Access Management Plan and Report
US 20/26 Corridor Preservation Study
Project No. STP-3230(106); Key No. 07826

Prepared for

Idaho Transportation Department

Idaho Transportation Department

and

COMPASS
COMMUNITY PLANNING ASSOCIATION
of Southwest Idaho

Community Planning Association of Southwest Idaho

In Conjunction with:

Ada County
Ada County Highway District
Canyon County
Canyon Highway District #4
City of Boise
City of Caldwell
City of Eagle
City of Meridian
City of Middleton
City of Nampa
City of Star
Valley Regional Transit

Prepared by

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACHD	Ada County Highway District
ADT	average daily traffic
AMP	Access Management Plan
CHD	Canyon Highway District No. 4
CIM	Communities in Motion
CO	Carbon Monoxide
COMPASS	Community Planning Association of Southwest Idaho
CPC	Corridor Preservation Committee
FHWA	Federal Highway Administration
I-84	Interstate Highway 84
IDAPA	Idaho Administrative Procedures Act
ITD	Idaho Transportation Department
ITS	Intelligent Transportation Systems
NCHRP	National Cooperative Highway Research Program
PDO	Property Damage Only
ROW	Right-of-Way
SH 16	State Highway 16
SH 44	State Highway 44
TAP	Transportation Access Plan
TRB	Transportation Research Board
US 20/26	U.S. Highway 20/26
vpd	vehicles per day

DEFINITIONS

At-grade Intersection: An intersection where all vehicles traverse the intersection at ground level, or "at grade." There is no grade separation (overpass or underpass). The existing intersection of US 20/26 with Linder Road is an example of a conventional at-grade intersection.

Circulator Road: A road included as part of the supporting road network for a principal arterial. It serves to better allow land abutting the principal arterial direct access to local and collector level streets and reduces the need for direct access to the principal arterial roadway. Preferably, circulator roads are designed to a collector level standard.

Continuous Flow Intersection (CFI): An at-grade innovative intersection design in which the left-turning vehicles cross over the travel lanes of the opposing through movement in advance of the intersection. This allows the left turns and through movements at the main intersection to proceed simultaneously.

Conventional Intersection: A conventional intersection of two major streets is any design that is very typical for a given area. For this study a conventional at-grade signalized intersection is generally considered to be an intersection where the left turns are handled by a protected left-turn signal phase from lanes in the median. The existing intersection of US 20/26 with Linder Road is an example of an at-grade conventional intersection. For this study a conventional grade separated intersection is generally considered to be a diamond interchange. The existing intersection of US 20/26 with I-84 in Caldwell is an example of a conventional grade-separated intersection (diamond interchange).

Grade-separated Intersection: An intersection with an overpass and/or underpass in which some vehicles traverse the intersection at ground level, or "at grade," and the remainder pass through via an overpass or underpass. The existing intersection of US 20/26 with I-84 in Caldwell is an example of a grade-separated intersection.

Innovative Intersection: An innovative intersection is an at-grade or grade-separated intersection that is significantly different from a conventional intersection in some way. Common differences include a reduction or spreading of conflict points, restriction and/or rerouting of movements, and reduction of the complexity of traffic signal phasing.

High Volume Intersection Improvement: An intersection improvement made to address expected high traffic volumes. For this study, a high volume intersection refers to either an at-grade innovative intersection, such as a continuous flow intersection (CFI), or a grade separated intersection.

Slip-Ramp: Roadway segments (ramps) that allow access to and from a mainline roadway to an adjacent parallel frontage road system. Slip-ramps are located in areas where the mainline roadway and frontage roads are at nearly the same elevation, which allows them to be shorter than a normal interchange ramp.

1. US 20/26 ACCESS MANAGEMENT PLAN

1.1 INTRODUCTION

U.S. Highway 20/26 (US 20/26), between Interstate Highway 84 (I-84) and Eagle Road, is a principal highway. It serves the growing areas of Canyon and Ada Counties by providing regional travel service. It is the only east–west regional highway in an eight mile wide corridor between State Highway 44 (SH 44) to the north and I-84 to the south. It is a frequent alternate route to I-84 and serves an area with rapid expansion of residential and business development. See Figure 1.

The US 20/26 Access Management Plan (AMP) and Report was prepared to define strategies that will improve safety and travel efficiency within the corridor. It will assist in integrating various surface transportation needs in the area and ensure wise public and private investment in roadway improvements. This plan will provide decision makers with clear direction for managing access along US 20/26. With the rapid pace of new development activity in the US 20/26 Corridor, the need for implementing these actions cannot be overstated. The foundation for this project is the regional long-range transportation plan, "Communities in Motion" (CIM), which was adopted in August 2006 by the Board of Directors for the Community Planning Association of Southwest Idaho (COMPASS). CIM identified the importance of improving this section of US 20/26 to meet the forecasted travel demand within the corridor.

This AMP is part of a larger Corridor Preservation Study for US 20/26 sponsored by the Idaho Transportation Department (ITD). This preservation study was initiated to shape the future of the corridor by preserving necessary right-of-way and providing for anticipated long-term travel demands.

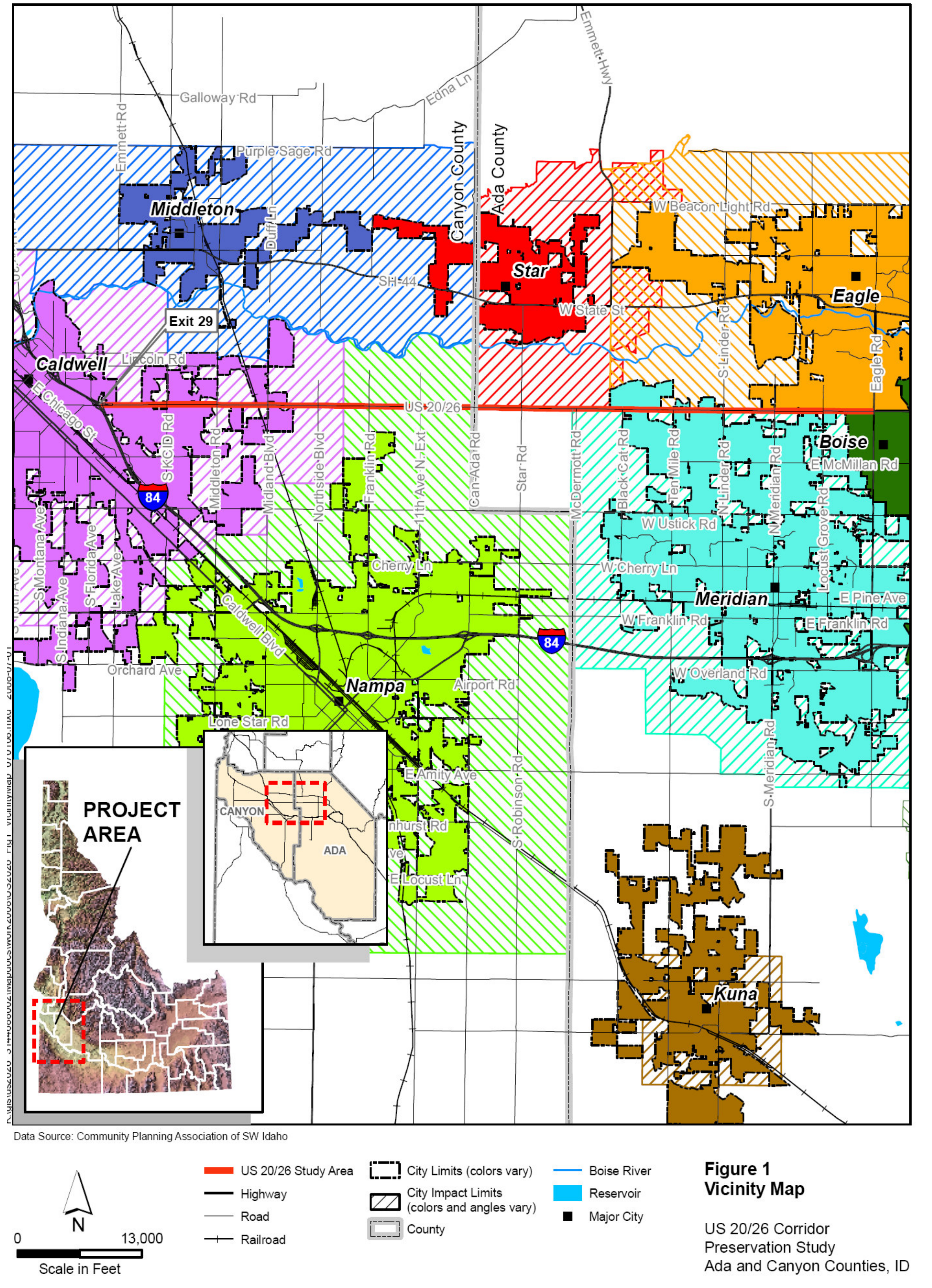
1.2 NEED FOR ACCESS MANAGEMENT

Capacity improvements are needed to accommodate current demand and future growth. Highway widening and access management can add traffic capacity to a highway. Transit improvements, intersection enhancements, or adding Intelligent Transportation Systems (ITS) facilities are other methods available to add capacity. Transportation funds are not currently available for significant highway or transit improvements. However, developing an access management plan is a strategy available now to improve capacity, operations and safety for both current and future conditions.

The management of access to US 20/26, including the location and design of intersections, private driveways, and grade separations, is the single-most critical design element that will determine the quality of transportation service along the highway. Studies have shown that access management strategies can reduce total crashes by up to 60%, improve capacity by 20 to 40% and improve travel times by reducing delay approximately 40%.

If transportation planning and management of access is not successful, the ability to provide acceptable long-term capacity, travel times and safety will be diminished. In addition, the effectiveness of future highway expansion efforts will be compromised.

Figure 1. Vicinity Map



1.3 ACCESS MANAGEMENT GOALS FOR US 20/26

The objective of the US 20/26 AMP is to provide clear and uniform direction to state and local decision makers for managing access along US 20/26. Managing access will preserve the corridor's mobility function and accommodate future development. It will also balance the local planning and economic goals in the corridor with the need for safe and efficient operations of US 20/26 as a high speed, high capacity facility.

Implementing a successful access management plan for the US 20/26 Corridor to achieve the optimum level of access, mobility and safety requires strategies that will fit within the context of the following goals:

1) **Preserve the original function of US 20/26:** Strategies for managing access on US 20/26 should preserve the original function of US 20/26, which is to move traffic safely and efficiently on this regionally important east-west highway. The most effective approach for accomplishing this goal is to minimize the number of access points necessary for providing reasonable and sufficient access to service the abutting lands.

2) **Develop a realistic plan:** Strategies should include only alternatives that can be realistically implemented. For example, a freeway facility may be the best option for providing a high level of mobility and safety, but this alternative would require a funding level that is not expected to be available.

3) **Partner with local government:** Land use and local road development is integral to access management. Because land use and site design approval by local governments influence the need and location for access points, participation of local governments with approval authority for land use and local roads is critical. If local land use plans and the AMP are not compatible, the plan will be ineffective. Successful access management along US 20/26 cannot occur without a consensus of ITD, affected highway districts, and city and county governments.

4) **Adopt the plan by all parties:** It is the intention of the study partners, COMPASS and ITD, that the US 20/26 AMP be adopted by all local agencies with jurisdiction along the corridor. Pursuant to adoption, actions taken by any local agency with regard to transportation planning, transportation facilities and traffic operations within the areas described in the AMP should be in conformity with this AMP. With this endorsement, every subdivision approval action, development plan review, and approval process should include careful review of the AMP. To the extent feasible at the time of approval, access, subdivisions and site plan approvals should advance the design standards and principals identified in the AMP. At the very least, actions taken should not preclude long term feasibility of implementing the ultimate build-out improvements described in the plan.

5) **Develop a local street network to accommodate future development:** Access management strategies for US 20/26 need to allow for a complete transportation network, providing a system of local circulator streets, collectors and arterials that support and complement the highway. This network must function efficiently together and allow property access to occur at the local street level. It should also allow for and promote current and/or future opportunities to incorporate ITS facilities, transit operations, or other transportation modes that would enhance transportation capacity improvements.

6) **Develop a system that can be phased:** The parallel road network must be completed to allow restricted or redirected access. This parallel network will be constructed by developers, in

accordance with development agreements. The segments of this transportation network will likely be completed over time and may not proceed in a linear fashion. Therefore, the plan must include provisions for temporary access. Without that, success of the plan is unlikely.

1.4 US 20/26 ACCESS MANAGEMENT PLAN FEATURES

The land use and established conditions vary within the US 20/26 Corridor, so the plan is divided into three segments as follows:

- West Segment: I-84 to Midland Road
- Middle Segment: Midland Road to McDermott Road/future State Highway 16 (SH 16) intersection
- East Segment: McDermott Road (future SH 16 intersection) to Eagle Road

The following describes the access management plan for each of the three segments. Because funding is unlikely to be available to construct the ultimate build-out project in the near term, discussion is included to address potential interim project phasing and right-of-way (ROW) preservation requirements.

1.4.1 West Segment (I-84 to Midland Road)

The west segment of US 20/26, from I-84 to Midland Boulevard, is in the City of Caldwell city limits and area of impact. The full build-out and access management plan of this segment is unique. Figure 2 illustrates the access management plan for this segment which involves a frontage road/slip ramp system. The plan also includes local circulator roads located parallel to US 20/26. The circulator roads will ensure all properties and ownerships abutting US 20/26 have local street access connections to north-south collector or arterial roads that link to the one-way frontage roads, which in turn, provide access to US 20/26.

A 230 feet ROW width is required for the mainline US 20/26 and the frontage roads. This includes space needed between the two roadways for the slip ramp transitions and other roadside features. A typical roadway cross-section for the west segment is illustrated in Figure 3.

Figure 2. West Segment – Access Management Plan

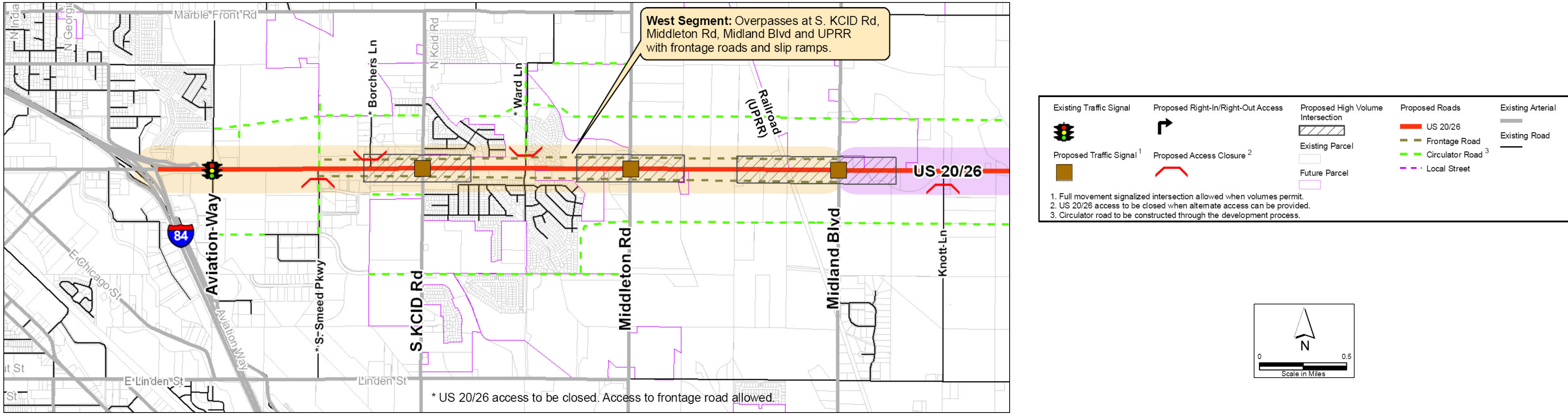


Figure 3. West Segment, US 20/26 Ultimate Build-Out Cross Section

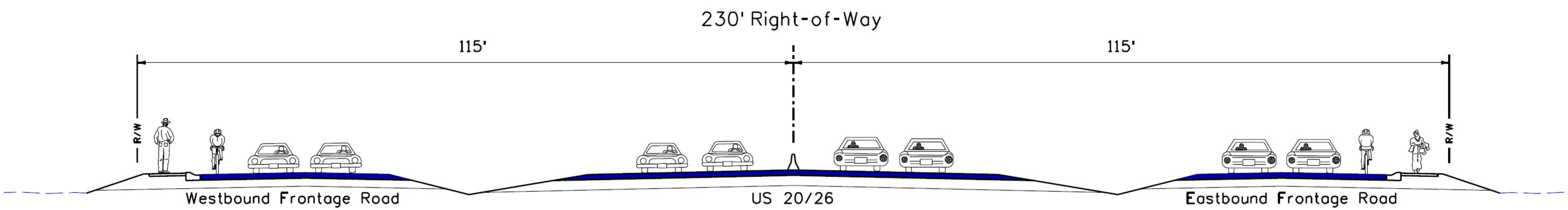


Figure 4 illustrates a conceptual layout for a portion of the proposed frontage road/slip ramp system from KCID Road to Middleton Road. This figure demonstrates how this system will function.

