower level of service (23% less) being provided on Saturdays and Sundays.

Comparable Headways versus Comparable Capacity

The operating and maintenance cost estimate spreadsheet presents data for two different operating scenarios. One for service with all modes operating at 15-minute headways, and one for service with all modes providing a similar level of total seated and standing capacity. Each method provides important insight and understanding of how operating costs are calculated and of the potential benefits of modes that can add capacity by providing multiple-vehicle consists (light rail and commuter rail).

All calculations that include operating costs are being reported using both methods.

Annual Estimated Operating and Maintenance Costs - at 15 Minute Headway (2009\$)

Treasure Valley HCT Study Phase 1 Alternatives Analysis	Operating Cost per Hour ¹	Capacity per Vehicle (bus or 2-car train) ²	HCT Frequency per Hour ³	Roundtrip Runtime (min) ⁴	Roundtrip Miles ⁵	Ave Speed (mph) ⁶	Peak Vehicles Required ⁷	Estimated HCT O&M Cost per one hour ⁸	Daily Factor to estimate Hours per Day ⁹	Operating Cost Annualization Factor ¹⁰	Estimated Annual O&M Cost ¹¹
Fairview/Cherry											
BRT-Exclusive	\$90.00	91	4	124	58	28	10	\$894	16	340	\$4,863,360
BRT-Mixed Traffic	\$83.00	91	4	143	58	24	11	\$930	16	340	\$5,057,024
Light Rail	\$220.00	266	4	124	58	28	10	\$2,185	16	340	\$11,888,213
Boise Cut-Off											
BRT-Exclusive	\$90.00	91	4	101	59	35	8	\$756	16	340	\$4,112,640
Commuter Rail	\$513.00	200	4	80	57	43	7	\$3,591	16	340	\$19,535,040
Commuter Rail - Bus Shuttle	\$75.00	65	4	14	3	13	3	\$195	16	340	\$1,060,800
Light Rail	\$220.00	266	4	101	59	35	8	\$1,848	16	340	\$10,053,120
Franklin											
BRT-Exclusive	\$90.00	91	4	120	57	29	10	\$870	16	340	\$4,732,800
BRT-Mixed Traffic	\$83.00	91	4	145	58	24	11	\$941	16	340	\$5,117,227
Light Rail	\$220.00	266	4	120	57	29	10	\$2,127	16	340	\$11,569,067
Overland											
BRT-Exclusive	\$90.00	91	4	121	58	29	10	\$876	16	340	\$4,765,440
BRT-Mixed Traffic	\$83.00	91	4	142	58	25	11	\$924	16	340	\$5,026,923
Light Rail	\$220.00	266	4	121	58	29	10	\$2,141	16	340	\$11,648,853
I-84											
BRT - Mixed Traffic - Ramp Stations	\$83.00	91	4	114	55	29	9	\$769	16	340	\$4,184,085
BRT - Exclusive	\$90.00	91	4	74	55	45	7	\$594	16	340	\$3,231,360

¹ **Operating cost per hour** - Used \$75 per hour cost for VRT bus + 10% for BRT-Mixed Traffic and + 20% for BRT Exclusive. Used national average of \$513 for Commuter Rail and \$220 for Light Rail (FTA - National Transit Database)

² **Capacity per vehicle** - Based on 80% of design capacity by vehicle type. Assumes articulated buses for BRT and self propelled DMUs for Commuter Rail. Commuter Rail and Light Rail assumed as 2-car trains.

³ **HCT frequency per hour** - Based on VRT/COMPASS modeling assumptions.

⁴ **Roundtrip runtime** - Time in minutes between downtown Caldwell and Boise multi-modal center. Does not include any layover time - derived from COMPASS model.

⁵ **Roundtrip miles** - Miles between downtown Caldwell and Boise multi-modal center and back. Derived from model.

⁶ **Average speed** - Average miles per hour for HCT model over the full length including 20 seconds of dwell time at each station.

⁷ **Peak vehicles required** - The number of HCT vehicles required to complete the roundtrip at the frequency noted.

⁸ **Estimated O&M cost per one hour** - Cost in 2009 dollars to operate the number of peak vehicles for one hour.

⁹ **Daily factor to estimate hours per day** - An estimate of the number of hours of HCT service that would be provided. 16 is based on assumption of 5:30 A.M. to 9:30 P.M. Service would likely taper off after 6:30 and continue until 12:00 A.M.

¹⁰ **Operating cost annualization factor** - Factor to escalate a single day to annual. It is less than 365 to account for a lower level of service typically provided on weekends and holidays.

¹¹ **Estimated annual O&M cost** - Result of multiplying the annualization factor by the hourly cost times hours in a day.

9/2/2009

Annual Estimated Operating and Maintenance Costs - at 1,000 Capacity/Hour (2009\$)