The frontage road/slip ramp system includes the following features:

- There is no direct access from local roads to US 20/26.
- Local streets and driveways connect to frontage roads.
- Two-lane one-way parallel frontage roads are located on each side of US 20/26.
- US 20/26 is a 4 lane divided highway.
- US 20/26 has bridge structures over KCID Road, Middleton Road, Midland Boulevard, and the railroad tracks just west of Midland Boulevard.
- Frontage road intersections will occur at one mile spacing, with the north-south crossroads of KCID Road, Middleton Road, and Midland Boulevard.
- Access from frontage road to US 20/26 is by slip ramps.
- In Figure 2, the frontage road system is shown to begin at Smeed Parkway, although the exact location cannot be determined at this time and will be dependent on future developments in that area.
- Between KCID Road and Middleton Road, a slip ramp pair (one off-ramp and one on-ramp in each direction of US 20/26) is used.
- Between Middleton Road and Midland Boulevard, only one off-ramp or one on-ramp is be used in each direction due to the limited space available between the overpass bridges at Middleton Road and the railroad tracks.
- East of Midland Boulevard, one ramp for each direction of US 20/26 terminates the frontage road / slip ramp system.

The City of Caldwell will support the one mile intersection spacing plan by working with Canyon Highway District No. 4 (CHD) and developers to provide local circulators approximately one-quarter mile from US 20/26. This will allow local traffic to move east-west and connect to north-south arterial roads such as Aviation Way, KCID Road, Middleton Road, and Midland Boulevard. Further, as development occurs, Caldwell will require north-south collector roads to be built at the one-quarter section lines located one-half mile from and parallel to the major cross roads. This will facilitate circulation between the local street circulation roads and the one-way frontage roads.

Figure 4. Portion of the West Segment Showing Frontage Roads/Slip Ramp System

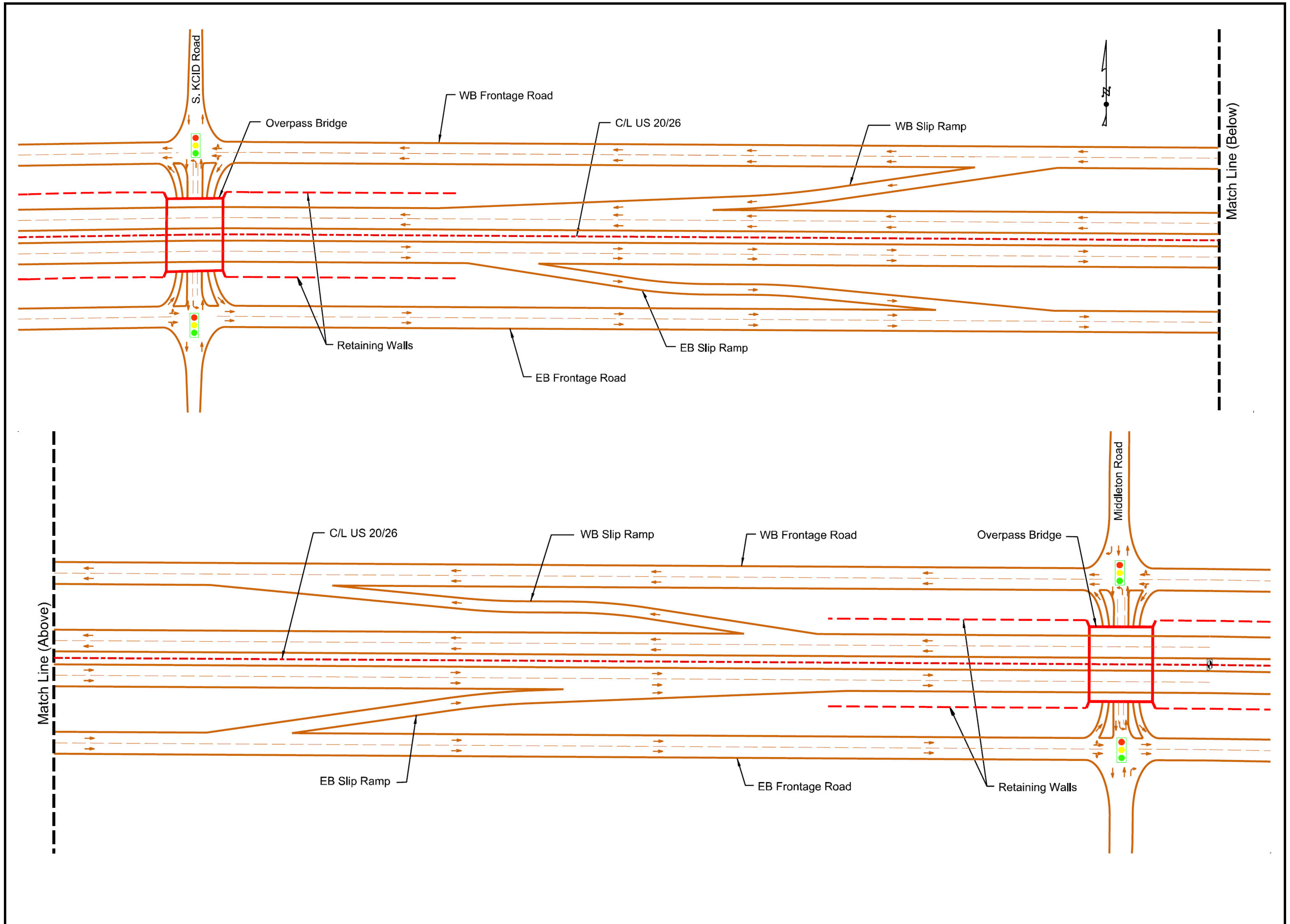


Table 1 summarizes the west segment access management characteristics for both the ultimate build-out and interim conditions.

Table 1. West Segment (I-84 to Midland Blvd) AMP Characteristics

	Build-Out Condition		**Interim Condition**
Access Spacing	Public Roads : 1-Mile Private driveways: None.		Public Roads: ½ mile Other Access Points: Temporary right-in/right out access variances may be considered as described in Section 1.6.3.
Intersection Treatment	**Signals**	**Overpass**	**Signals (as warranted and funded)**
Aviation Way	X (Exist.)		X (Exist.)
S KCID Rd (at 20/26)		X	X
S KCID Rd (at Frontage Rd)	X		n/a
Middleton Rd (at 20/26)		X	X
Middleton Rd (at Frontage Rd)	X		n/a
Midland Rd (at 20/26)		X	X
Midland Rd (at Frontage Rd)	X		n/a
No. of Travel Lanes	US 20/26: 4 lanes One-Way Frontage Roads: 2 lanes (in each direction).		US 20/26: 6 lanes (with outside lane in each direction used as continuous right turn auxiliary lane).
Median Treatment	Narrow median with barrier separation.		Divided median to restrict left turn movements.
Right-of Way Width	230' ROW required (includes US 20/26 and one way frontage roads).		Preserve ROW and/or provide setbacks through development process, as needed for build-out condition.
Secondary Road Network	Complete east-west collector system. Locate approx. ¼ mile north and south of US 20/26 and connect to north-south arterials. Add north-south collectors at ¼ section lines to connect frontage roads and parallel collectors.		Local agencies to complete collector system through the development process. System will be phased over time so roadways may not be connected in the interim.

West Segment Interim Project

If funding is not available to construct the ultimate build-out project, interim projects will be constructed to meet the near-term travel demands and needs of the area. Based on recommendations by the City of Caldwell and support from the Corridor Preservation Committee (CPC), the initial interim project phases and development approvals for the western segment are anticipated to include the following characteristics:

- Limit full access to at-grade intersections with public streets every 1/2 mile from Aviation Way to Midland Boulevard. These intersections will be signalized when funded and warranted.
- Allow existing public and private access points to remain, as necessary, until the construction of local circulation streets and/or frontage roads. These existing access points will be restricted to right-in/right-out movements.
- Permit new temporary interim access to US 20/26 pending future alternative access to the frontage road / circulator roads. Such temporary direct access to US 20/26 will be limited to right-in/right-out only.
- Build the highway initially as a divided arterial with a divided median to restrict left turns to the designated 1/2 mile locations.
- Build the interim section on US 20/26 existing State right-of-way and preserve for the ultimate build-out project by acquiring additional right-of-way (ROW) or requiring needed setbacks during development.

The interim facility construction is to be paid for by developers as development occurs along the corridor. The full build-out for the west segment will involve adding the US 20/26 overpasses, slip ramps, and one-way frontage roads. Adding these roadway elements will likely need to occur collectively, since they act together allowing the slip ramp/frontage road system to function.

1.4.2 Middle Segment (Midland Blvd to McDermott Road)

The middle segment of US 20/26, from Midland Boulevard to McDermott Road (future SH 16), is located in the area of impact for the cities of Caldwell, Nampa, Star and Meridian. It is feasible to achieve one-mile intersection spacing in this segment. Figure 5 illustrates the access management plan for this segment. The plan includes one mile intersection spacing with future high volume intersection improvements at Franklin Road and near McDermott Road (future SH 16 intersection). Examples of high volume intersection improvements may include at-grade innovative intersections, such as continuous flow intersections, or grade separated intersections (interchanges). The intersection treatment and location for the US 20/26 and SH 16 intersection will be determined as a part of the SH 16, I-84 to SH 44 project. Local circulator roads are located parallel to US 20/26 and approximately one-quarter mile away. The purpose of circulator roads is to ensure all properties and ownerships abutting US 20/26 have local street access connections to north-south section line roads rather than accessing US 20/26 directly.

A typical roadway cross-section for this segment is illustrated in Figure 6.

Figure 5. Middle Segment – Access Management Plan Section

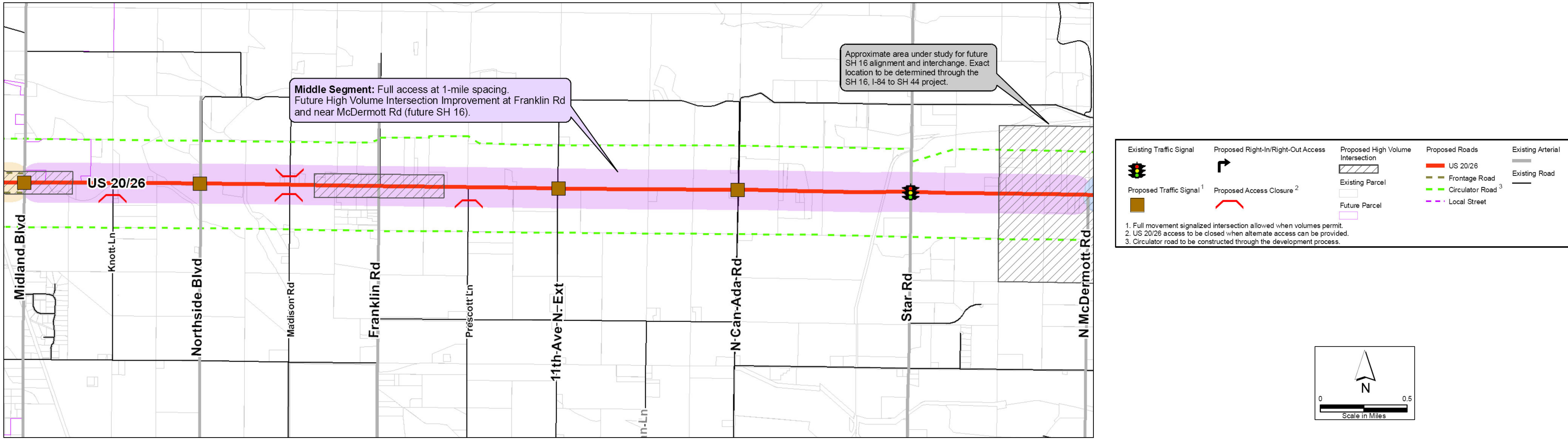
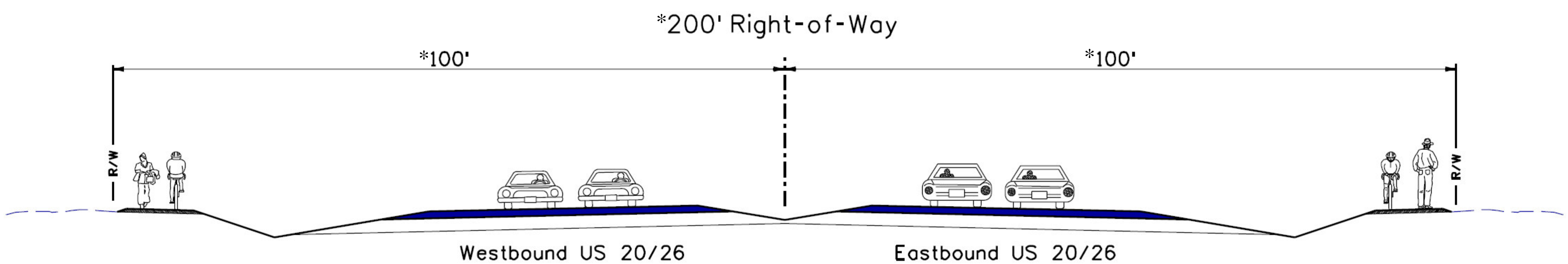


Figure 6. Middle Segment, US 20/26 Ultimate Build-Out Cross Section



*Through development agreements, the multi-use path may be moved outside the highway ROW, with the ROW width reduced by 10' to 90' left and/or right.

Table 2 summarizes the middle segment access management characteristics for both the ultimate build-out and interim conditions.

Table 2. Middle Segment (Midland Blvd to McDermott Road) AMP Characteristics

	Build-Out Condition		Interim Condition
Access Spacing	Public Roads: 1 Mile Private driveways: None		Temporary right in / right-out access variances may be considered as described in Section 1.6.3.
Intersection treatment	**Signal**	**High Volume Intersection**	
Midland Blvd		X - end slip ramp system	
Northside Rd	X		
Franklin Rd		X	Signalize all intersections listed (as warranted and funded).
11th Ave N	X		
Can-Ada Rd	X		
Star Rd	X (Exist.)		
McDermott Rd area (SH 16)		X	
No. of Travel Lanes	4 lanes		3 or 4 lanes
Median Treatment	Divided median		To be determined.
Right-of Way Width	200' ROW		Preserve ROW and/or provide setbacks through development process, as needed for build out condition.
Secondary Network	Complete east-west collector system. Locate approx. ¼ mile north and south of US 20/26 and connect to north-south arterials that provide access to US 20/26.		Local agencies to complete collector system through the development process. System will be phased over time so roadways may not be connected in the interim.

1.4.3 East Segment (McDermott Road to Eagle Road)

The east segment of US 20/26, from McDermott Road (future SH 16) to Eagle Road, is located in the cities of Meridian, Eagle, and Boise. It also includes the City of Star's area of impact. Unlike the west and middle segments, the combination of existing development, approved plats, and established local streets means one-mile intersection spacing is generally not feasible for the majority of the east segment.

Figure 7 illustrates the access management plan for this segment. The plan includes one mile intersection spacing from the McDermott Road area to Black Cat Road and ½ mile spacing from Black Cat Road to Eagle Road. Future high volume intersection improvements will be located in the McDermott Road area (SH 16) and at Linder Road. Examples of high volume intersection improvements may include at-grade innovative intersections, such as continuous flow intersections, or grade separated intersections (interchanges). The intersection treatment and location of the US 20/26 and SH 16 intersection will be determined as a part of the SH 16, I-84 to SH 44 project. Local circulator roads are located parallel to US 20/26 and approximately one-quarter mile away. The purpose of circulator roads is to ensure all properties and ownerships abutting US 20/26 have local street access connections to north-south section line and ¼ section line roads rather than accessing US 20/26 directly.

Figure 8 and Figure 9 illustrate typical cross sections used for this segment.