Treasure Valley HCT Study Phase 1 Alternatives Analysis	Operating Cost per Hour	Capacity per Vehicle (bus or 2-car train)	Capacity Per Hour (@ 15 min hdwy) ¹²	HCT Frequency needed to provide 1,000 spaces per hour ¹³	Peak Vehicles Required (to provide 1,000 spaces per hr) ¹⁴	Estimated HCT O&M Cost per one hour (@ 1,000 capacity) ¹⁵	Estimated annual cost to provide 1,000 spaces per hour ¹⁶
Fairview/Cherry							
BRT-Exclusive	\$90.00	91	364	11	26	\$2,301	\$12,517,440
BRT-Mixed Traffic	\$83.00	91	364	11	29	\$2,411	\$13,116,656
Light Rail	\$220.00	266	1,064	4	10	\$2,185	\$11,888,213
Boise Cut-Off							
BRT-Exclusive	\$90.00	91	364	11	21	\$1,922	\$10,452,960
Commuter Rail	\$513.00	200	800	5	9	\$4,361	\$23,721,120
Commuter Rail - Bus Shuttle	\$75.00	65	260	16	7	\$555	\$3,019,200
Light Rail	\$220.00	266	1,064	4	8	\$1,848	\$10,053,120
Franklin							
BRT-Exclusive	\$90.00	91	364	11	25	\$2,235	\$12,158,400
BRT-Mixed Traffic	\$83.00	91	364	11	29	\$2,442	\$13,282,213
Light Rail	\$220.00	266	1,064	4	10	\$2,127	\$11,569,067
Overland							
BRT-Exclusive	\$90.00	91	364	11	25	\$2,252	\$12,248,160
BRT-Mixed Traffic	\$83.00	91	364	11	29	\$2,396	\$13,033,877
Light Rail	\$220.00	266	1,064	4	10	\$2,141	\$11,648,853
I-84							
BRT - Mixed Traffic - Ramp Stations	\$83.00	91	364	11	24	\$1,970	\$10,716,075
BRT - Exclusive	\$90.00	91	364	11	16	\$1,476	\$8,029,440

¹² Capacity per hour at 15 minute headway - Four runs per hour times the total seated and standing vehicle capacity.

¹³ HCT frequency needed to provide 1,000 spaces per hour - The HCT frequency needed to provide 1,000 seated and standing spaces on HCT vehicles.

¹⁴ Peak vehicles required to provide 1,000 spaces per hour - Based on the HCT frequency, vehicle capacity and round trip runtime, the total number of vehicles required to be in service to provide the needed headway.

¹⁵ Estimated O&M cost per one hour @ 1,000 capacity - Cost in 2009 dollars to operate the number of peak vehicles for one hour.

¹⁶ Estimated annual O&M cost @ 1,000 spaces - Result of multiplying the annualization factor by the hourly cost times hours in a day.

**Treasure Valley High Capacity Transit Study
Priority Corridor
Alternatives Analysis Phase 1
Evaluation Methodology
September 17, 2009**

GOAL 4: SUPPORT TRANSPORTATION AND LAND USE PLANS

Objective 4.2. Provide opportunities for transit-oriented development.

Introduction

Different modes and types of alignments have different degrees of influence on land development. Generally, the higher the investment in permanent transit infrastructure, the higher the likelihood is of higher intensity development occurring adjacent to it. Different types of alignments also lend themselves to different levels of development response, depending on ability to access the transit alignment.

Mode and alignment support transit-oriented development

This is a general, qualitative measure of each alternative's ability to influence development. It is based on both the mode's level of investment in permanent infrastructure and the general characteristics of the alignment.

Analysis

Generally investments in rail transit infrastructure support increased intensity of land use. Land becomes more valuable when it is easily accessible. Any transportation infrastructure increases the accessibility of land. When that infrastructure is a permanent investment, such as a highway or a rail line, developers respond by building more intensively. With transit investments, the degree to which developers respond and build more intensively is directly proportional to the level of investment in transit infrastructure. The more permanent the transit infrastructure is, the more likely it is to result in higher intensity development.

The ability of a transit line to influence development also depends on the accessibility of the transit line from adjacent land. Arterial alignments would have the highest accessibility from adjacent land, while railroad and freeway alignments would have lower accessibility from adjacent land due to the broad width of the right-of-way and limited crossings.

The following lists qualitative findings for the Treasure Valley HCT alternatives:

Boise Cutoff: Moderately supportive of transit-oriented development.

- Commuter rail, light rail, and BRT would be moderately supportive of transit-oriented development. All three modes would be an investment in permanent transit infrastructure. However, the alignment's location on the Boise Cutoff alignment would tend to limit its

ability to influence adjacent land development. In addition, the limited number of stations and hours of operation for commuter rail would tend to limit its influence on land development.

Arterial Alignments:

- Light Rail would be supportive of transit-oriented development along all three arterial alignments. It is an investment in permanent rail infrastructure with moderately good accessibility to adjacent land.
- BRT - Exclusive would be moderately supportive of transit-oriented development along the arterial alignments. It is an investment in permanent infrastructure, though not as heavy an investment as light rail.
- BRT - Mixed Traffic would have little influence on adjacent land development because it is a limited investment in infrastructure.

I-84/I-184:

- Express BRT on I-84/I-184 would have poor influence on adjacent land development. It would be a limited investment in transit infrastructure and it would have limited accessibility from adjacent land.

TREASURE VALLEY HIGH CAPACITY TRANSIT SYSTEM STUDY
Priority Corridor Phase 1 Alternatives Analysis

DRAFT - Technical Matrix - 9-21-09

Goals / Design Concepts	Measure	Boise Cutoff			Fairview/Cherry			Franklin			Overland			I-84/I-184		
		Commuter Rail	Light Rail	BRT - Exclusive	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Express BRT - Exclusive	Express BRT - Mixed Traffic	
GOAL 1: IMPROVE TRANSIT CONNECTIVITY																
Objective 1.1 Connect major city central business districts (CBDs)	Number of major city CBDs with direct HCT connection	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Direct access to all four CBDs	Directly serves Boise, Nampa and Caldwell CBDs - does not directly serve Meridian CBD	Directly serves Boise, Nampa and Caldwell CBDs - does not directly serve Meridian CBD	Directly serves Boise, Nampa and Caldwell CBDs - does not directly serve Meridian CBD	Directly serves Boise and Caldwell CBDs - does not directly serve Meridian and Nampa CBDs	Directly serves Boise and Caldwell CBDs - does not directly serve Meridian and Nampa CBDs	
Objective 1.2 Connect residential areas with major employment centers	Number of major employment centers served with HCT	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 5 designated employment centers	Serves 4 designated employment centers	Serves 4 designated employment centers	Serves 4 designated employment centers	Serves 4 designated employment centers	Serves 4 designated employment centers	
Objective 1.3 Connect residential areas with major activity centers	Number of major activity centers served with alignment	Serves 3 main activity centers (St. Luke's Boise, St. Luke's Meridian, Boise State University), and 11 commercial centers	Serves 3 main activity centers (St. Luke's Boise, St. Luke's Meridian, Boise State University), and 11 commercial centers	Serves 3 main activity centers (St. Luke's Boise, St. Luke's Meridian, Boise State University), and 11 commercial centers	Serves 2 main activity centers (Mercy North Hospital and St. Alphonsus Medical Center), and 7 commercial centers	Serves 2 main activity centers (Mercy North Hospital and St. Alphonsus Medical Center), and 7 commercial centers	Serves 2 main activity centers (Mercy North Hospital and St. Alphonsus Medical Center), and 7 commercial centers	Serves 3 main activity centers (Mercy North Hospital, St. Alphonsus Medical Center and St. Lukes Meridian), and 12 commercial centers	Serves 3 main activity centers (Mercy North Hospital, St. Alphonsus Medical Center and St. Lukes Meridian), and 12 commercial centers	Serves 2 main activity centers (Mercy North Hospital and St. Lukes Meridian), and 7 commercial centers	Serves 2 main activity centers (St. Lukes Boise and BSU), and 7 commercial centers	Serves 2 main activity centers (St. Lukes Boise and BSU), and 7 commercial centers	Serves 2 main activity centers (St. Lukes Boise and BSU), and 7 commercial centers	Serves 3 main activity centers (Mercy North Hospital, St. Alphonsus Medical Center and St. Lukes Meridian), and 11 commercial centers	Serves 3 main activity centers (Mercy North Hospital, St. Alphonsus Medical Center and St. Lukes Meridian), and 11 commercial centers	
GOAL 2: IMPROVE TRANSIT MOBILITY																
Objective 2.1 Provide dedicated transit right-of-way where possible	Width and use of existing right-of-way	No additional ROW required	35% of the alignment would require additional ROW.	35% of the alignment would require additional ROW.	77% of the alignment would require additional ROW.	77% of the alignment would require additional ROW.	No additional ROW required	43% of the alignment would require additional ROW.	43% of the alignment would require additional ROW.	No additional ROW required	69% of the alignment would require additional ROW.	69% of the alignment would require additional ROW.	No additional ROW required	100% of the alignment would require additional ROW for additional lanes	No additional ROW required	
Objective 2.2 Provide good transit transfer opportunities with planned future bus system	Number of locations where the HCT alignment would connect with one bus route	3	5	5	3	3	3	6	6	6	3	3	3	3	3	
	Number of locations where the HCT alignment would connect with two or more bus routes	5	8	8	19	19	19	14	14	14	17	17	17	7	7	
Objective 2.3 Minimize transit travel time between major origins/destinations	2035 transit travel times along HCT alignments (Caldwell to Boise Multi-Modal Center)	51 min total 41 min on commuter rail 4 min transfer 6 min on shuttle to downtown Boise	51 min	51 min	62 min	62 min	71 min	60 min	60 min	73 min	61 min	61 min	71 min	37 min	57 min	
	Travel Time Reliability	High reliability	High reliability	High reliability	High reliability	High reliability	Poor reliability	High reliability	High reliability	Poor reliability	High reliability	High reliability	Poor reliability	High reliability	Poor reliability	
GOAL 3: MANAGE TRAVEL DEMAND																
Objective 3.1 Improve transit mode share	Daily boarding rides on HCT mode (baseline no-build scenario = 12,700)	22,000 with 15 min headway 19,800 with 30 min headway	26,500	26,500	18,900	18,900	17,000	15,800	15,800	13,800	17,400	17,400	15,800	21,400	15,600	