Figure 7. East Segment – Access Management Plan

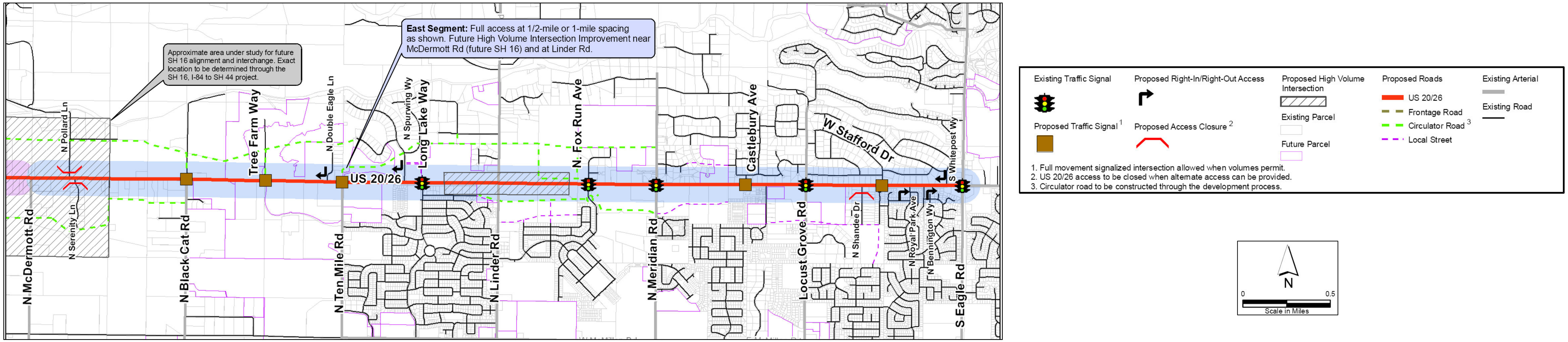
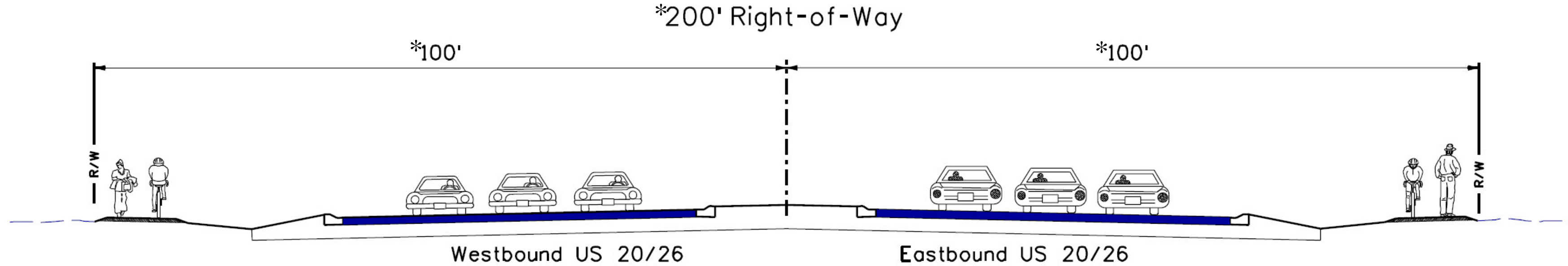


Figure 8. East Segment, Ultimate Build-Out Cross Section (McDermott Road area to Meridian Road)



*Through development agreements, the multi-use path may be moved outside the highway ROW, with the ROW width reduced by 10' to 90' left and/or right.

Figure 9. East Segment, Ultimate Build-Out Cross Section (Meridian Road to Eagle Road)

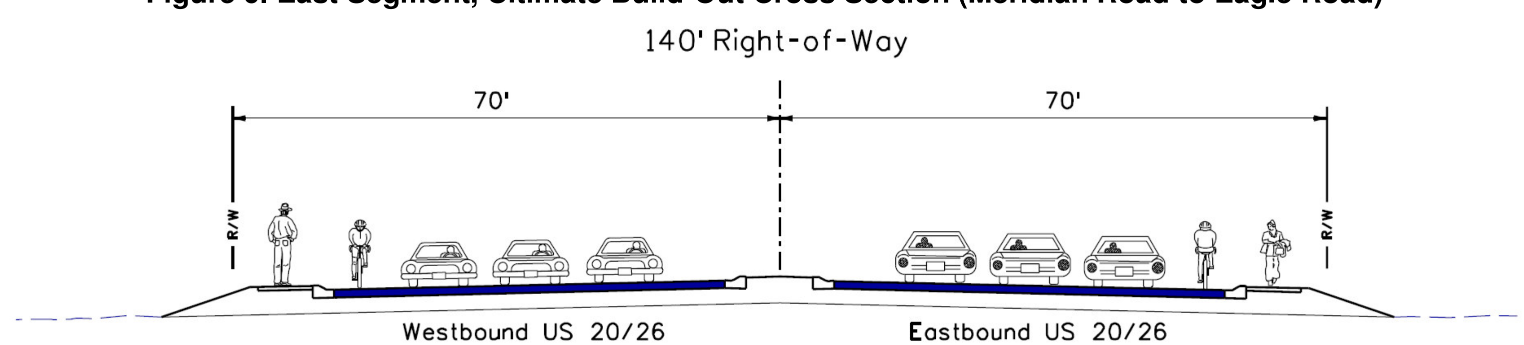


Table 3 summarizes the east segment access management characteristics for both the ultimate build-out and interim conditions.

Table 3. East Segment (McDermott Road to Eagle Road) AMP Characteristics

	Build-Out Condition		**Interim Condition**
Access Spacing	Public Roads: 1-Mile spacing from McDermott Rd area to Black Cat Rd and ½ mile spacing from Black Cat Road to Eagle Road Private driveways: None		Temporary right-in/right-out access variances may be considered as described in Section 1.6.3.
Intersection Treatment	**Signal**	**High Volume Intersection**	
McDermott Rd area (SH 16)		X	Signalize all intersections listed (as warranted and funded).
Black Cat Rd	X		
Tree Farm Way	X (Exist.)		
Ten Mile Rd	X		
Long Lake Way	X (Exist.)		
Linder Rd		X	
[1,2]N Fox Run Ave	X (Exist.)		
Meridian Rd	X (Exist.)		
[1]Castlebury Ave	X		
Locust Grove Rd	X (Exist.)		
[3]W. Stafford Dr	X		
Eagle Rd	X (Exist.)		
No. of Travel Lanes	6		4 to 6, depending on future funding.
Median Treatment	Divided median		To be determined.
Right-of Way Width	200' ROW (McDermott Rd area to Meridian Rd) and 140' ROW (Meridian Rd to Eagle Rd).		Preserve ROW and/or provide setbacks through development process, as needed for build out condition.
Secondary Network	Complete east-west collector system. Locate approx. ¼ mile north and south of US 20/26 and connect to north-south arterials that provide access to US 20/26.		4Local agencies to complete collector system through the development process. System will be phased over time so roadways may not be a connected in the interim.

[1]Due to existing development, some intersections are not located exactly at 1/2 mile spacing. Opportunities may arise in the future to relocate these access points to the nearby half mile point, and would be in compliance with this plan.

[2]Some residents have expressed a desire to close or change the current access of Fox Run. Such an action would be consistent with this AMP, provided the access points on both the north and south side of U.S. 20/26 are concurrently relocated to align at/near the 1/2 mile point between Linder and Meridian Roads.

[3]W. Stafford Drive: This road has relatively low traffic volumes and may not ever meet minimum thresholds for traffic signal warrants. Since there is alternative access to this subdivision with the traffic signal at Locust Grove Road, the W. Stafford Drive signal shown in the AMP may not be necessary.

[4]Unlike the west and middle segments, significant development has already occurred and opportunities to develop the secondary road network are more limited.

1.5 NON-CONFORMING ACCESS

1.5.1 Non-Conforming Existing Public Streets

Existing public street intersections that do not conform to the US 20/26 AMP are listed below. Because these intersections are not included as a proposed access points in the AMP's ultimate build out condition, they were not listed in Tables 1 to Table 3. To meet the AMP's objectives, it will be beneficial to close each of these access points. However, it is recognized that in some cases, closure of one or more of these access points could be difficult. This will depend on the ability to develop an effective supporting local circulator system that provides sufficient access to properties abutting US 20/26.

For each non-conforming public street intersection, a recommended action plan is summarized.

S. Smeed Parkway (located north and south of US 20/26, between Aviation Way and S. KCID Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. As adjacent land develops or when the frontage road / slip ramp system is constructed, this access to US 20/26 will be closed. Alternate access to the frontage road and local circulation roads is planned.

Borchers Lane (located north of US 20/26, between S. Smeed Parkway and S. KCID Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. As adjacent land develops or when the frontage road / slip ramp system is constructed, this access to US 20/26 will be closed. Alternate access to the frontage road and local circulation roads is planned.

Ward Lane (located north and south of US 20/26, between S. KCID Road and Middleton Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. As adjacent land develops or when the frontage road / slip ramp system is constructed, the access to US 20/26 will be closed. Alternate access to the frontage road and local circulation roads is planned.

Knott Lane (located south of US 20/26, between Midland Boulevard and Northside Boulevard): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. This access will be located in the area of influence of the ramps located east of Midland Boulevard used to terminate the frontage road / slip ramp system. As adjacent land develops or when the frontage road / slip ramp system is constructed, this access to US 20/26 will be closed. A local circulator is planned to provide alternate access from this road to Midland Boulevard and Northside Boulevard.

Madison Road (located north and south of US 20/26, between Northside Boulevard and Franklin Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. This access may be located in the area of influence of the future Franklin Road high volume intersection improvements. As adjacent land develops or when the Franklin Road high volume intersection improvements are constructed, this access to US 20/26 will be closed. A local circulator is planned to provide alternate access from this road to Northside Boulevard and Franklin Road.

Prescott Lane (located south of US 20/26, between Franklin Road and 11th Avenue Ext.): The existing access will be restricted to right-in/right-out movements when a widening project is programmed and/or when accident history indicates a safety issue. This access may be located in the area of influence of the future Franklin Road high volume intersection improvements. As adjacent land develops or when the Franklin Road high volume intersection improvements are constructed, this access to US 20/26 will be closed. A local circulator is planned to provide alternate access from this road to Franklin Road and 11th Avenue Ext.

N. Pollard Lane (located north of US 20/26, between McDermott Road and N. Black Cat Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. This road may be in the area of influence for the future SH 16 interchange near McDermott Road. As adjacent land develops or when the SH 16 corridor and/or interchange is constructed this access will be closed. A local circulator is planned to provide alternate access from this road to N. Black Cat Road.

N. Serenity Lane (located south of US 20/26, between McDermott Road and N. Black Cat Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. This road may be in the area of impact for the future SH 16 interchange near McDermott Road. As the adjacent land south and east of this neighborhood develops or when the SH 16 corridor and/or interchange is constructed this access will be closed. A local circulator is planned to provide alternate access from this road to N. Black Cat Road.

N. Double Eagle Lane (located north of US 20/26, between N. Black Cat Road and N. Ten Mile Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. Private property at the end of this road prevents connectivity to the Tree Farm development. No alternate access appears to be available.

N. Spurwing Way (located north of US 20/26, between N. Ten Mile Road and N. Linder Road): Private property at the end of this road prevents connectivity to adjacent developments and makes construction of a local circulator road difficult. This road will be restricted to right in/out movement when a widening project is programmed and/or when accident history indicates a safety issue. The road entrance will be relocated to the signal at N. Long Lake Way to provide full movement access, if feasible.

N. Shandee Drive (located south of US 20/26, between Locust Grove Road and Eagle Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. As adjacent land to the south develops, this access will be closed. A local road connection is planned to provide alternate access from this road to Locust Grove Road. It is recommended that the proposed development to the south connect to Shandee Drive.

N. Royal Park Avenue (located south of US 20/26, between Locust Grove Road and Eagle Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. A future closure is unlikely due to the traffic generated by the church facility located at the corner of the N. Royal Park Avenue intersection with US 20/26.

N. Bennington Way (located south of US 20/26, between Locust Grove Road and Eagle Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue. Due to the high residential traffic volumes of this road and the inability to provide additional access and local circulation, a left-in may be appropriate at this location.

S. Whitepost Way (located north of US 20/26, between Locust Grove and Eagle Road): The existing access will be restricted to right-in/right-out movement when a widening project is programmed and/or when accident history indicates a safety issue.

1.5.2 Non-Conforming Existing Private Access

Access points in existence prior to the adoption of this AMP may remain until such time as there is a change in use of the access, a change in land use, or alternate access is available. The following guidance should be used in taking actions with respect to existing US 20/26 access points that do not conform to the AMP:

1. Discourage the expansion and/or intensification in use of such access points.
2. Encourage elimination of such access points as the land use develops, by relocating access points off newly established local frontage or backage roads.
3. Designate such access points as non-conforming features to be brought into compliance with applicable standards under the following conditions, if feasible:
    a. When new access permits are requested;
    b. When substantial enlargements or improvements are made to the property (change in use);
    c. When there are significant changes in trip generation (change in intensity); or
    d. When alternative access is available.

When closure, modification, or relocation of access is necessary or required, the agency(ies) having jurisdiction should use appropriate legal processes to effect such action.

1.6 IMPLEMENTING THE ACCESS MANAGEMENT PLAN

If successfully implemented, the strategies outlined in the US 20/26 AMP will ensure a safe and efficient transportation system is provided to meet the corridor's long range needs. Property owners, developers and local land use agencies need to act to support the US 20/26 AMP and achieve conformance with the plan's goals, access locations and designs.

The following three actions will make implementing the plan a reality:

1) **AMP Adopt the AMP:** Official adoption of the AMP by COMPASS, ITD, and each local agency will be the first step of implementing the plan. This can be accomplished by formal resolution of the entire report, or can involve a limited adoption of only Section 1.0, which in itself is the Access Management Plan for the project. A unified adoption by all agencies with interest in the corridor will demonstrate widespread support of the strategies and goals outlined in the report.

   With local agency adoption of the US 20/26 AMP, ITD can work in partnership with cities, counties and highway districts to ensure that future developments are consistent with this plan. Early collaboration regarding future developments will ensure that all provisions for access management are being met, including local circulation streets and provisions for temporary access points, where warranted.

2) **Adjust agency policies and/or procedures to support the AMP:** Following adoption, agencies may use strategies outlined in the AMP to adopt new ordinances or revise existing ordinances. These ordinances will guide their decision making on a range of land use issues pertaining to access location and design. Local agencies may also adopt corridor specific plans. These may be in the form of zoning overlay districts, adoption of standards by specific roadway class, or adoption of specific studies such as the US 20/26 AMP. Additionally, agency staff should be familiar with the AMP and planning and engineering strategies required to achieve the plan. They need to ensure land use and

development approvals do not allow access to US 20/26 that are inconsistent with the AMP. The State of Idaho can also act by passing legislation to give Access Management Plans legal authority needed to strictly manage access within a corridor. Proposed legislation is anticipated to be discussed during the 2009 Idaho State Legislative Session.

3) **Coordinate between Agencies:** Without the coordination and cooperation of all involved agencies, the US 20/26 AMP cannot be implemented successfully. While ITD is the agency responsible for the issuance of access permits along US 20/26, it needs to work closely with developers and local agencies on every development within close proximity of US 20/26. This will ensure that the local circulation street and collector system will be sufficient to support access limitations proposed by the AMP. Prior to the issuance of any ITD action on applications or permits, ITD should confer with the local land use and transportation agencies. This joint effort by ITD and the local agencies should preclude developers from applying to ITD for access permits in advance of or inconsistent with local approvals.

   One additional complication for local road development is that cities have land use authority in their areas of impact, but decisions regarding local roads fall under Ada County Highway District's (ACHD) or CHD's jurisdiction. This demonstrates yet another example where inter-agency coordination is critical in implementing the AMP initiatives.

1.6.1 Developing the Local Circulation Network

The local circulation network is a critical AMP component. This parallel road system is required to provide alternative access to properties abutting US 20/26 and will provide local circulation to the major north-south arterials that provide access to and from US 20/26. Determining the supporting roadway network alignment and design is the responsibility of each developer in cooperation with the local land use agencies. In the subdivision review and site design approval process, local land use agencies will require land developers to design and construct their respective portions of the local street system. The local and collector street network shown on the AMP maps is located generally parallel to US 20/26. The alignments were selected based on current corridor knowledge, parcel boundaries and input from the appropriate local agencies. The exact locations will need to be determined based on current information during the development process.

The final alignment selection for the local circulation roads should consider the following:

- The road alignments should allow the local circulation system to connect to the section line north-south roads that will provide access to US 20/26.
- The roads should allow a reasonable traffic flow, provide connectivity, and not have too many stop signs or turns. Preferably these roadways are designed to a collector level standard and do not allow front-on housing.
- The alignment can vary between 500 and 1500 feet away from and generally parallel to US 20/26.
- The alignment should abut or cross through each parcel of land or contiguous ownership that abuts US 20/26 to ensure all ownerships abutting US 20/26 have an alternative access other than direct US 20/26 access.
- The local circulation roads must be coordinated with proposed developments. A proposed development's road system should be designed to coordinate with existing, proposed, and planned roadways outside the development. For proposed developments that abut

unplatted land or future development phases of the same development, roadway stubs shall be provided as deemed necessary by the local agency. This will allow future access to abutting properties or logical extensions of the street system into the surrounding areas.

- Circulation roadways should connect with surrounding streets to permit safe and convenient traffic movement between residential neighborhoods and to facilitate emergency access and evacuation. Such connections should not be permitted where the effect would be to encourage use of such streets by through traffic.
- Circulation roadways should intersect with other roadways at safe and convenient locations.
- Where the circulation roads connect to section line roads, they should be opposite rather than offset from the next segment of the circulator road that extend through to the next section. The same applies at the one-half section line roads in areas where the US 20/26 intersection spacing is at one-half mile.
- Where local streets intersect with a major north-south road, it is desirable there be at least 1300 feet separation from US 20/26. If the north-south road is a higher volume road, as many will be, the separation between the east-west local street intersection and US 20/26 should be greater to ensure adequate capacity and safe operation between the two intersections.

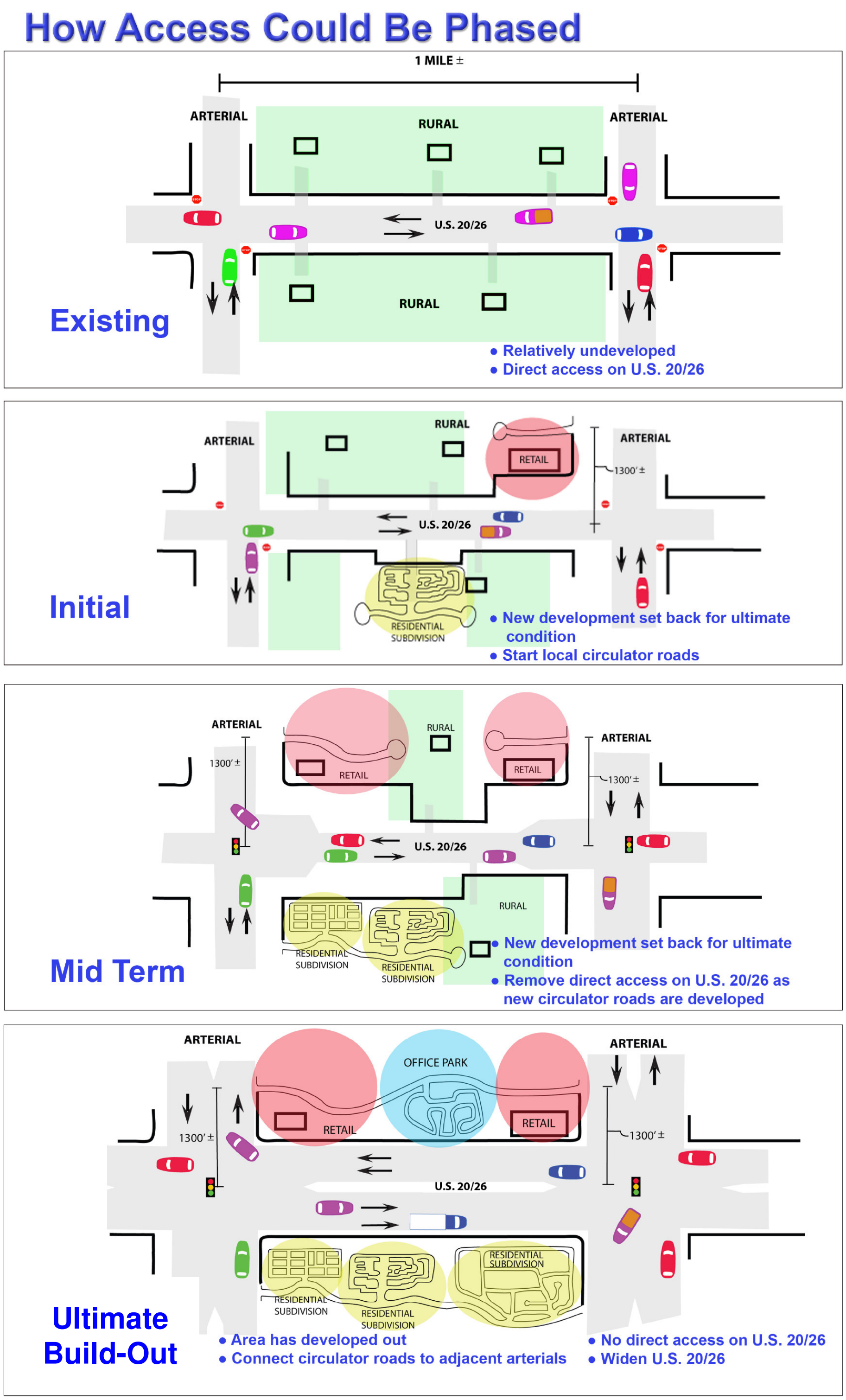
In addition to determining the alignment for each circulation roadway, local land use agencies and highway districts will work with developers to ensure that each road will have the capacity needed to handle the anticipated long-term traffic generation.

1.6.2 Phasing from Current Conditions to Build-Out

Several steps are needed for the US 20/26 Corridor to grow from its current two-lane roadway into a four to six-lane roadway with turn lanes, medians, supporting street system, and high volume intersection improvements. Business and residential development growth will drive an increasing need for improvements to US 20/26. To mitigate growth impacts on road capacity and safety, local governments, through their land zoning and development authority, will need to require private development to mitigate their impacts by improving local streets and the highway. The US 20/26 AMP will provide guidance to make those improvements effective and long lasting.

Figure 10 illustrates how development adjacent to US 20/26 can make transportation improvements as growth occurs. Smaller developments may only have the opportunity to make initial or mid-term improvements. Larger developments, perhaps ones with one-quarter mile or longer frontage, may be able to proceed to a mid-term phase or immediately to the ultimate build-out phase. The illustration shown provides basic examples of how a series of phases can arrive at the ultimate build-out design for US 20/26 and a supporting parallel street network.

Figure 10. Phasing of Interim Access and the Local Circulatory System



1.6.3 Making Access and Development Related Decisions

Each access connecting to US 20/26 represents a reduction in public safety and roadway performance. Due to these negative impacts, access points should be very carefully considered. Every attempt should be made to find access into the general street system without direct access to US 20/26.

Proposed US 20/26 Access Points and Subdivision Approvals

Other than the public street intersections identified by this access study for full movement and noted on the AMP, all other access needs shall be directed to local streets. Requests for new or changed access to US 20/26 should be denied if they do not meet the standards identified in the AMP, except in cases where unique or special conditions can be documented. In some development or redevelopment situations, existing private access to US 20/26 may need to remain, or new access may be necessary. The AMP is not intended to deny reasonable access to the roadway system, but to carefully manage access and redirect private access to secondary streets rather than US 20/26. However, at every opportunity, such as implementing developments, redevelopment, or new roadway improvements, any existing US 20/26 access should be closed and access redirected to alternative routes of local street and collector functions.

The decision to approve or deny an access request can be difficult. Decisions should be fair, consistent, lawful, and a coordinated effort between ITD and the local agencies.

The following guidance will be used in reviewing and taking action on proposed US 20/26 access points:

- New access must be consistent with this AMP. All new access points for development must be from a local road, frontage road, and/or a backage road.
- Any direct access to US 20/26 that must be granted due to specific conditions will be granted as a temporary access only. Once the conditions change, such as availability of access from an alternative location, the temporary access will be closed. These variances to the US 20/26 AMP should be granted only after all reasonable and feasible options for alternative access have been explored and proven to be impractical. It should also be demonstrated that the granted access will be temporary in nature by clearly outlining the terms, future actions, and time frames in which the alternative access is anticipated and the temporary access can be closed.
- Lot splits should be discouraged. Parcels of real property fronting US 20/26 created after the adoption of this AMP will not be provided with direct access to US 20/26 unless the location, use and design thereof conforms to the AMP provisions.

Local agencies and ITD will work together to ensure new non-conforming access points are not approved.

Variances to Standards

A variance to standards or to the AMP may be granted by ITD. In these cases, an access is approved that does not meet set standards, and yet is deemed necessary for reasonable access. For US 20/26, it is recommended that ITD approve an access as a "Modification of Access Standards" when the proposed access point meets the following findings:

- Granting the variation is in harmony with the purpose and intent of the US 20/26 AMP.
- It has been studied and documented that there are no other feasible options for meeting access standards at that time.

- Applications for variance to set standards must provide proof of unique or special conditions that make application of the provisions impractical. This proof should include documentation that:

    a. indirect or restricted access cannot be obtained;

    b. no engineering or construction solutions can be applied to mitigate the condition;

    c. no alternative access is available from a street with a lower functional classification than the primary roadway;

    d. the proposed roadway connection conforms to the greatest extent practicable with the access spacing, location, and design standards set forth in ITD's access standards, policies, and the AMP; and

    e. ITD and the local highway district agree that a roadway connection is necessary to provide reasonable connectivity to the supporting road network or to provide access to an area that is otherwise isolated due to topography, unique natural features, or existing land use and roadway patterns.

Under no circumstances should a variance be granted, unless not granting the variance would deny all reasonable access; endanger public health, welfare or safety; or cause an exceptional and undue hardship on the applicant. No variance should be granted where such hardship is "self-inflicted."

It is important to recognize that while granting one exception may not create a significant safety and mobility impact, the cumulative impact of granting several similar exceptions along this 15 mile route would be significant and counter to the performance needs of US 20/26.

After careful assessment has been made and an access need to US 20/26 is shown to be a proven necessity, and thereof must be granted, the access permit should be temporary pending the completion of alternative local streets that will ultimately allow the temporary access closure. In this context, necessity for access should rise to the level of substantial impairment to land development, absent the granting of access. Developers may speculate that absent a direct access there may be reduction of value in both land and sales due to lower access convenience for the customer and route circuitry to the development. However, such reduction may be negligible in comparison to the crash potential and operational impacts created by the access point.

Documenting Access Decisions

Carefully made decisions regarding access management within the corridor will involve a coordinated effort that considers input from all effected parties including jurisdictional agencies, private developers, and the public. Any final decision must carefully consider both the short and long term impacts to safety and operations to successfully achieve the primary goal for the US 20/26 Corridor, which is to provide the overall best balance between access, mobility, and safety.

To document the considerations, a traffic impact study should be available to help evaluate the traffic and safety impacts of an access or development proposal. The decision maker should consider the following series of questions during each evaluation step:

- Has every attempt been made to find and develop alternative access routes?
- If an alternative route is not available, does the development plan anticipate a future route and incorporate that future condition into the current plan?
- Has the best balance between allowing access and mitigating the public safety impacts been found?

- Does a level of necessity for legal access justify the decrease in public safety?
- Have all alternatives to direct access been carefully evaluated for both operation and safety?
- Can the development provide internal circulation for each parcel?
- Can the internal street system or cross-parcel easement agreements connect to other local streets abutting the development?
- Does the plan incorporate or allow for the continuation of the local street network?
- Can the plan of internal streets also allow abutting properties to connect or circulate to local and collector streets and minor arterials?
- Does the local street plan and access service achieve the objectives or support the AMP objectives?
- Is there documentation in the record to support the decision?

The above lists can serve as checklists when reviewing applications and documenting decisions for new or revised access.

1.7 RECOMMENDATIONS FOR POLICY IMPROVEMENTS

The current access permit rules and statutory authority do not allow ITD to create unique and enforceable access plans for specific segments of state highway, even when a community and ITD recognize or anticipate unique access and performance needs. New legislation could provide a solution by allowing the parties involved to establish unique access plans if certain criteria are met and if a formal agreement is signed. New legislation would provide the legal authority and flexibility for ITD to work with local jurisdictions to establish the access control level that best serves all interests in the corridor.

For ITD to make needed access decisions along US 20/26, it is strongly recommended that one or both of the following actions be implemented:

1) Amend ITD's access management rules, access type standards and assignment criteria to consider the future corridor needs. This will allow day-to-day access permitting and land use decisions to be based on long term goals and anticipated needs. This would improve the ability of the entire state system to anticipate future transportation needs.
2) Adopt the proposed Transportation Access Plan (TAP) Idaho Legislative Session. This would authorize ITD to enter into interagency agreements with local government units to manage access to specific segments of the state highway. Then, access management plans, much like the proposed US 20/26 AMP would hold legal authority.

2. ACCESS MANAGEMENT REPORT

2.1 PERSPECTIVES ON ACCESS MANAGEMENT

2.1.1 Benefits of Access Management

The management of access to US 20/26 is the most critical single design element that will determine the quality of transportation service along the highway. It calls for strict control of the location, spacing, design, and operation of intersections, driveways, median openings, and interchanges that connect to US 20/26. Access management principles can help guide decisions involving land use policy and planning, corridor design, traffic operation, and land development.

Access Management:

- Uses a combination of strategies derived from land use planning, transportation planning, traffic engineering, roadway design, and law,
- Maintains travel mobility for efficient movement of goods and services,
- Preserves the public investment in the roadway system by maintaining the existing roadways functional performance,
- Promotes sustainable land use patterns while preserving the investment in commercial, residential, and other developments that depend on reliable transportation performance,
- Increases safety by using turn lanes to enter and exit the highway to limit vehicle speed differences, decreasing the likelihood of a crash.
- Increases safety by reducing the number of potential vehicle conflict points, reducing motor vehicle crashes,

Access management benefits are not limited to individual motor vehicles, but extend to other modes using the corridor, such as transit, pedestrians, and bicycles.

The access management strategies presented in this report use design principles that promote increased capacity and safety. They encourage decision makers to implement a proof of necessity concept into their access and development approvals considered within the corridor. As confirmed by numerous studies, there is no such thing as a completely safe access point. Each access location produces conflicts on the roadway. These are not only vehicle to vehicle conflicts, but conflicts with pedestrians and other modes wherever they cross the paths. The crux of the problem is the need for land access and meeting legal rights of private property versus the best interests of public safety and operation of the public facility. A decision to permit access is a decision to increase conflict and reduce public safety. Yet such decisions are necessary if property is to have access to the street system.

2.1.2 Economics

Travel mobility, as measured by travel times, a lack of congestion, and better travel safety is important to support the economic vitality of the area served by US 20/26. Residents desire reasonable and consistent travel times to work, shopping, schools and other activities. Additionally, retail businesses have market areas (the size and demographics of the area for the source of the majority of customers) that are determined by travel time. As travel time increases due to traffic signal delays, congestion and lower speeds, the retail market area shrinks, reducing the customer base.

2.1.3 Historical Perspective

Managing access to and from public roads has a history of over 200 years in the United States. The impacts of vehicular access to and from roadways have been a topic of transportation engineers, planners and decision makers since the early 1900s. By the 1930s, with the rapid growth of traffic, the piecemeal, irregular and uncontrolled sprawl of development and frequent access was seen as a problem. It was not just an eyesore, but a significant issue that was degrading roadway efficiency and causing safety problems. According to Robert Whitten, planning consultant, in *7 Harvard City Planning Studies*, he states the following:

> "The motor age is directly responsible for the blighting of the countryside. Filling stations, repair shops, lunch stands, tourist camps, summer colonies, billboards, and sporadic and sprawling urban development are playing havoc with the charm and beauty of many of our county highways.... Moreover, the present unregulated and disorderly roadside development is destructive of property values and is a serious handicap to the safe and efficient use of the highway... The enormous expenditures that are being made for highways cannot be justified unless these investments are protected by some continuing control of the uses of abutting lands." *Model laws for Planning Cities, Counties and States, Cambridge* 1935, p133-134.

While in the early part of the 20^{th} Century, the impact of frequent land access was noticeable and often discussed, there was little field research until the 1950s.

David Schoppert, in writing, *Prediction of Traffic Accidents from Roadway elements of Rural Two-lane Highways with Gravel Shoulders*, [Highway Research Board Bulletin 158, 1957], concluded in part, "Access to the highway through driveways or intersections is directly related to accidents at all average daily traffic (ADT) levels. The number of access points is a reasonably good indicator of the number of accidents within an ADT group." It was also Schoppert's opinion that the number of accidents increases with the number of situations presenting a change in conditions and therefore requiring a decision on the part of the motor vehicle operator. This is one of the earliest conclusions that driver workload, caused in part by the frequency of access related turning movements, is a strong contributing factor in accident potential on busy highways.

Research in Oregon concluded that motor vehicle accident rates increase for several reasons, including the increasing number of commercial units adjacent to the section, the increasing number of traffic signals, and the increasing number of intersections. (Head, J.A., *Predicting Traffic Accidents from Roadway Elements on Urban Extensions of State Highways* - 1958, Highway Research Board Bulletin 208.) Every study since the 1950s has indicated a direct and significant link between the number of access points and the number of accidents on a roadway.

Under President Eisenhower, a committee of industrial, engineering, construction and business leaders declared in 1955 that a national highway system was the "top national economic and defense priority". With regard to access control the report stated,

> "One of its principal features in the provision for adequate ROW is to permit control of access to the highway itself. Otherwise, experience shows that the facility becomes prematurely obsolete due to developments crowding against the roadway which make if unfit for the purposes for which it was designed. Control of access to the degree required by traffic conditions is essential to the protection of life and property. It is also essential to preserve the capacity of the

> highway. So far as the investment of funds in major roads is concerned, provisions for control of access to the extent required by traffic is fundamental."
> *A Ten Year National Highway Program*, 1955.

From the efforts of this special committee, President Eisenhower, and many others, the Interstate System was born with the specific requirement of controlled access. This action was taken given the failure of the then current arterial system to provide safe and efficient travel for commerce and defense.