Objective 3.2 Provide service with good access for walk and bike	Existing and forecast year population and population density within 1/2 mile of alignment	2008: 68,291 2008: 3.5 Pop/acre 2035: 98,749 2035: 5.1 Pop/acre	2008: 72,467 2008: 3.7 Pop/acre 2035: 104,033 2035: 5.3 Pop/acre	2008: 72,467 2008: 3.7 Pop/acre 2035: 104,033 2035: 5.3 Pop/acre	2008: 83,376 2008: 4.4 Pop/acre 2035: 110,707 2035: 5.8 Pop/acre	2008: 83,376 2008: 4.4 Pop/acre 2035: 110,707 2035: 5.8 Pop/acre	2008: 83,376 2008: 4.4 Pop/acre 2035: 110,707 2035: 5.8 Pop/acre	2008: 64,071 2008: 3.4 Pop/acre 2035: 93,964 2035: 5.0 Pop/acre	2008: 64,071 2008: 3.4 Pop/acre 2035: 93,964 2035: 5.0 Pop/acre	2008: 66,844 2008: 3.5 Pop/acre 2035: 97,444 2035: 5.1 Pop/acre	2008: 76,024 2008: 3.9 Pop/acre 2035: 97,404 2035: 5.0 Pop/acre	2008: 76,024 2008: 3.9 Pop/acre 2035: 97,404 2035: 5.0 Pop/acre	2008: 76,024 2008: 3.9 Pop/acre 2035: 97,404 2035: 5.0 Pop/acre	2008: 44,997 2008: 2.5 Pop/acre 2035: 68,416 2035: 3.8 Pop/acre	2008: 44,997 2008: 2.5 Pop/acre 2035: 68,416 2035: 3.8 Pop/acre	
	Existing and forecast year employment and employment density within 1/2 mile of alignment	2008: 84,344 2008: 4.3 Jobs/acre 2035: 131,786 2035: 6.7 Jobs/acre	2008: 87,248 2008: 4.4 Jobs/acre 2035: 133,180 2035: 6.8 Jobs/acre	2008: 87,248 2008: 4.4 Jobs/acre 2035: 133,180 2035: 6.8 Jobs/acre	2008: 64,214 2008: 3.4 Jobs/acre 2035: 90,389 2035: 4.8 Jobs/acre	2008: 64,214 2008: 3.4 Jobs/acre 2035: 90,389 2035: 4.8 Jobs/acre	2008: 64,214 2008: 3.4 Jobs/acre 2035: 90,389 2035: 4.8 Jobs/acre	2008: 64,214 2008: 3.4 Jobs/acre 2035: 90,389 2035: 4.8 Jobs/acre	2008: 84,842 2008: 4.5 Jobs/acre 2035: 131,622 2035: 7.0 Jobs/acre	2008: 84,842 2008: 4.5 Jobs/acre 2035: 131,622 2035: 7.0 Jobs/acre	2008: 83,133 2008: 4.4 Jobs/acre 2035: 130,122 2035: 6.8 Jobs/acre	2008: 69,614 2008: 3.6 Jobs/acre 2035: 105,978 2035: 5.5 Jobs/acre	2008: 69,614 2008: 3.6 Jobs/acre 2035: 105,978 2035: 5.5 Jobs/acre	2008: 69,614 2008: 3.6 Jobs/acre 2035: 105,978 2035: 5.5 Jobs/acre	2008: 59,178 2008: 3.3 Jobs/acre 2035: 90,058 2035: 5.0 Jobs/acre	2008: 59,178 2008: 3.3 Jobs/acre 2035: 90,058 2035: 5.0 Jobs/acre
	Qualitative assessment of opportunities for and quality of walk and bike access	Meridian is considering a multi-use path adjacent to rail line. Very limited access to adjacent residential and employment areas.	Meridian is considering a multi-use path adjacent to rail line. Very limited access to adjacent residential and employment areas.	Meridian is considering a multi-use path adjacent to rail line. Very limited access to adjacent residential and employment areas.	Widening planned east of Locust Grove likely to include bike lanes and sidewalks.	Widening planned east of Locust Grove likely to include bike lanes and sidewalks.	Widening planned east of Locust Grove likely to include bike lanes and sidewalks.	Street reconstruction associated with LRT would likely include sidewalks and bike lanes	Street reconstruction associated with BRT would likely include sidewalks and bike lanes	No major street reconstruction or widening planned. Discontinuous sidewalk and limited shoulder space for bikes west of Maple Grove.	Street reconstruction associated with LRT would likely include sidewalks and bike lanes	Street reconstruction associated with BRT would likely include sidewalks and bike lanes	Sidewalks exist on most portions in Ada County. Shoulder bike lanes are striped in new sections.	Bike and ped access is possible but interchange areas are not pedestrian and bike friendly.	Bike and ped access is possible but interchange areas are not pedestrian and bike friendly.	
Objective 3.3 Provide potential park-and-ride sites with good auto access	Ability to site major park-and-ride facilities	Vacant parcels available within or adjacent to rail right-of-way. Close to I-84 and readily accessible from the freeway. Would directly serve Boise Towne Square Mall, which could potentially accommodate a combined parking structure for P&R and the mall. Would directly serve College of Western Idaho and Idaho Center, both potential sites for large shared P&R lots.	Relatively built out, limiting the availability of land for P&R sites. Further from I-84, potentially limiting the P&R travel shed. Identified as a mobility corridor which could improve accessibility to P&Rs. Would directly serve College of Western Idaho and Idaho Center, both potential sites for large shared P&R lots.	Moderately built out with a relatively high number of parcels potentially available for P&R sites. Close to I-84 and readily accessible from the freeway. Would directly serve Boise Towne Square Mall, which could potentially accommodate a combined parking structure for P&R and the mall. Would directly serve the Idaho Center, a potential site for a large shared P&R lot.	Moderately built out with a number of parcels potentially available for P&R sites. Relatively close to I-84 with good freeway access.	P&Rs located along I-84 would be within easy access to a large travel shed. Local access could be complicated in vicinity of freeway interchanges. Siting P&Rs for easy auto access near interchanges and maintaining a short walk distance from the P&R to the HCT station is a challenge.										