What is now termed "modern access management" was an effort started in the early 1980's to incorporate access management strategies on the non-freeway system. This involves the application of a set of access location and design techniques across a range of roadway types, from local streets to principal highways. The degree of access control varies depending on the importance of the roadway, the volume of traffic, its context in the community, roadway speed and the long term vision for the function of the roadway. The overall goal of access management is to reduce the frequency of conflicts in the public right-of-way. Where conflicts must occur, such as intersections, it is essential to apply good design and engineering standards to reduce the negative impacts of the conflicts.

In subsequent years, a range of research has investigated various access techniques, reporting on their variations and results.

Historically, state highways have attracted abutting retail businesses. Retail businesses find highway frontage attractive, given the potential customers and market area a highway provides. A typical retail land use pattern developed early as the 1920's is often called "strip development". This placed businesses in easy view and easy access of the busiest highways in the community. While of value and interest to retail sales, retail tax collection and convenience to travelers, this land development pattern has been recognized as problematic for the operation and safety of the roadway. Some classic examples in the Boise area include the older portions of Chinden Boulevard, Fairview Avenue, Vista Avenue, State Street and others. In recent times, the performance and safety issues of this land development pattern have been well documented and are presented in part in this report.

If not strip development, how will site development look along an access managed roadway? While stand-alone small businesses on individual parcels were once prevalent, beginning in the early 1960's, shopping centers with groups of small to medium businesses at one location began to appear. Over time shopping centers grew in size as the economy of scale and sharing of costumers was realized. Larger parcels became necessary, allowing greater spacing of access points and more organized internal traffic circulation. Yet, these were simply larger strip developments, still seeking one or more driveways, or perhaps traffic signals to the arterial. The area adjacent to Eagle Road, from I-84 north to SH 44 (State Street) is an example of this type of larger development.

One example of a non-strip development pattern is along the interstate system. With total access control along the freeway, business activities have occurred at interchanges. Nationally, large regional shopping centers and "big-box" developments are more and more often locating near or at interchanges to take advantage of a high-speed, high volume abutting corridor, yet have no direct access connections.

Access management strategies for a principal highway, like US 20/26, call for little or no direct driveway access and traffic signals to be well spaced to maximize traffic flow and traffic volumes. These are two very important aspects of improving potential customer availability. The challenge for site location and design of access is to have local circulation to ease the flow of customers to the business site without creating restrictions, operational problems, or safety impacts.

2.2 REGIONAL PARTNERS

The local governments and agencies with jurisdiction along the US 20/26 Corridor include Ada and Canyon Counties; Ada County Highway District and Canyon Highway District No. 4; the Cities of Boise, Eagle, and Meridian in Ada County; and the City of Caldwell in Canyon County. The Cities of Star and Nampa have also expanded their areas of impact to include acreage along US 20/26.

Without local government support, an access management plan developed for the corridor would be ineffective. As such, COMPASS and ITD actively involved local government in the study's decision making process, including the screening of project options.

To integrate the local government's participation, COMPASS formed a Corridor Preservation Committee (CPC) comprised of elected and appointed officials representing local governments along the corridor. The CPC will be responsible for adopting the plan into local government policy, plan and ordinance.

The CPC included representatives from the following agencies: ITD, COMPASS, Ada County, ACHD, Canyon County, CHD, City of Caldwell, City of Eagle, City of Meridian, City of Middleton, City of Nampa, City of Star and Valley Regional Transit. A small area on the east end of the corridor is within the City of Boise, but because the land was already developed, the City opted out of the CPC. The CPC met several times a year in public meetings from 2006 to 2008. The CPC reviewed plans and made recommendations to COMPASS and ITD on access management options.

2.3 PUBLIC AND STAKEHOLDER INVOLVEMENT

During the US 20/26 corridor study, a number of strategies were used to gain input from the public on the primary corridor issues and possible solutions. Public outreach has included one-on-one stakeholder meetings, newsletters, and public meetings.

Individual Stakeholder Meetings: In August and September of 2005, the US 20/26 project team conducted interviews with individuals who use the 20/26 corridor, live along it, and/or are involved in some aspect of managing it. These interviews were informal and helped the project team gather insightful information while engaging key stakeholders. In all, 22 interviews were conducted with 38 people. Stakeholders interviewed include a broad cross section of agencies, businesses, and the public with interests in the corridor. Included were highway districts, city and county staff and elected officials, transit agencies, school districts, emergency service providers, utilities, developers, business and homeowners, and others.

Those interviewed identified a desire for a facility that moves traffic safely and efficiently (with speeds of 45-55 mph). They also indicated a high level of support for the goals identified in CIM, including access management. The input informed the project team of possible areas of consensus or disagreement.

Newsletters: Newsletters were published and distributed in May 2006, May 2007, and September 2007 to residents in a large area of the Treasure Valley. The newsletters provided updates about the corridor preservation study, future meetings, and opportunities to comment.

Public Meetings: Two public meetings were held on the project to collect public input.

Public Meeting #1 was a "Project Scoping" meeting and was held on May 11, 2006 at the Friendship Lutheran Church in Meridian and May 12, 2006 at the Idaho Department of Health and Welfare in Caldwell for public input. Approximately 156 people attended the meetings. The meetings enabled the public to obtain project information, to comment on the purpose and need of the study, to identify alternatives, and to identify other concerns that should be considered in project development.

This meeting asked the public for input on the question, "*What access type do you think best serves the future needs of the corridor?*" The following three options for access and mobility were presented at the meeting:

- Use an expressway with interchanges and overpasses.
- Use one mile at-grade signalized intersection spacing.
- Use one-half mile at-grade signalized intersection spacing.

The majority of the public indicated a strong interest in alternatives that improve mobility and safety because they are concerned that growth will diminish the quality of their current mobility.

Public Meeting #2 was held on May 30, 2007 at the Friendship Lutheran Church in Meridian and on May 31, 2007 at the Thomas Jefferson Charter School in Caldwell. Approximately 218 people attended the meetings. The meetings presented a proposed access management plan to the public for comment. Meeting participants made it clear that making the roadway safe and controlling traffic congestion by limiting traffic signals and access points were priority issues. While participants were supportive of expressway level of service that uses frontage and/or backage roads with traffic signals every mile, they indicated a preference for no traffic signals at all.

The conclusion of this outreach process was that the majority of stakeholders, particularly the public in general, had high expectations for the long term performance of US 20/26. Overall, they hoped US 20/26 could maintain a high-speed and high capacity function.

2.4 SELECTING STRATEGIES FOR ACCESS MANAGEMENT

There are a number of possible strategies for managing access. At the most basic level, selecting access management elements that define the overall strategy for a corridor involve choosing the proposed roadway type (freeway, expressway, at-grade signalized intersections, etc.) and choosing the access point spacing. These elements must be developed jointly to define the proposed access management strategy for a corridor; and they were a significant consideration in determining the most acceptable and feasible access control and intersection treatments for the US 20/26 Corridor.

2.4.1 Access/Intersection Type

Selecting the proposed functional design type for the roadway will fundamentally impact most other decisions made within the corridor. It typically involves investigating the various tradeoffs between cost, environmental impact, support from the public and agency stakeholders, and other factors; and it requires close examination of how the proposed facility will operate in concert with the supporting roadway network. The roadway system's ability to work as a unit, which involves optimizing the balance between mobilization and access, ultimately defines if success has been achieved.

The three most widely considered roadway functional design types include the following:

Freeway: Many urbanizing regions throughout the United States have experienced the growth that the Treasure Valley has experienced in the last five years. Those collective experiences have shown that a freeway level design with full control of access would provide the best long-term mobility and service for the region. This is true, given the large area the US 20/26 Corridor will serve, the scope of land development, and the distance to a parallel facility (I-84). With any roadway alternative other than freeway, the future traffic volumes on US 20/26 will produce low levels of service at intersections during peak hours.

Expressway: The next lower functional design level below a freeway is an expressway. Expressways are divided, high speed principal arterials and may have a mix of at-grade intersections and grade separations. Unlike a freeway with complete access control, travelers on an expressway may stop occasionally at a traffic signal, travel at slower speeds and need to be more cautious due to greater conflicts caused by entering and exiting vehicles. Although there may be some private access due to unique circumstances, all direct access to development should be excluded. If carefully designed with well managed access, an expressway design can provide an acceptable level of capacity, although travel time will increase noticeably compared to the free-flow a freeway alternative would provide. Many expressways are initially constructed with a series of at-grade intersections that are converted to grade-separated crossings (overpasses) or interchanges when traffic volumes become excessive and as funding allows.

Roadway Facility with At-Grade Intersections: A facility with at-grade intersections (the two intersecting roadways intersect at the same elevation; does not include an overpass or other grade-separated design) provides the lowest functional design level. For US 20/26, most intersections will exceed capacity in the peak hours by the year 2030 if only at-grade intersections are used.

While traffic signals are normally seen as a safety solution for vehicles entering the highway, most studies show that traffic signals actually increase crash rates. Some studies even show an increase in injury crashes. Overall, crash rates always increase as the frequency of traffic signals along a corridor increases. Each additional signal also increases traffic delays, increases congestion and increases travel time. Poorly located signals, ones that are not uniformly spaced or are too close to another, may cause even a greater degree of interference by reducing traffic progression and traffic flow efficiency.

2.4.2 Access Management Strategies for US 20/26

Strategies identified for the US 20/26 Access Management Plan focused on achieving three primary goals:

- Minimize the number of access points necessary for providing reasonable and sufficient access to service abutting lands.
- Allow for construction of a complete roadway network of local circulators that allow property access at a local road level.
- Ensure the recommended strategies are supported by local governments with land use and local road development approval authority.

An initial list of strategies, performance measures and expectations was developed using stakeholder interviews, public meetings, and meetings with special groups such as the CPC. These strategies involved a mix of at-grade intersection and expressway type options with different access spacings. These alternatives were evaluated with significant input and involvement from the CPC members to determine the final recommended alternatives.

Based on public meeting comments, the initial options included the following:

1. One half- mile at-grade intersection spacing
2. One-mile at-grade intersection spacing with half mile right-in/right out
3. One-mile at grade intersection spacing
4. At-grade intersection spacing greater than one mile with ½ mile right in/right out
5. At-grade intersection spacing greater than one-mile
6. Limited access, Interchanges at three river crossings, one-mile at-grade intersection spacing
7. "Communities in Motion" Expressway (six interchanges, eight overpasses)
8. "Communities in Motion" Expressway with High-Occupancy Vehicle Lane(s)
9. Unrestricted Access – (No Action Alternative)

This list represents a range of access management types that would be consistent with or more restrictive than local and state access management policies, and also includes a No Action Alternative. These options were presented to the CPC in October 2006.

The alternatives were screened, with significant input from the CPC to determine which alternatives were to be advanced into the access management plan. The CPC member agencies took the access management options to their constituents at City Council and County Commission Meetings. In March 2007, the CPC refined and narrowed the range of access management options based on a series of outreach meetings sponsored by member agencies. These refinements were based on further evaluation by the local governments on their economic development goals within the corridor and the need to maintain consistency with recent land use decisions. The initial recommendations included the following:

- West Segment (I-84 to Midland Road): Access would be allowed at one-half mile spacing using at-grade intersections, with ROW preserved for an interchange at Middleton Road.
- Middle Segment (Midland Road to McDermott Road): Access would be allowed at one mile spacing using at-grade intersections, with ROW preserved for interchanges near Franklin Road and McDermott Road.
- East Segment (McDermott Road to Eagle Road): Access would be allowed at ½ mile spacing using at-grade intersections, with ROW preserved for interchanges at McDermott Road and Linder Road.

These recommendations were presented at the May, 2007 public meeting. Following the public meeting, the City of Caldwell proposed a new design which involves a two-lane one-way frontage road on each side of and parallel to US 20/26. Bridge structures would be constructed over KCID, Middleton and Midland Roads. Frontage roads would be connected to US 20/06 by ramps (commonly called slip ramps) at approximately one-mile intervals. Caldwell indicated that this system will provide better compatibility with their current and future lane use plans and provide the best opportunity to meet all of the near and long-term goals of the corridor. At the October, 2007 CPC meeting, this option was formally accepted as the recommended option for the west corridor segment. This decision was based on a motion to pursue a bonding measure to fund the full expansion of US 20/26.

The alternatives that COMPASS, ITD and CPC recommend to be advanced into the final US 20/26 Corridor Access Management Plan include:

- West Segment (I-84 to Midland Road): A Frontage Road / Slip Ramp system will be used with 20/26 overpasses and frontage road at-grade intersections at 1-mile spacing.
- Middle Segment (Midland Road to McDermott Road): Access will be allowed at one mile spacing using at-grade intersections, with ROW preserved for interchanges near Franklin Road and McDermott Road.
- East Segment (McDermott Road to Eagle Road): Access will be allowed at ½ mile spacing using at-grade intersections, with ROW preserved for interchanges at McDermott Road and Linder Road. No ½ mile spaced access would be allowed between McDermott Road and Black Cat Road.

Additionally, a local road circulation system will be developed for the entire corridor. This system will be implemented by local agencies in phases as development occurs. The circulator roads will be spaced approximately ¼ mile from the corridor and roughly parallel to it, allowing traffic to connect to designated north-south arterials that connect to US 20/26. As existing access points are closed along US 20/26, to be in conformance with the AMP, businesses and residences will have new access via the local circulator roads.

Based on the scoping process, alternatives screening and the coordinated efforts with the CPC, the access management alternatives recommended will meet the economic development goals of the local governments along the corridor. While they are consistent with recent land use decisions, continued coordination between COMPASS, ITD, city and county governments, and highway districts will be critical in advancing these strategies into an AMP that is effective and achievable.

2.5 EXISTING AND FUTURE CORRIDOR CONDITIONS

2.5.1 Land Use and Growth

Within the US 20/26 Corridor study limits, the majority of current land use is agriculture. However, there is a mix of land use types including isolated single family residential, agricultural related local businesses, mixed industrial, isolated retail (no shopping centers), and large and small residential subdivisions.

As with many suburban areas, the land along and adjacent to US 20/26 is rapidly developing. New residential subdivisions are in development phases at the east and west ends of the study area. Retail planning and development is in progress as a result of residential growth. However, little new non-retail employment, or industrial growth is evident. Over the next 30 years, this area is expected to be dominated by residential and supporting retail land uses.

2.5.2 Highway Characteristics and Travel Demands

US 20/26 is an east-west principal highway which serves regional traffic that connects the Boise urbanized area with the Nampa-Caldwell area. It serves the growing areas of Canyon and Ada Counties and is an alternate route to I-84. As such, in addition to providing for basic capacity needs, US 20/26, is expected to provide a high degree of regional mobility that is both safe and efficient.

Currently, the highway maintains a 55 mph posted speed over the majority of its length. The geographic location of the highway, immediately south of the Boise River, has a strong influence on connectivity and travel patterns. With the exception of some turn lanes and traffic signals, the highway has not had significant capacity improvements in the study segment since it was originally constructed. The shoulder widths do not meet current standards. There are currently no pedestrian facilities along this section of US 20/26.

Current ADT volumes on US 20/26 range from a low of 8,000 vehicles per day (vpd) near Midland Boulevard to over 21,000 vpd at the eastern end of the corridor near Eagle Road. Approximately 11 percent of the traffic is large trucks. Using the regional travel demand forecasting model[1], it is estimated that by 2030, ADT volumes along US 20/26 will range from approximately 30,000 vpd at the westerly end to almost 58,000 vpd in the eastern section.

To meet future capacity, four travel lanes will be needed between the I-84 and McDermott Road area and six travel lanes from McDermott Road area to Eagle Road. Other improvements required to meet the anticipated future travel demands include either intersection improvements or interchange construction. In addition to these improvements, implementation of a successful access management plan to eliminate direct access points to the highway is needed to enhance the capacity and safety of the system.

Access to US 20/26 is managed by traffic signals or stop signs with the exception of the Franklin Road Interchange at I-84 (Exit 29). Numerous residential and business driveways connect to US 20/26 allowing vehicles to turn left or right onto the roadway. While most of the public intersections have one or more turn lanes, the majority of the private access points do not. Without a turn lane, a motorist must slow down or stop in high speed traffic to turn into the access. There are left and right turn lanes at some public intersections, and a continuous two-way center turn lane from N. Spurwing Way (just west of Linder Road) to Eagle Road.

2.5.3 Access to the Highway

Over the length of the US 20/26 study segment, there are currently about 325 access points that tie directly to the highway. Refer to Table 4. A full movement public intersection was counted as two access points, one for the north leg and one for the south leg. These access points include public intersections, business driveways, residential driveways, and agricultural access points. At an average of over 20 access points per mile, this is a relatively high access count for a generally agricultural area along a principal highway.

Table 4. US 20/26 Study Segment Access Points

US 20/26 Segment (2005)	Fields	Homes	Businesses	Streets	Total
I-84 to Middleton (2 miles)	30	9	10	13	62
Middleton to Can Ada (5 miles)	36	33	7	17	93
Can Ada to Black Cat (3 miles)	35	31	0	10	76
Black Cat to Meridian (3 miles)	25	13	0	12	50
Meridian to Eagle (2 miles)	16	12	1	15	44
Totals (15 miles)	142	98	18	67	325

1 The 2030 travel demand forecasting model was developed by COMPASS in cooperation with ITD and local governments and highway districts. The model uses predictions in land development, demographics and growth trends and other data sources to estimate future traffic volumes and transportation characteristics.

2.5.4 Planned Improvements in the area

The following transportation improvement projects are planned and will impact the movement of traffic along US 20/26. Most of these projects are not currently funded.

State Highway 16. An environmental study is underway for a new alignment to extend SH 16 as a freeway from State Highway 44 to I-84. This new roadway would ultimately intersect with US 20/26 with a grade separated interchange at, or near, McDermott Road. No funds are programmed for construction at this time. The segment from SH 44 to US 20/26 may be funded for construction as a separate project with no interchanges. Traffic from SH 44, diverting to US 20/26 via the new Boise River bridge crossing may add additional traffic to US 20/26.

State Highway 44. A study of the SH 44 Corridor between I-84 and Eagle Road is currently in progress. The 2030 regional Long Range Transportation Plan (CIM) identifies this route as a future four-lane limited access divided highway. Recent forecasts may indicate a need for six lanes east of SH 16. No funds are programmed for construction at this time.

Franklin Road River Crossing. The City of Middleton 2007 Comprehensive Plan indicates that Franklin Road would eventually extend north from US 20/26, crossing the Boise River and aligning with Kingsbury Road to create another north-south roadway between Middleton and Star. The proposed crossing would be three miles east of Middleton Road and three miles west of Star Road. This project is identified in the regional long range transportation plan as a “study only” and is not expected to be funded in the next twenty years.

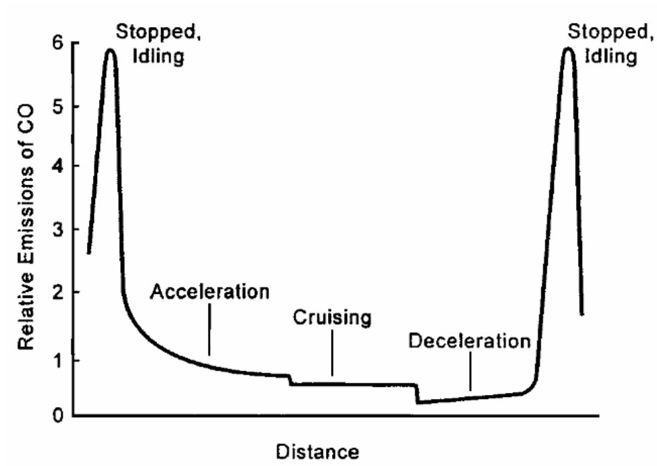
General: ACHD and CHD will continue to have local road improvement projects in the surrounding area. It is paramount that local road improvements (new or widening) are coordinated between ITD, the local governments, and highway districts to ensure these efforts do not conflict with or preclude implementing the goals and plans identified for US 20/26.

2.5.5 Air Quality and Fuel Efficiency

Air quality is a significant concern in the Treasure Valley. Studies using the national air quality computer model called “MOBILE 6” show fuel consumption is minimized at speeds of 30-55 mph. Fuel efficiency drops substantially when speeds are below 25 mph. Emissions of carbon monoxide (CO) and volatile organic compounds are minimized at speeds between 35 and 55 mph. Emissions of Nitrogen Oxides are minimized at speeds between 10 and 50 mph. This makes progression speeds of 35 mph and higher desirable for fuel and air quality.

Maintaining smooth and progressed traffic flow reduces the frequency of large numbers of vehicles stopping at a signal and then accelerating back to the posted speed. Figure 11 is a graph showing a typical CO emission generation for a vehicle traveling between two points where stopping is required. This graph clearly shows that the time spent stopped and idling generates the greatest impact on CO emissions. Irregular signal spacing is the most likely cause of more frequent stopping and limiting of roadway capacity.

Figure 11. Typical CO Emission for Stopping



2.5.6 Existing Access Policies

Property owners are entitled to 'reasonable' access to and from their property, but they do not have the right to have access to each and every public street that abuts their property. It is the intent of this access management plan to reduce the need for direct access to US 20/26 by directing private access needs to the local street system. The local streets system will then connect to US 20/26 at specified locations. While there may be disagreements between government and property owners as to what constitutes 'reasonable access', it is not the intent of the access management plan to deny access to the extent that it creates substantial impairment in the use of any property. It is the intention of the access plan to preserve US 20/26 as a major high function regional highway. This will create a valuable public asset and transportation utility that supports economic growth and value for abutting and nearby properties.

The State and local governments have statutes, regulations, policies, ordinances, and/or comprehensive plans that guide decisions for roadway access. While ITD currently has authority to manage access on US 20/26, local governments have also adopted access management policies that support access restrictions to US 20/26.

The following sections summarize current regulations that are available for the agency decision-maker's use with respect to the US 20/26 Corridor.

State Access Policies

Idaho Code, Section 40-310(9), enables the Idaho Transportation Board to regulate access on state highways. It states that the board shall: Designate state highways or parts of them, as controlled access facilities and regulate, restrict or prohibit access to those highways to serve the traffic for which the facility was intended.

Idaho Code, Section 40-312(1), provides the mechanism for implementing this regulatory authority by providing, "The board shall prescribe rules and regulations affecting state highways and enforce compliance with those rules and regulations."

Idaho Administrative Procedures Act (IDAPA) 39.03.42, "Rules Governing Highway Right-of-Way Encroachments on State Rights-of-Way", adopted in March 2001, provides the standards and criteria for a property owner to obtain or upgrade access to a state highway. The rule carries the force and effect of state law.

The IDAPA rule sets access standards based on defined functional classification, existing number of lanes, and existing urban or rural designation. The access types range from the least restrictive, Type I for a major collector, to the most restrictive, Type V for a freeway-type highway. The IDAPA rule also defines the intersection, approach, and signal spacing allowed with each access type.

The two access control types associated with US 20/26 are Type III and Type IV.

> *Type III access control* is assigned to two-lane undivided principal arterial highways. In rural areas, Type III allows consideration of access for private approaches at 1000 feet and intersections and traffic signals at one-half mile. In urban areas, it allows consideration of access for private approaches at only 300 feet, with intersections at one-quarter mile (1320 ft) and traffic signals at one-half mile.
>
> *Type IV access control* is assigned to four-lane principal arterial highways. In rural areas, Type IV allows consideration of access for private approaches, signals and intersections at one mile spacing in rural areas and one half mile in urban areas.

Recognizing the plan for four lanes on US 20/26, and the regional importance of the highway, the Idaho Transportation Board, by resolution, designated US 20/26, as Type IV access control in 2003.

Local Government Access Policies

In addition to access decisions by ITD, local land use agencies have authority to manage and approve land divisions, local streets, and site plans. These approvals include the issuing of building permits and approving the access location to and from developments. ACHD and CHD also regulate subdivision street patterns and access locations on public roadways in the study area. The following includes the local government rules and policies with respect to managing access along US 20/26.

Ada County Highway District

ACHD's Development Policy Manual (September 2005), Section 7204, sets the minimum spacing for collector intersections along an arterial at 1300 feet. It states the optimum spacing is 1700 feet. The standards set the minimum driveway spacing along an arterial street at 220 feet for right-in/right-out drives and 440 feet for full access drives. ACHD is currently revising its access management policy.

Canyon Highway District #4

The Association of Canyon County Highway Districts' Highway Standards and Development Procedures Manual (May 2007), Section 3061, defines access spacing standards based on rural or urban conditions. Based on the current City of Caldwell and City of Nampa limits, the urban definition applies to US 20/26. The standards limit public road intersections along 20/26 (Principal Arterial) to one intersection every 2000 feet. Driveway access to US 20/26 is not allowed. However, it is noted that if a parcel does not have access, provisions for a temporary access must be made until an alternate access is developed.

City of Caldwell

Caldwell's Municipal Code at Chapter 13, Section 5-09, points to ITD access policies for US 20/26. Their policy follows ITD's urban Type IV access control, calling for two approaches per side per mile which results in a full movement intersection every one-half mile.

City of Eagle

The 2007 Comprehensive Plan for the City of Eagle, Section 6.8.1, discusses the Chinden Planning Area and recognizes the likelihood of regional commercial and mixed uses along US 20/26. It limits access to US 20/26 in accordance with ITD's Type IV access restrictions and states that internal circulation should be constructed to serve the entire area utilizing limited access points to state highways.

City of Meridian

Through its 2005 Unified Development Code, Chapter 3, Article H, "Development along Federal and State Highways", the City of Meridian has set policy to limit access to US 20/26. It sets a one-half mile spacing standard for intersections and calls for a local and parallel street system to connect to north-south cross roads. It incorporates the ROW preservations as set by ITD and states that no new private approaches will be allowed directly to US 20/26.

City of Nampa

The City of Nampa's Design Policy Manual, Section 80, allows for public intersection spacing along principal arterials of 2000 feet for intersecting collector roads and 5,000 feet for intersecting arterial roads. Unsignalized driveway spacing for a principal arterial roadway varies from a minimum of 4 times the design speed to 10 times the design speed, depending on the driveway ADT.

City of Star

The City of Star, which has planning areas abutting the north side of US 20/26, adopted their Comprehensive Plan in February, 2008. Section 5.5 states that mixed-use development along state highways (SH 16, SH 44, US 20/26) should consider transit oriented development, and access to these sites would be from frontage roads and secondary access and collectors from the rear of the site. In Section 5.5.5: Highway Commercial, it states that access to developments would be limited to frontage roads or secondary access. In Section 6.12 it encourages staff and developers to work with ACHD, CHD and ITD to develop frontage roads, secondary access points and collector "backage" roads to reduce direct access onto SH 44, SH 16 and US 20/26.

2.6 ACCESS SPACING AND SIGNAL DESIGN

2.6.1 Access Point Spacing

Whether the proposed facility is a freeway, an expressway, or involves a series of at-grade intersections, the access point spacing is an important consideration with respect to safety and mobility. The number and spacing of public and private access points allowed along a roadway is directly related to the type of facility, with a freeway having the longest access point spacing. For any facility, only the minimum number of access points necessary to provide reasonable and sufficient access to abutting lands should be allowed for the facility to operate at its peak performance.

While abutting development may wish to have more frequent access to US 20/26, each new access will have a negative impact on capacity and safety, which is detrimental to all development along the highway and to the traveling public. The intent of the US 20/26 AMP is to find the best balance between meeting the anticipated traffic demands and the need for access to US 20/26. Each land service access should prove its necessity for access service while using good design to minimize its impacts to the public roadway. Access points should not be based on driver convenience because mere convenience is not sufficient justification to decrease public safety.

2.6.2 Introduction to Traffic Signals

Typical of any principal highway in an urbanizing area, US 20/26 will have a number of intersections with other public roads. Given the scale of urban growth and the anticipated traffic volumes, it is assumed that most full movement intersections permitted along US 20/26 will likely require a traffic signal. The capacity, safety and speed of a highway are significantly impacted by decisions about location and spacing between traffic signals; and therefore, the location of intersections becomes very important to the efficiency of US 20/26.

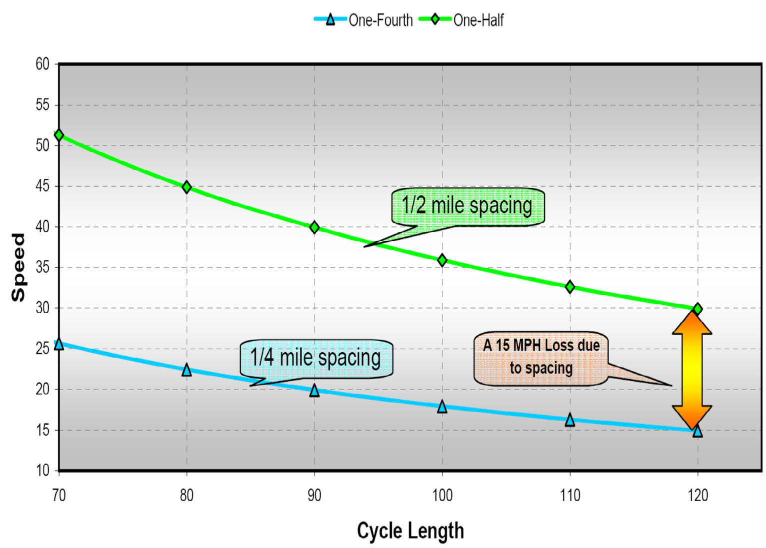
Traffic Signal System Efficiency

It has long been recognized that maximum traffic flow rates are achieved when traffic is moving at a uniform speed of about 40 mph to 45 mph. Coordination of traffic signals, sometimes referred to as progression, is the timing of the signals so that a "platoon" of cars traveling on a roadway arrives at a succession of green lights and proceeds through multiple intersections without stopping. A well coordinated signal system can enhance traffic flow, reduce delay and minimize pollution. However, it is not always possible to retain efficient coordination throughout a signal network due to spacing and location. It is also more difficult to maintain signal progression on a two-way street compared to a one-way street.

If minimizing travel time is a high priority, maximum flow rate is reduced in favor of higher speeds above 45 mph. Maximum traffic flow is achieved at about 40 mph. When signals are closer together it is necessary to reduce speeds to maintain smooth traffic progression. Both flow rate and travel time performance is significantly reduced as signal spacing drops below one-half mile.

Short traffic signal spacings also result in higher accident rates, reduced flexibility for signal timing, more speed changes in traffic flow, reduced fuel economy and increased emissions (refer to Figure 12).

Figure 12. Cycle Length and Progression Speed

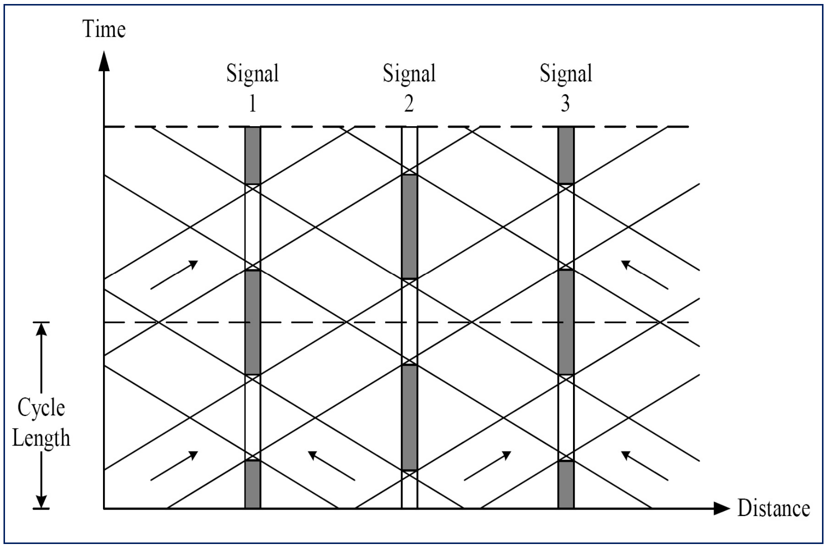


Traffic signal systems work best when responding to two general conditions: off-peak periods when relatively low traffic volumes allow a shorter cycle length and relatively higher speeds; and, peak periods of high traffic volumes when longer cycles are needed. Figure A-2 shows how cycle length, travel speed and signal spacing are related.

Although not indicated in the figure, greater advantages are achieved with one mile traffic signal spacing versus one-half mile spacing, because longer distances between intersections increase the traffic volume capacity of the intersections. For one mile spacing, signal cycle lengths would need to be 120 to 130 seconds. This can allow a progression speed of 45 to 55 mph – more typical of an expressway. One mile intersections would also allow conversion to grade-separations, if and when necessary as the cross-streets increase to high volumes. At one mile spacing, there is also a safety benefit by reducing crash rate and frequency.

An efficient system of traffic signals is also achieved by coordinating nearby signals. Figure 13 illustrates a traffic signal time-space diagram for two-way traffic. This is how the signal coordination system helps ensure that traffic platoons (groups) on the main highway can maintain progressed flow in both directions with a series of green signals. As shown in the figure, when there is not a window for through traffic (shown with arrows in the figure), there is an opportunity to allow a green signal for the cross street with a minimum impact to main highway traffic. This diagram works for any uniform spacing

Figure 13. Signal Time Space Diagram for Two-Way Traffic



It is very helpful if a traffic signal system is fully computerized or linked to a central control center and can adjust to changing travel patterns throughout the day. The recently completed Treasure Valley Intelligent Transportation System Plan identifies US 20/26 as a priority corridor for a coordinated signal system.