TREASURE VALLEY HIGH CAPACITY TRANSIT SYSTEM STUDY
Priority Corridor Phase 1 Alternatives Analysis

DRAFT - Technical Matrix - 9-21-09

Goals / Design Concepts	Measure	Boise Cutoff			Fairview/Cherry			Franklin			Overland			I-84/I-184	
		Commuter Rail	Light Rail	BRT - Exclusive	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Express BRT - Exclusive	Express BRT - Mixed Traffic
Objective 3.4 Minimize impacts to traffic operations	Potential impact of HCT concept on traffic operations and major signalized intersections	Crossing signal upgrades would be needed at several locations. Potential for some delay to cross-street traffic. Coordinated signals may be required at some Franklin Road intersections to avoid traffic queuing over tracks. Grade separation may be needed at Eagle Road.	Crossing signal upgrades would be needed at several locations. Potential for some delay to cross-street traffic. Coordinated signals may be required at some Franklin Road intersections to avoid traffic queuing over tracks. Grade separation may be needed at Eagle Road.	Crossing signal upgrades would be needed at several locations. Potential for some delay to cross-street traffic. Coordinated signals may be required at some Franklin Road intersections to avoid traffic queuing over tracks. Grade separation may be needed at Eagle Road.	High level of existing left turns to access driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	High level of existing left turns to access driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	Mixed traffic operations would impact transit reliability. Long queue lengths could require queue-bypass treatments over 500' long.	Limited amount of existing left turn traffic to driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	Limited amount of existing left turn traffic to driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	Mixed traffic operations would impact transit reliability. Long queue lengths could require queue-bypass treatments over 500' long.	Moderate to high level of existing left turns to access driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	Moderate to high level of existing left turns to access driveways would need to be accommodated with U-turns at signalized intersections. Traffic signal priority would be likely which could impact intersection performance.	Mixed traffic operations would impact transit reliability. Long queue lengths could require queue-bypass treatments over 500' long.	Exclusive lanes located on the left and stations located on ramps on the right would create delays to transit due to weaving at interchanges. Overall operations would have limited impact on traffic operations.	Mixed traffic operations would impact transit reliability.
GOAL 4: SUPPORT TRANSPORTATION AND LAND USE PLANS															
Objective 4.1 Provide transit improvements that are consistent with adopted local, state, and regional plans	HCT improvements identified in local, state, and regional plans	Included in CIM. Included in Meridian and Nampa Comp Plans. Supportive of Boise, Ada, Canyon Comp Plans	Included in CIM. Included in Nampa Comp Plan. Supportive of Boise, Ada, Canyon Comp Plans	Not specifically referenced in planning documents. Supportive of broad Comp Plan goals for improved transit service.	Plans for future transit service noted in CIM. HCT improvement would support Old Boise/Eastside Master Plan -30th Street Area Master Plan -Boise, Ada and Canyon Comp Plans	Plans for future transit service noted in CIM. HCT improvement would support Old Boise/Eastside Master Plan -30th Street Area Master Plan -Boise, Ada and Canyon Comp Plans	Plans for future transit service noted in CIM. HCT improvement would support Old Boise/Eastside Master Plan -30th Street Area Master Plan -Boise, Ada and Canyon Comp Plans	Noted in CIM as potential express bus route. Supportive of broad Comp Plan goals for improved transit service.	Noted in CIM as potential express bus route. Supportive of broad Comp Plan goals for improved transit service.	Noted in CIM as potential express bus route. Supportive of broad Comp Plan goals for improved transit service.	Supportive of broad Comp Plan goals for improved transit service. SW Boise and S Meridian Transportation Plans reference Overland as a primary transit route	Supportive of broad Comp Plan goals for improved transit service. SW Boise and S Meridian Transportation Plans reference Overland as a primary transit route	Supportive of broad Comp Plan goals for improved transit service. SW Boise and S Meridian Transportation Plans reference Overland as a primary transit route	Supportive of broad Comp Plan goals for improved transit service.	Supportive of broad Comp Plan goals for improved transit service.
Objective 4.2 Provide opportunities for transit-oriented development	Mode and alignment support transit-oriented development	Limited access ROW and limited stations and service hours. Commuter rail on the Boise Cutoff alignment would moderately support TOD.	Limited access ROW. Light rail on the Boise Cutoff alignment would moderately support TOD	Limited access ROW. Exclusive BRT on the Boise Cutoff alignment would moderately support TOD	Good access and high infrastructure investment. Light rail on the Fairview alignment would support TOD	Good access and moderate infrastructure investment. Exclusive BRT on the Fairview alignment would moderately support TOD	Good access and minimal infrastructure investment. Mixed Traffic BRT on the Fairview alignment would have little influence on TOD	Good access and high infrastructure investment. Light rail on the Franklin alignment would support TOD	Good access and moderate infrastructure investment. Exclusive BRT on the Franklin alignment would moderately support TOD	Good access and minimal infrastructure investment. Mixed Traffic BRT on the Franklin alignment would have little influence on TOD	Good access and high infrastructure investment. Light rail on the Overland alignment would support TOD	Good access and moderate infrastructure investment. Exclusive BRT on the Overland alignment would moderately support TOD	Good access and minimal infrastructure investment. Mixed Traffic BRT on the Overland alignment would have little influence on TOD	Poor access. An express bus on I-84 would have little influence on TOD	Poor access. An express bus on I-84 would have little influence on TOD
GOAL 5: FINANCIAL FEASIBILITY															
Objective 5.1 Develop high-capacity transit concepts that have the potential to be funded using a mix of federal, state, and local funds	Order-of-magnitude capital cost (in millions)	\$230 - \$350	\$1,150 - \$1,720	\$470 - \$720	\$1,530 - \$2,290	\$430 - \$640	\$25 - \$40	\$1,480 - \$2,220	\$420 - \$630	\$25 - \$40	\$1,540 - \$2,310	\$430 - \$650	\$25 - \$40	\$510 - \$780	\$50 - \$80
	Estimated operations and maintenance cost - all modes at 15 minute headway (in millions 2009\$)	\$19.5 +\$1.0	\$10.0	\$4.1	\$11.9	\$4.9	\$5.1	\$11.6	\$4.7	\$5.1	\$11.6	\$4.8	\$5.1	\$3.2	\$4.2
	Estimated operations and maintenance cost - all modes provide 1,000 per hour capacity	\$23.7 + \$3.0	\$10.0	\$10.4	\$11.9	\$12.5	\$13.1	\$11.6	\$12.2	\$13.4	\$11.6	\$12.2	\$13.0	\$8.0	\$10.7
Objective 5.2 Develop cost-effective high-capacity transit concepts	Annualized capital cost per HCT rider	\$2.10 - \$3.20 with 15 min headway \$2.30 - \$3.50 with 30 min headway	\$6.60 - \$9.90	\$2.90 - \$4.40	\$12.40 - \$18.50	\$3.70 - \$5.50	\$0.20 - \$0.40	\$14.30 - \$21.50	\$4.30 - \$6.50	\$0.30 - \$0.40	\$13.50 - \$20.30	\$4.00 - \$6.10	\$0.30 - \$0.40	\$3.90 - \$5.90	\$0.60 - \$0.80
	Operating cost per HCT rider at 15 minute headway	\$3.7	\$1.2	\$0.5	\$1.9	\$0.8	\$1.0	\$2.2	\$1.0	\$1.2	\$2.0	\$0.9	\$1.0	\$0.5	\$0.9
	Operating cost per HCT rider at 1,000 per hour	\$4.8	\$1.2	\$1.3	\$1.9	\$2.2	\$2.5	\$2.2	\$2.5	\$3.1	\$2.0	\$2.3	\$2.7	\$1.2	\$2.2