Travel Time and Delay

Table 5 compares one-quarter versus one-half mile signal spacing on a five mile arterial corridor. The study resulted in a decision to maintain one-half mile signal spacing for the study corridor. While one-quarter mile spacing lowered the turning volumes at each intersection and achieved a better level of service at each individual intersection, the one-half mile spacing, which concentrated volumes at fewer locations, significantly reduced overall travel time throughout the corridor. This increased performance of the one-half mile signal spacing is mostly due to the slower speeds necessary to maintain one-quarter mile signal spacing as shown in the previous speed graph.

Table 5. Estimated Savings in Travel Time & Delay During Peak Hour

½ vs. ¼ mile Signals + Side Friction in Five Miles			
	Travel Speed MPH	Total Travel Time: Veh-H/H	Total Delay Time: Veh-H/H
Access Controlled Segment (½ mile spacing)	22	542	275
Unrestricted Segment (¼ mile spacing)	13	942	675
Percent change		-42%	-59%

Notes: veh-H/H=Vehicle–Hours/Hour

Access Control Demonstration Project. FHWA/CDOT report to US Congress. 1985

2.6.3 Signal Spacing Basics

Closely spaced traffic signals on suburban and urban roads result in an excessive number of stops, unnecessary delay, increased fuel consumption, excessive vehicular emissions and high crash rates. Irregularly spaced signals, often a result of piecemeal land use planning, add to safety and congestion problems and are often experienced as bottlenecks to capacity and flow. Conversely, long and uniform signal spacing permits traffic signal timing plans that efficiently accommodate varying traffic conditions during peak and off-peak periods. Proper spacing of signalized intersections is an essential element in achieving smooth and reliable traffic flow with adequate capacity and level of service, and is therefore a necessity for the functional performance expected from US 20/26.

Proper signal progression is also required for a system of signals to efficiently work together. Signal progression is when signals are timed to provide green lights and the smooth flow of platoons (groups) of vehicles, traveling at similar speeds, through a series of signalized intersections. On the typical two-way roadway, making sure both the main roadway and the crossroad directions of traffic enjoy smooth flow is challenging. The ability to implement signal progression depends on the signal spacing and signal cycle length. Traffic signal progression at reasonable speeds can be achieved at short signal spacings such as at one-quarter mile only if the traffic volumes are very low and short traffic signal cycles (60 seconds or less) can be used. As the main roadway and the cross-street traffic volumes increase, longer cycle lengths must be used to handle the traffic levels for crossing and turning vehicles, and to allow more green time to the capacity of the main road. As a result, 90 to 120 second cycle lengths are now commonly used on arterial streets during peak periods in developed areas. In developing areas, such as US 20/26, the future cycle length due to traffic volume growth must be a consideration to achieve desired travel speeds when planning future intersection spacing.

The performance factors of one-quarter, one-half and one-mile intersection spacing as applicable to US 20/26 were carefully reviewed as a part of this study and are summarized below.

2.6.4 One-Quarter Mile Intersection Spacing for US 20/26

Given the predicted long range traffic volumes for US 20/26, the selection of quarter mile spacing will deliver poor performance. A four lane highway with quarter mile signal spacing is not technically capable of providing adequate capacity for the predicted year 2030 traffic volumes at any location along US 20/26.

If uniform quarter mile spacing was selected, the best travel speed during the off-peak period would be about 25 mph on average. During peak morning and evening commute hours, the evening peak being the highest volume, quarter-mile spacing would be expected to deliver progression speeds of 15 to 20 mph on average. To some degree, the speed will be determined by the amount of delay to the through traffic caused by heavy volumes on the cross streets. Signal progression could fail during peak hours due to signal induced traffic back-ups and may fail even during much of the day. If some signals were not at the uniform spacing, further reductions of capacity and speeds would result.

This low performance is a technical reality of one-quarter mile spacing when used on a high volume arterial. One-quarter mile spacing, while never very effective for performance, can be used on collectors where traffic volumes and speeds are lower, signal progression is not important, and there is minimal long distance traffic needs. The occasional use of a one-quarter mile spaced signal on a larger spaced system, such as one-half mile signal spacing or one mile signal spacing, will create noticeable bottlenecks and capacity limitations. This occurs as a result of the technical aspects of two-way traffic progression and is explained under the one-half mile intersection spacing section below.

In regards to safety, studies indicate that one-quarter mile traffic signal spacing will result in a 40 to 60 percent higher crash rate as compared to one-half mile spacing and will have twice the crash rate of one mile spaced traffic signals. Currently, some of the US 20/26 intersections are averaging 3 to 5 reported crashes per year. If, many years from now, US 20/26 has one-quarter mile signals for its entire length, the crash frequency for all approximately 60 signals could total over 250 per year.

One-quarter mile signal spacing was mentioned at the public meetings in May, 2006. The functional performance offered was not acceptable by the majority of those commenting on the issue. The CPC, meeting on several occasions to discuss intersection spacing, did not find one-quarter mile spaced traffic signals acceptable given the low performance for capacity and average travel speed.

2.6.5 One-Half Mile Intersection Spacing for US 20/26

One-half mile uniform signalized intersection spacing delivers much improved functional performance compared to the one-quarter mile traffic signal spacing. Travel speeds are higher, crash rates are lower, and capacity is improved. A system of one-half mile spaced traffic signals compared to one-quarter mile spaced traffic signals can provide over 40% reduction in travel time and about 60% less delay. However, one-half mile spacing, while operating much better than one-quarter mile, does not function at expressway levels of performance. Speeds at one-half mile spacing are normally 35 to 40 mph in the peak hours. Off-peak speeds should increase to 45 mph if uniform spacing is maintained.

Traffic capacity analysis and modeling of US 20/26 show that one-half mile spaced traffic signals with four lanes at the westerly end of the corridor and six lanes at the easterly end will accommodate the anticipated traffic volumes for the year 2030. At one-half mile spacing, capacity is still limited more by traffic signal intersection capacity and delays than the number of through lanes.

At one-half mile signal spacing, uniform spacing remains very important. The addition of any non-uniformly spaced signals will degrade capacity and travel speed performance to some degree. This is due to the technical nature of maintaining a two-way traffic progression system at speeds above 30 mph. A two way progression system creates uniform windows of opportunity for signal locations. If the signal location selection shifts away from the uniform windows, the green time progression window narrows rapidly cutting into arterial capacity and smooth flow. As the cross street and turning traffic volumes increase at the off-set signal, progression performance decreases further, sometimes reaching failure.

The use of one-half mile spacing of intersections increases the necessity of a good local street network. The local network must provide traffic circulation to and from the one-half mile spaced intersections. The local street system becomes more important for short distance local travel and for those motorists whom do not want to travel at high speeds on US 20/26. The one-half mile spacing makes access to US 20/26 less convenient, but a higher performance level will be provided on US 20/26.

2.6.6 One Mile Intersection Spacing for US 20/26

As the traffic signal spacing increases above one-half mile spacing, roadway performance improves further. Only a freeway type design would add additional performance. Signal progression travel speed can increase to over 45 mph during the off-peak. Fewer traffic signals means less frequent access related conflicts and therefore an improved safety record. Corridor travel time is reduced, providing improved regional mobility. It is estimated that the average travel time from one end of the corridor to the other would be seven minutes longer if the traffic signals were one-half mile apart, rather than one mile spacing. This higher level functional performance is very supportive of regional travel and expressway operation.

As with one-half mile spacing, use of one mile spacing of intersections increases the necessity of a good local street network. The local network must provide traffic circulation to and from the one mile intersections. The local street system becomes more important for short distance local travel and for those motorists whom do not want to travel at higher speeds. The one mile spacing makes access to US 20/26 less convenient, but US 20/26 will provide a higher performance level.

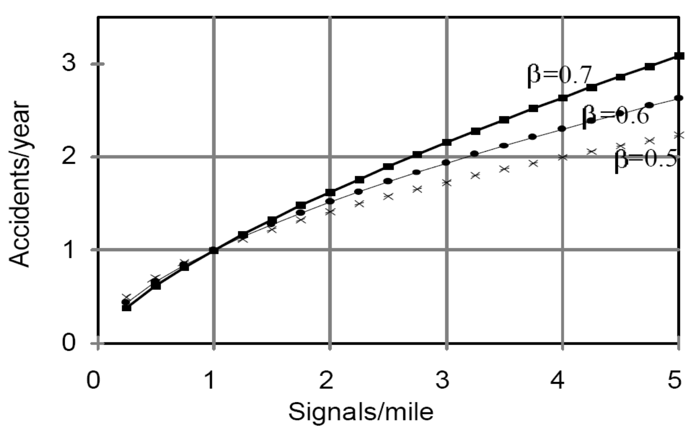
2.6.7 Traffic Signals and Accident Rates

While there are not many traffic signal spacing studies for accident rates, those completed show accident frequency increasing as signals are added. It is well known by traffic engineers that changing a non-signalized intersection to signalized will increase accident rates. It is normally assumed, usually without specific site research, that the accident severity is reduced by installing a traffic signal.

A study by Squire and Parsonson (1989) indicated that the crash rate on 4-lane roadways is essentially constant at densities of two signals or fewer per mile. But the crash rate increases substantially when there are more than two signals per mile.

Figure 14 shows that when adjacent land development is serviced by 2 signals per mile instead of 1 per mile, the number of intersection accidents is increased by 40% to 60%. Four intersections per mile can be expected to increase the number of collisions by a factor of 2. [E. Hauer, "Access and Safety", 2001]. This significant increase in crashes is seldom incorporated into signal decisions, and, it is not feasible to predict the frequency and accident severity increases for each new signalized intersection.

Figure 14. Accident Rate to Signal Rate Comparison



Using a very large multi-state database, a federal study on traffic signals reported that, on average, there are 0.7 crashes per year at rural unsignalized intersections and 4.8 crashes per year at rural signalized intersections. The same study observed 1.4 crasher per year at urban unsignalized intersections and 6.2 crashes per year at urban signalized intersections, showing the strong increase in crash frequency as traffic signals are installed. Regardless of the accident data, and as in the case of US 20/26, the main purpose of a traffic signal installation is typically not safety, but is instead to lower delay and allow the side street traffic to cross or turn left onto the major highway.

2.6.8 Additional Traffic Signal Design Elements

The design and operation of traffic signals influence both intersection capacity and safety. There are several good references for signalized intersection design at the end of this report. The following includes a summary of some important traffic signal design features that should be implemented to improve both safety and operation:

- Use both far side and near side signal heads. Use one signal head per lane in addition to a signal head on the left and right signal poles.
- Use larger signal heads and LED systems.
- Use intersection lighting.
- Consider the use of protected-only left turns: high speeds make it more difficult for the motorist to determine an acceptable gap in oncoming traffic.
- Install dilemma zone detection systems for every signal.
- Maintain intersection sight distance triangle by acquiring needed right-of-way, easements, or permits.
- Interconnect all relevant signals to maintain signal coordination and progressed flow and adjust for directional volume demands based on time of day or special events.

If implemented during design, these recommended design features will help reduce operational and safety impacts of signalized intersections on US 20/26.

2.7 INTERSECTION DESIGN AND SAFETY FOR US 20/26

Along with an AMP that addresses well spaced intersections, each intersection must also have an acceptable and capable level of design. By reducing the access point frequency, traffic volumes are more concentrated at the remaining intersections. Properly designed access related geometric design elements should reduce the potential for access related accidents, help maintain through lane capacities, and reduce the likelihood of traffic delays. The most important design element for intersections is the use of auxiliary turn lanes.

2.7.1 Auxiliary Turn Lanes

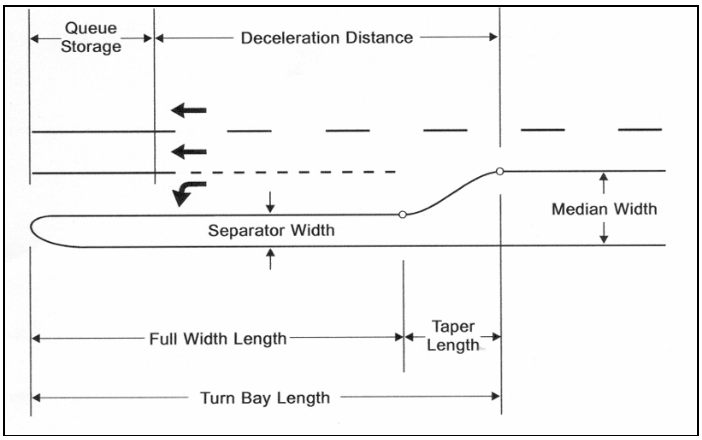
The use of auxiliary turn lanes is very important for intersection safety and capacity. Without their use, an increased risk of collisions exists as the relative speed between through and turning vehicles increases. Capacity is impacted if through motorists are delayed by slowing and turning vehicles. Also, as with any vehicular delay and speed change, both fuel consumption and emissions are impacted.

Prior to US 20/26 being constructed into the configuration proposed in the AMP, if temporary full movement access points are allowed on US 20/26, these access points should include a dedicated left turn lane or a two-way-left-turn-lane, if left turn volumes will exceed 10 vehicles in the peak hour. An even safer condition with fewer delays will exist if any new access is restricted to right-turns-only, absent a left turn lane of some type.

Elements of a Deceleration Lane

Figure 15 illustrates the basic elements of a deceleration/turn lane. The length of an auxiliary deceleration/turn lane (left turn or right turn) is comprised of two elements: 1) the deceleration distance, which includes the transition taper to slide into the lane followed by the full width deceleration distance; and 2) the queue storage length, which includes the space available for vehicles to wait at the signal in a stopped condition. The motorist in the through lane wishing to turn at the access, must first maneuver from the though lane to the turn lane. They need to transition to the left (for a left turn lane) or right (for a right turn lane) once next to the taper, reduce their speed and prepare to stop while waiting for a gap in on-coming traffic. If there are vehicles frequently making this maneuver, it is more likely that vehicles will already be standing in a queue waiting the opportunity to turn.

Figure 15. Illustration of Elements for a Turn Lane



"Speed differential" is the speed of the turning vehicle compared to a following vehicle in the through lane. As the speed differential between two vehicles increases, the potential for a crash increases exponentially. For example, when the relative speed differential is 35 mph, in the case where a right turning vehicle is turning at 10 mph and the car following in the through lane is going 45 mph, the relative potential for a collision is 90 times more than a car following at only 20 mph with a 10 mph speed differential. The American Association of State Highway and Transportation Officials (AASHTO) and many state departments of transportation have adopted 10 mph as a recommended maximum speed deferential for designing turn lanes at intersections. In order to meet this guideline, a speed change lane must be long enough to allow a turning vehicle to slide over into a turn lane such that a following vehicle only deals with a 10 mph speed change by slightly slowing or lightly braking before the turning vehicle is out of the through lane. This issue applies to both right turns and left turns.

In addition to the deceleration length to minimize speed differential, it is also necessary to allow sufficient storage queue length for turning vehicles. If the queue of vehicles waiting is long, a properly designed storage lane prevents the last vehicle in the queue from reducing the needed deceleration distance for other vehicles entering the turn lane, or in the worse case, from not clearing through traffic before needing to stop.

Deceleration/Turn lane Design

Absent a left turn lane, the turning vehicle waits in the fast through lane for a gap in on-coming traffic. This blocks both the traffic flow and places many people at risk as the accident probability is very high in the inside fast lane.

Intersection approaches with left-turn bays have lower average crash rates at both signalized and unsignalized access points. Research shows that total crashes as well as left-turn crash rates are lower when a left-turn lane is provided. The benefit of having left-turn bays at unsignalized access locations is particularly evident in safety research.

For left turning vehicles, providing an adequate turn lane may be more critical than a right turn lane, particularly on a multi-lane roadway where they would be slowing to turn from the high-speed through lane. Storage lengths for left turn lanes also tend to be longer than right turn lanes as other vehicles waiting in the storage lane are waiting for a gap in traffic or waiting for a green light if it is a signalized intersection. Storage length for the number of vehicles waiting to make a left turn is calculated using several methods. If a traffic signal is present the calculation depends in part on the cycle length as well as the volume of approaching traffic. Failure to allow sufficient vehicle storage and deceleration lengths will negatively impact the through traffic, most often during a critical peak period. Most storage length calculations are based on passenger cars. The likelihood of large trucks must be accounted for separately in the queue calculation. As the signal cycle length increases, so must the vehicle storage length. As traffic volumes on the highway increase, gaps available for left turns decrease, which also require longer storage lengths. Some queue length formulas provide the distance for an average queue. However, the average queue length calculated from most formulas yield about a 40% failure rate. Failure occurs when vehicles that need to enter the queue area cannot because there are already other waiting vehicles stacked in the queue. Increasing the queue length by 30 to 40 percent from the calculated values will reduce the failure potential to approximately 10 percent.

A right turn deceleration lane also improves traffic operations and safety by allowing a driver of a turning vehicle to exit the through traffic lane safely with little interference to the following through traffic. Several methods are also available for calculating turn lane lengths for right turn auxiliary lanes that allow for many of the same principles and considerations discussed for left turn lanes.