**Treasure Valley HCT
Priority Corridor Alternatives Analysis Phase 1**

EVALUATION RANKINGS

Objective 1.1. Connect major city central business districts (CBDs).

Measure: Number of major city CBDs with direct HCT connection

- 1 = Serves one or zero of the four CBDs.
- 2 = Serves two out of the four CBDs.
- 3 = Serves three out of the four CBDs.
- 4 = Serves all four CBDs, but would have limited for walk access to at some major facilities.
- 5 = Serves all four CBDs and would allow for walk access to major facilities.

Objective 1.2. Connect residential areas with major employment centers.

Measure: Number of major employment centers served with HCT

- 1 = Serves less than 3 employment centers.
- 2 = Serves 4 employment centers.
- 3 = Serves 5 employment centers.
- 4 = Serves 6 employment centers.
- 5 = Serves 7 or more employment centers.

Objective 1.3. Connect residential areas with major activity centers.

Measure: Number of major activity centers served with alignment

- 1 = Serves fewer than 2 main activity centers, and fewer than 5 commercial centers.
- 2 = Serves 2 main activity centers, and fewer than 10 commercial centers.
- 3 = Serves 2 main activity centers, and at least 10 commercial centers.
- 4 = Serves 3 main activity centers, and at least 10 commercial centers.
- 5 = Serves 3 main activity centers, and at least 20 commercial centers.

Objective 2.1. Provide dedicated transit right-of-way where possible.

Measure: Width and use of existing right-of-way

- 1 = 80 percent or more of the alignment would need additional right-of-way.
- 2 = 61 to 80 percent of the alignment would need additional right-of-way.
- 3 = 41 to 60 percent of the alignment would need additional right-of-way.
- 4 = 21 to 40 percent of the alignment would need additional right-of-way.
- 5 = 20 percent or less of the alignment would need additional right-of-way.

Objective 2.2. Provide good transit transfer opportunities with planned future bus system.

Measure: Number of locations where the HCT alignment would connect with one bus route

- 1 = Fewer than 2 locations
- 2 = 2 to 3 locations
- 3 = 4 to 5 locations
- 4 = 6 to 7 locations
- 5 = more than 7 location

Measure: Number of locations where the HCT alignment would connect with two or more bus routes

- 1 = Fewer than 5 locations
- 2 = 5 to 10 locations
- 3 = 11 to 15 locations
- 4 = 16 to 20 locations
- 5 = more than 20 locations

Objective 2.3. Minimize transit travel time between major origins/destinations.

Measure: 2035 transit travel times along HCT alignments (Caldwell to Boise Multi-Modal Center)

- 1 = 75 min or more
- 2 = 66 to 75 min
- 3 = 56 to 65 min
- 4 = 46 to 55 min
- 5 = 45 min or less

Measure: Travel Time Reliability.

- 2 = Poor reliability – HCT operation subject to traffic congestion and roadway incidents
- 4 = High reliability – HCT operates in exclusive guideway

Objective 3.1. Improve transit mode share.

Measure: Daily boarding rides on HCT mode (baseline no-build scenario = 12,700)

- 1 = 14,000 or less
- 2 = 14,001 to 17,000
- 3 = 17,001 to 20,000
- 4 = 20,001 to 23,000
- 5 = 23,001 or more

Objective 3.2. Provide service with good access for walk and bike.

Measure: Existing and forecast year population and population density within 1/2 mile of alignment

- 1 = Fewer than 4.0 persons per acre in 2035
- 2 = 4.1 to 5.5 persons per acre in 2035
- 3 = 5.6 to 6.5 persons per acre in 2035
- 4 = 6.6 to 8.0 persons per acre in 2035
- 5 = More than 8.0 persons per acre in 2035

Measure: Existing and forecast year employment and employment density within 1/2 mile of alignment

- 1 = Fewer than 4.0 jobs per acre in 2035
- 2 = 4.1 to 6.0 jobs per acre in 2035
- 3 = 6.1 to 8.0 jobs per acre in 2035
- 4 = 8.1 to 10.0 jobs per acre in 2035
- 5 = More than 10.0 jobs per acre 2035

Measure: Qualitative assessment of opportunities for and quality of walk and bike access

- 1 = Few sidewalks and bikeways available
- 2 = Some discontinuous sidewalks and bikeways available
- 3 = Sidewalks and bikeways often available
- 4 = Sidewalks and bikeways are generally available
- 5 = Sidewalks and bikeways are readily available

Objective 3.3. Provide potential park-and-ride sites with good auto access.

Measure: Ability to site major park-and-ride facilities

- 1 = Poor ability to site park-and-rides (limited sites and poor access)
- 2 = Poor to moderate ability to site park-and-rides (limited sites and/or poor access)
- 3 = Moderate ability to site park-and-rides (some sites available with reasonable access)
- 4 = Moderate to good ability to site park-and-rides (some sites available with good access)
- 5 = Good ability to site park-and-rides (good sites available with reasonable or good access)

Objective 3.4. Minimize impacts to traffic operations.

Measure: Potential impact of HCT concept on traffic operations and major signalized intersections

- 1 = High impact of HCT on traffic operations
- 2 = High to moderate impact of HCT on traffic operations
- 3 = Moderate impact of HCT on traffic operations
- 4 = Moderate to low impact of HCT on traffic operations
- 5 = Low impact of HCT on traffic operations

Objective 4.1. Provide transit improvements that are consistent with adopted local, state, and regional plans.

Measure: HCT improvements identified in local, state, and regional plans

- 1 = Neither the alignment or the mode is specifically mentioned in any planning documents.
- 2 = Either the alignment or the mode is specifically mentioned in at least one planning document.
- 3 = Alignment and mode is specifically mentioned in at least one planning document.
- 4 = Alignment and mode is specifically mentioned in at least two planning documents.
- 5 = Alignment and mode is specifically mentioned in at least three planning documents.

Objective 4.2. Provide opportunities for transit-oriented development.

Measure: Mode and alignment support transit-oriented development

- 1 = Low ability to support transit-oriented development
- 2 = Low to moderate ability to support transit-oriented development
- 3 = Moderate ability to support transit-oriented development
- 4 = Moderate to high ability to support transit-oriented development
- 5 = High ability to support transit-oriented development

Objective 5.1. Develop high-capacity transit concepts that have the potential to be funded using a mix of federal, state, and local funds.

Measure: Order-of-magnitude capital cost (in millions)

- 1 = Over \$1.5 billion
- 2 = \$1.1 billion to \$1.5 billion
- 3 = \$401 million to \$1 billion
- 4 = \$101 million to \$400 million
- 5 = Less than \$100 million

Measure: Estimated annual operations and maintenance cost

- 1 = Over \$20 million
- 2 = \$15 million to \$20 million
- 3 = \$10 million to \$14.9 million
- 4 = \$5 million to \$9.9 million
- 5 = Less than \$5 million

Objective 5.2. Develop cost-effective high-capacity transit concepts.

Annualized capital cost per HCT rider

- 1 = More than \$15.00
- 2 = \$10.00 to \$14.99
- 3 = \$5.00 to \$9.99
- 4 = \$1.00 to \$4.99
- 5 = Less than \$1.00

Operating cost per HCT rider

- 1 = More than \$4.00
- 2 = \$3.00 to \$3.99
- 3 = \$2.00 to \$2.99
- 4 = \$1.00 to \$1.99
- 5 = Less than \$1.00

DRAFT - Ranking Matrix - 9-21-09

Goals / Design Concepts	Measure	Boise Cutoff			Fairview/Cherry			Franklin			Overland			I-84/I-184	
		Commuter Rail	Light Rail	BRT - Exclusive	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Express BRT - Exclusive	Express BRT - Mixed Traffic
GOAL 1: IMPROVE TRANSIT CONNECTIVITY															
Objective 1.1 Connect major city central business districts (CBDs)	Number of major city CBDs with direct HCT connection	5	5	5	5	5	5	5	5	5	3	3	3	2	2
Objective 1.2 Connect residential areas with major employment centers	Number of major employment centers served with HCT	3	3	3	3	3	3	3	3	3	2	2	2	2	2
Objective 1.3 Connect residential areas with major activity centers	Number of major activity centers served with alignment	4	4	4	2	2	2	4	4	3	2	2	2	4	4
GOAL 2: IMPROVE TRANSIT MOBILITY															
Objective 2.1 Provide dedicated transit right-of-way where possible	Width and use of existing right-of-way	5	4	4	2	2	5	3	3	5	2	2	5	1	5
Objective 2.2 Provide good transit transfer opportunities with planned future bus system	Number of locations where the HCT alignment would connect with one bus route	2	3	3	2	2	2	4	4	4	2	2	2	2	2
	Number of locations where the HCT alignment would connect with two or more bus routes	2	2	2	4	4	4	3	3	3	4	4	4	2	2
Objective 2.3 Minimize transit travel time between major origins/destinations	2035 transit travel times along HCT alignments (Caldwell to Boise Multi-Modal Center)	4	4	4	3	3	2	3	3	2	3	3	2	5	3
	Travel Time Reliability	4	4	4	4	4	2	4	4	2	4	4	2	4	2
GOAL 3: MANAGE TRAVEL DEMAND															
Objective 3.1 Improve transit mode share	Daily boarding rides on HCT mode (baseline no-build scenario = 12,700)	4 with 15 min headways 3 with 30 min headways	5	5	3	3	2	2	2	1	3	3	2	4	2
Objective 3.2 Provide service with good access for walk and bike	Existing and forecast year population and population density within 1/2 mile of alignment	2	2	2	3	3	3	2	2	2	2	2	2	1	1
	Existing and forecast year employment and employment density within 1/2 mile of alignment	3	3	3	2	2	2	3	3	3	2	2	2	2	2
	Qualitative assessment of opportunities for and quality of walk and bike access	2	3	3	3	3	2	3	3	2	3	3	2	1	1
Objective 3.3 Provide potential park-and-ride sites with good auto access	Ability to site major park-and-ride facilities	4	4	4	3	3	3	4	4	4	2	2	2	3	3
Objective 3.4 Minimize impacts to traffic operations	Potential impact of HCT concept on traffic operations and major signalized intersections	3	3	3	2	2	3	2	2	3	2	2	3	3	3
GOAL 4: SUPPORT TRANSPORTATION AND LAND USE PLANS															
Objective 4.1 Provide transit improvements that are consistent with adopted local, state, and regional plans	HCT improvements identified in local, state, and regional plans	5	5	4	4	4	4	3	3	3	2	2	2	2	2
Objective 4.2 Provide opportunities for transit-oriented development	Mode and alignment support transit-oriented development	2	3	2	4	3	2	4	3	2	4	3	2	1	1
GOAL 5: FINANCIAL FEASIBILITY															
Objective 5.1 Develop high-capacity transit concepts that have the potential to be funded using a mix of federal, state, and local funds	Order-of-magnitude capital cost (in millions)	4	2	3	1	3	5	1	3	5	1	3	5	3	5
	Estimated operations and maintenance cost - all modes at 15 minute headway (in millions 2009\$)	1	3	5	3	5	4	3	5	4	3	5	4	5	5
	Estimated operations and maintenance cost - all modes provide 1,000 per hour capacity	1	3	3	3	3	3	3	3	3	3	3	3	4	3
Objective 5.2 Develop cost-effective high-capacity transit concepts	Annualized capital cost per HCT rider	4	3	4	1	4	5	1	3	5	1	3	5	4	5
	Operating cost per HCT rider at 15 minute headway	2	4	5	4	5	4	3	4	4	3	5	4	5	5
	Operating cost per HCT rider at 1,000 per hour	1	4	4	4	3	3	3	3	2	3	3	3	4	3