The use of left and right turn deceleration lanes for all at-grade intersections on US 20/26 is recommended. Other than on very low volume roads, or with low volumes and low speeds (<30 mph), left and right turn lanes are always desirable and always improve safety and traffic flow.

As an example of good design, a left-turn lane for west-bound traffic on US 20/26 turning south on Meridian Road would be designed with a minimum deceleration length of about 500 feet assuming a 55 mph design speed. It would have a queue storage length of between 300 and 500 feet depending on the calculated future year turning volume and the frequency of large trucks. Therefore, the total full lane width length would be approximately 800 to 1000 feet. An additional transition taper area of 100 feet or more would be required to complete the total turn bay length. This length would achieve several goals defined above and would ensure a speed differential of 10 mph or less between the through traffic and the turning vehicle. High left-turn volumes may require double left-turn lanes on the approach before a through lane is added.

A right turn deceleration lane would have a combination taper and deceleration length of about 510 feet (assuming 55 mph design speed and including a transition taper) and a queue storage length of about 200 to 300 feet. The queue length should be calculated based on future turning volumes. Because any congestion or significant slowing in the right turn lane will immediately impact the flow and capacity of through traffic, adding right turn lanes in the four-lane portion and any remaining existing two-lane sections of US 20/26, is an important safety and capacity feature.

It is also recommended that careful attention be given to the geometric layout of the right turn movement at the intersection. The right turn access departure lane (lane moving away from US 20/26 and onto the crossroad) should be flared wider beginning at 15 feet in width at US 20/26 and then tapering at a rate of 50:1, down to 12 feet over a distance of about 150 feet. This better accommodates the turning paths of larger vehicles without encroachment on adjacent lanes. As an alternative, three centered compound curves can also be designed to facilitate this right turn movement. While more difficult to design and built, they are more efficient for large trucks.

If recommended dimensions for turn lanes are compromised, both the safety and capacity of US 20/26 will be diminished, and intersection capacity and level-of-service will be reduced. As segments of the US 20/26 Corridor are advanced into design, special consideration to intersection geometric layout should be given.

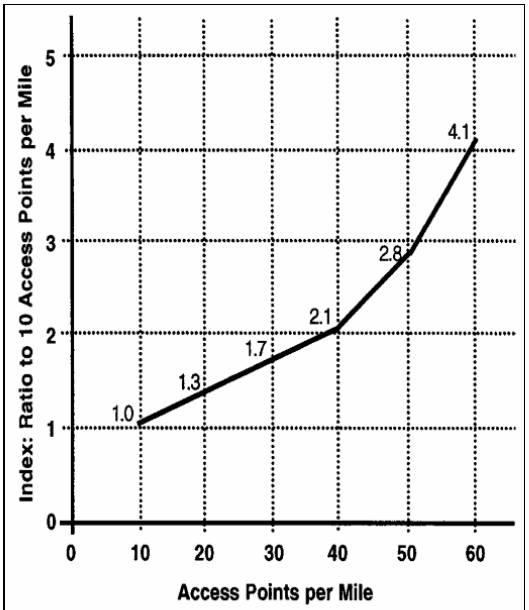
2.7.2 Safety and Access Management

The safety of the public when traveling on public roadways has always been a major concern, yet permitting access based on safety has had very little analysis historically. On many corridors, an access related crash is the most likely crash type. Access managed corridors can typically achieve crash reductions of 30 to 60 percent, as compared to similar roadways with little or no access management [Access Management Manual, Transportation Research Board (TRB)]. On US 20/26, over 67 percent of all crashes are related to access. Also, over 72 percent of injuries, and over 62 percent of crashes involving a death, and over 55 percent of deaths are access related crashes.

The Federal Highway Administration (FHWA) and the National Highway Traffic Administration report that over 27 percent of all reported crashes occur within intersections, contributing to almost 25 percent of all traffic fatalities, and almost 50 percent of all traffic injuries. [The National Intersection Safety Problem, FHWA-SA-02-007]. Studies completed in several states indicate a range of 55 to 70 percent of all crashes in urban areas are related to access maneuvers and locations.

Figure 16 is a composite index of several crash studies. It is based on research published by the National Cooperative Highway Research Program (NCHRP). [Impacts of Access Management Techniques, NCHRP Report 420] The vertical axis is the relative crash rate and the horizontal axis is the number of access points per mile. This graph illustrates how every new access point per mile contributes, on average, a 4% increase in crash rates. As the number of access points per mile increases, so does the crash rate. This study, like many others, confirms that there is no such thing as a completely safe access. Every access point, including intersections and driveways, will increase the accident rate to some degree.

Figure 16. Composite Crash Index from NCHRP 420



The crash severity has much to do with speed. By providing access to lower speed streets, any crash is less likely to result in serious injury. The relationship between vehicle speed and crash severity is based on the laws of physics. Generally, the more energy involved in a collision, the greater the potential for injury to vehicle occupants. Because kinetic energy is determined by the square of the vehicle's speed, the probability and injury severity increase exponentially with vehicle speed. For example, a 65 percent increase in speed (e.g., from 30 to 50 mph) results in an increase of approximately 1.8 times increase in the kinetic energy of a vehicle.

Protecting public health and safety is a key responsibility of government and of property owners when their actions create health and safety problems beyond the limits of their ownership. Failure to incorporate known engineering, design and safety standards can increase the risk for tort liability. But this must also be compared to rights of property access, another protected right of citizens who own property. Access management provides guidance to find an appropriate balance between safety impacts and the rights of access to property. The best way to summarize the balance is describing access management as a process requiring proof of necessity for the creation of an access. The local road circulation plan included in the US 20/26 AMP is a planning method to help reduce the necessity of creating direct access to US 20/26, because it redirects the access needs to slower, lower volume streets where the impact of the access on safety will be less.

2.7.3 US 20/26 Accident History

A review of crash history is an important indicator of current safety conditions along a corridor. The most likely location of a crash on a highway is at an access location. An access location, or access point, can be either a public intersection or a private driveway. At these locations motorists enter, cross over, or exit the highway, representing an increased risk of vehicle to vehicle conflict.

The national average for intersection related crashes is approximately 44% of all crashes. This is an average of both urban and rural data. On average, intersection related crashes account for approximately 48% of injuries and 23% of fatalities [The National Intersection Safety Problem, FHWA-SA-02-007].

Crash data were obtained from ITD covering over six years from January 1999 through July 2005. This data set included the portion of US 20/26 from east of the Franklin Road Interchange at I-84 (Exit 29) to west of the Eagle Road intersection (a distance of approximately 15 miles).

Access related crashes within the study limits of US 20/26 represented nearly 68% of all crashes (refer to Figure 17), which is higher than expected for a primarily rural highway when compared to national averages, and is more reflective of a high speed urban roadway. Of the reported 338 access related accidents, 282 were intersection related crashes with 240 injuries and 3 fatalities. Additionally, 56 crashes were driveway related with 45 injuries and 2 fatalities. There were also two railroad crossing crashes and 10 utility pole hits during this time period. Trucks with three or more axles accounted for 41 crashes, with 33 (80%) of the crashes being access related. Refer to Table 6 for a summary of the US 20/26 Corridor crash history.

Figure 17. Crashes Reported on US 20/26

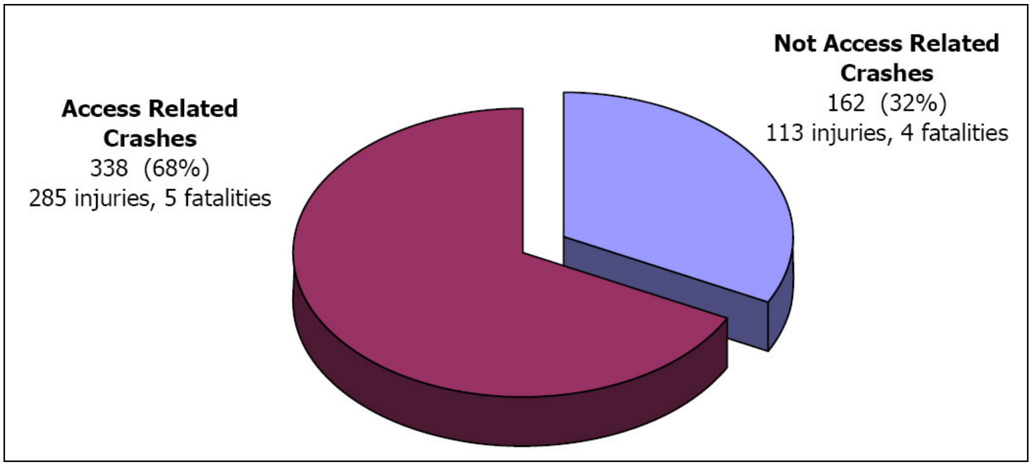


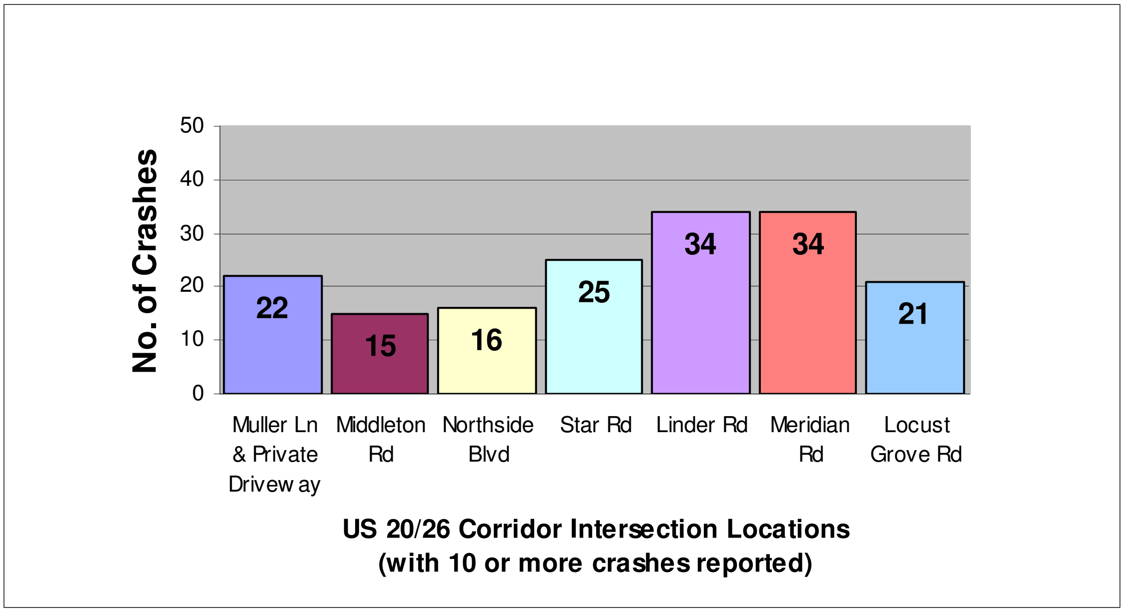
Table 6. US 20/26 Crash Data Summary Table

	All Incidents	Access Related	Access Related[1] %
Crashes (no. of vehicles)	500 (985)	338	67.6%
Injury Crashes	230	167	72.6%
Injuries	398	285	71.6%
Fatality Crashes	8	5	62.5%
Fatalities	9	5	55.6%
Property Damage Only (PDO) Crashes	262	156	59.5%

[1]The phrase “access related” includes driveway, driveway related, intersection, and intersection related crash locations.

Along the 15-mile study segment, the primary concentrations of crashes occurred at public intersections. Refer to Figure 18 for those intersections (shown from west to east) with more than 10 intersection-related crashes during the reporting period.

Figure 18. US 20/26 Intersections with 10 or More Crashes Reported



Crash data from the Franklin Road Interchange at I-84 (Exit 29) and the Eagle Road intersection are not included in this report. Both are unique junctions at the termini of the study and thus are not being analyzed as a part of this corridor study. However, it does bear mention that during the same time period, the I-84 interchange area had 52 reported crashes and the Eagle Road intersection had 25 reported crashes.

Without significant improvements in access management and design, crash frequency will continue to rise as a product of increasing traffic volumes and increasing number of new access locations. Improving access control has the potential to reduce total crash rates by 30 to 60% depending on the level of access control selected, as compared to continuing the current level of access management (TRB Access Management Manual). Along with more restrictive management of access, counter measures such as adding auxiliary turn lanes and raised median islands, and improving roadway geometrics are all important considerations to help prevent an increase in the crash rate.

2.8 DEVELOPING THE TRANSPORTATION NETWORK

2.8.1 Transportation Network Efficiency

Travel speed and mobility objectives vary with the importance of the roadway. Motorists do not expect to travel quickly and smoothly on a local street, but they do have higher expectations of good travel speeds and smooth flow on higher function roadways. This produces the concept of network hierarchy. It is always desirable that no driveways connect directly to highways or arterial roads. The roadway network operates most efficiently when roads in one specific hierarchy connect only to those of an adjacent level of hierarchy. Trips should begin at a parking space or driveway, and then connect to a low speed local street, which then connect to a medium speed collector street, and finally connect to an arterial (or principal) highway. This step by step transition sequence provides for the best safety, capacity, and overall roadway network performance. Each transition is to a higher functioning road with higher volumes, higher speeds, and higher design levels (larger radii, greater sight distance, etc).

When each functional level is designed and operated for its specific use, both safety and desired performance is maximized. Separating the various travel purposes (long distance, short distance, residential, shopping, and commuting) means more functional consistency in the travel stream of vehicles and improved safety. Short trips can be accomplished on the local streets. But for medium to longer trips, collector level and arterial level function is necessary for efficiency and improved travel time. Many roadways of these types are plagued with frequent driveways contributing to higher collision rates, congestion and delays, and every access point onto an arterial or collector street creates a safety problem to some degree. The entering and exiting turning movements and the upstream and downstream weaving and merging movements create turbulence in the flow of traffic which increases the potential for collisions. Since the 1950's, the national reference of roadway design *"A Policy on Geometric Design of Highway and Streets"* from AASHTO has recommended that there be no driveways onto collectors or higher functional roadways. A vehicle transitioning from a driveway onto a roadway with higher volumes and higher speeds is always at increased risk of a collision.

When a hierarchical network is not planned and maintained, many of the problems and poor performance discussed above often occur. Arterial streets end up serving as multi-function roadways trying to provide retail and residential access, and experience higher traffic volumes of through traffic and higher travel speeds for longer distance travel needs. These functions are not compatible. Higher traffic volumes and travel speeds make access movements more risky and difficult. Access movements reduce traffic flow and increase the potential for accidents. When there is congestion on the arterials and collectors, local streets can attract higher volumes and speeds. This occurs, much to the dismay of local property owners, as the congestion begins to make local streets the preferred means of medium length or even longer distance trips. As much as local residents don't like speeders and high volumes on residential streets; commuters, freight, and longer distance travelers' don't like the reduced performance and travel interference created by frequent access points and frequent traffic signals on collectors and arterials.

The Boise area contains several examples of collectors and arterial roadways that serve mixed functions for long and short distance travel needs. Examples of such roadways include Fairview Avenue (west of I-184), parts of Chinden Boulevard, West State Street, Franklin Road, and Eagle Road. These roads provide for collector functions and are also expected to provide arterial function for longer distance travel. Serving this mix of functions causes a high congestion level and slow speeds during peak hours resulting primarily from heavy arterial traffic flows interacting with short distance collector traffic. Overall, these roadways have a high driveway and intersection access frequency, poor level-of-service, inadequate capacity during peak hours, and higher than average crash rates.

2.8.2 Developing the US 20/26 Transportation Network

Because the majority of the land use along US 20/26 is currently agriculture, there is very little secondary circulation and much of the agricultural land must access US 20/26 directly. In the areas of development, mostly residential at this time, there is a mix of secondary circulation on local streets. Some subdivisions are not cross-connected which reduces local circulation options for residents; other subdivisions are isolated with only US 20/26 access. While it is anticipated that more development in the area will interconnect these smaller subdivisions, there will still be a breakdown in the desired hierarchy structure of the road network.

Advance planning of the road network and local street system helps ensure a roadway network that can provide access to adjacent developed land, while minimizing the access point frequency on important principal highways such as US 20/26. Implementing this plan for access management will help restore a hierarchical roadway system needed to make this corridor function efficiently and safely far into the future.

One role of transportation and land use agencies is to plan for a hierarchical street network to achieve proper, well-functioning transitions from local to arterial roadways. The objective of this planning process is to ensure that each private property has an available access point from a local street. At the next level, each local street connects to a collector and then to an arterial. A good transportation plan is efficient and effective. This means that the plan provides access service and mobility with the minimum of public road miles, with a careful balance between mobility, safety, travel time, and adequate system capacity for the relevant traffic volumes.

Limiting access onto US 20/26 and incorporating a supporting local circulation network at well spaced and predetermined intersection locations will ensure fewer crashes and improved operational and capacity characteristics. Accomplishing these important goals will define the long-term success for the US 20/26 corridor.

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