DRAFT - Weighted Scoring Matrix - 9-22-09

Goals / Design Concepts	Weight	Boise Cutoff			Fairview/Cherry			Franklin			Overland			I-84/I-184	
		Commuter Rail	Light Rail	BRT - Exclusive	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Light Rail	BRT - Exclusive	BRT - Mixed Traffic	Express BRT - Exclusive	Express BRT - Mixed Traffic
GOAL 1: IMPROVE TRANSIT CONNECTIVITY															
Objective 1.1 Connect major city central business districts (CBDs)	2.2	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	6.6	6.6	6.6	4.4	4.4
Objective 1.2 Connect residential areas with major employment centers	2.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	5.0	5.0	5.0	5.0	5.0
Objective 1.3 Connect residential areas with major activity centers	2.3	9.2	9.2	9.2	4.6	4.6	4.6	9.2	9.2	6.9	4.6	4.6	4.6	9.2	9.2
GOAL 2: IMPROVE TRANSIT MOBILITY															
Objective 2.1 Provide dedicated transit right-of-way where possible	2.3	11.5	9.2	9.2	4.6	4.6	11.5	6.9	6.9	11.5	4.6	4.6	11.5	2.3	11.5
Objective 2.2 Provide good transit transfer opportunities with planned future bus system	1.2	2.4	3.0	3.0	3.6	3.6	3.6	4.2	4.2	4.2	3.6	3.6	3.6	2.4	2.4
Objective 2.3 Minimize transit travel time between major origins/destinations	2.5	10.0	10.0	10.0	8.8	8.8	5.0	8.8	8.8	5.0	8.8	8.8	5.0	11.3	6.3
GOAL 3: MANAGE TRAVEL DEMAND															
Objective 3.1 Improve transit mode share	2.3	9.2	11.5	11.5	6.9	6.9	4.6	4.6	4.6	2.3	6.9	6.9	4.6	9.2	4.6
Objective 3.2 Provide service with good access for walk and bike	2.1	4.9	5.6	5.6	5.6	5.6	4.9	5.6	5.6	4.9	4.9	4.9	4.2	2.8	2.8
Objective 3.3 Provide potential park-and-ride sites with good auto access	2.0	8.0	8.0	8.0	6.0	6.0	6.0	8.0	8.0	8.0	4.0	4.0	4.0	6.0	6.0
Objective 3.4 Minimize impacts to traffic operations	2.1	6.3	6.3	6.3	4.2	4.2	6.3	4.2	4.2	6.3	4.2	4.2	6.3	6.3	6.3
GOAL 4: SUPPORT TRANSPORTATION AND LAND USE PLANS															
Objective 4.1 Provide transit improvements that are consistent with adopted local, state, and regional plans	2.2	11.0	11.0	8.8	8.8	8.8	8.8	6.6	6.6	6.6	4.4	4.4	4.4	4.4	4.4
Objective 4.2 Provide opportunities for transit-oriented development	1.7	3.4	5.1	3.4	6.8	5.1	3.4	6.8	5.1	3.4	6.8	5.1	3.4	1.7	1.7
GOAL 5: FINANCIAL FEASIBILITY															
Objective 5.1 Develop high-capacity transit concepts that have the potential to be funded using a mix of federal, state, and local funds	2.2	5.5	5.5	6.6	4.4	6.6	8.8	4.4	6.6	8.8	4.4	6.6	8.8	7.7	8.8
Objective 5.2 Develop cost-effective high-capacity transit concepts	1.8	4.5	6.3	7.2	4.5	6.3	7.2	3.6	5.4	6.3	3.6	5.4	7.2	7.2	7.2
TOTAL		104.4	109.2	107.3	87.3	89.6	93.2	91.4	93.7	92.7	72.4	74.7	79.2	79.9	80.6

w/ Operating Cost Based on 15 Minute Headways

GOAL 5: FINANCIAL FEASIBILITY															
Objective 5.1 Develop high-capacity transit concepts that have the potential to be funded using a mix of federal, state, and local funds	2.2	5.5	5.5	8.8	4.4	8.8	9.9	4.4	8.8	9.9	4.4	8.8	9.9	8.8	11.0
Objective 5.2 Develop cost-effective high-capacity transit concepts	1.8	5.4	6.3	8.1	4.5	8.1	8.1	3.6	6.3	8.1	3.6	7.2	8.1	8.1	9.0
TOTAL		105.3	109.2	110.4	87.3	93.6	95.2	91.4	96.8	95.6	72.4	78.7	81.2	81.9	84.6