Initial Design Concept Report

State Route 189, International Border to Grand Avenue

Nogales, Santa Cruz County, Arizona

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Executive Summary

The Arizona Department of Transportation (ADOT) is the sponsor of a proposed action, the construction and operation of corridor spot improvements and a revised service traffic interchange (TI) at Interstate (I-) 19 and State Route (SR) 189 in Nogales in Santa Cruz County, Arizona. The revised TI will include new system ramps and additional general purpose lanes to meet the future traffic demand. ADOT is working in close consultation with the Federal Highway Administration (FHWA), the lead federal agency, to develop an environmental assessment (EA), design concept report (DCR), and change of access request for the proposed action.

In June 2014, the State Transportation Board adopted the 2015–2019 Five-Year Transportation Facilities Construction Program. Current funding allocates $2 million for environmental work in fiscal year (FY) 2016 and $4 million for design in FY 2019. Funding for construction is programmed for $65 million in FY 2019. In September 2016, a $25 million appropriation was passed by the Arizona Legislature to help accelerate the project for construction in FY 2019 and is currently identified as a design build.

Alternatives Development and Screening

This report describes the development and evaluation of three corridor alternatives(Corridor Management, Connector Route, and Expressway) and six I-19/SR 189 (Mariposa) TI options. The corridor alternatives have been presented to the public and the stakeholders through many outreach activities, starting with the May 2011 agency scoping meeting and continuing with stakeholder meetings in June 2011, September 2011, and April 2012; a public meeting in May 2012; and a stakeholder meeting with area property owners and business interests in June 2012. In August 2012, the City of Nogales passed a resolution supporting the selection of the Corridor Management alternative. The Board of Supervisors of Santa Cruz County provided similar support for the Corridor Management alternative. Similarly, the corridor access management alternative rated the highest in project implementation, cost, and regional plan consistency. Subsequently, the study team identified the Corridor Management alternative with options as the Recommended Build Alternative. This recommendation is supported by local agency stakeholders and the public.

A public meeting was held in November 2014 to seek public input on six TI options. Public feedback on the TI options was documented and—based on the ratings, technical analysis, stakeholder and public feedback—a multidirectional flyover at the Mariposa TI is recommended that includes a grade-separated structure over the Frank Reed Road intersection. The Ultimate Condition plan includes these features and has the support of local stakeholders because it separates the heavy truck movements destined for I-19 or the border from local traffic at the Frank Reed Road intersection.

Based on the planned funding of $69 million in FY 2019, a project implementation was developed that could be constructed in phases. The first phase will be called the Interim Condition. This phase will implement improvements along the corridor and provided an at-grade eastbound SR 189 to northbound I-19 ramp. When additional funding is available, the second phase of construction will be called the Phase Ultimate Condition. In this phase, the eastbound to northbound ramp previously constructed in the interim phase will be reconstructed to be grade-separated over Frank Reed Road. In addition to the reconstruction of this ramp, a new southbound I-19 to westbound SR 189 flyover ramp will be constructed and be grade separated over Frank Reed Road. Based on stakeholder input and technical evaluations, a split multidirectional flyover ramp layout is recommended. The split ramp layout provides flexibility in the phasing of key flyover components based on the funding available. Section 3.0, *Evaluation of Alternatives*, in this report further documents the decision process to identify the TI options for the Recommended Build Alternative, which will incorporate an Interim and an Ultimate Condition. The Interim and Ultimate Conditions are presented in Figures ES-1 and ES-2.

Figure ES-1. Interim Condition

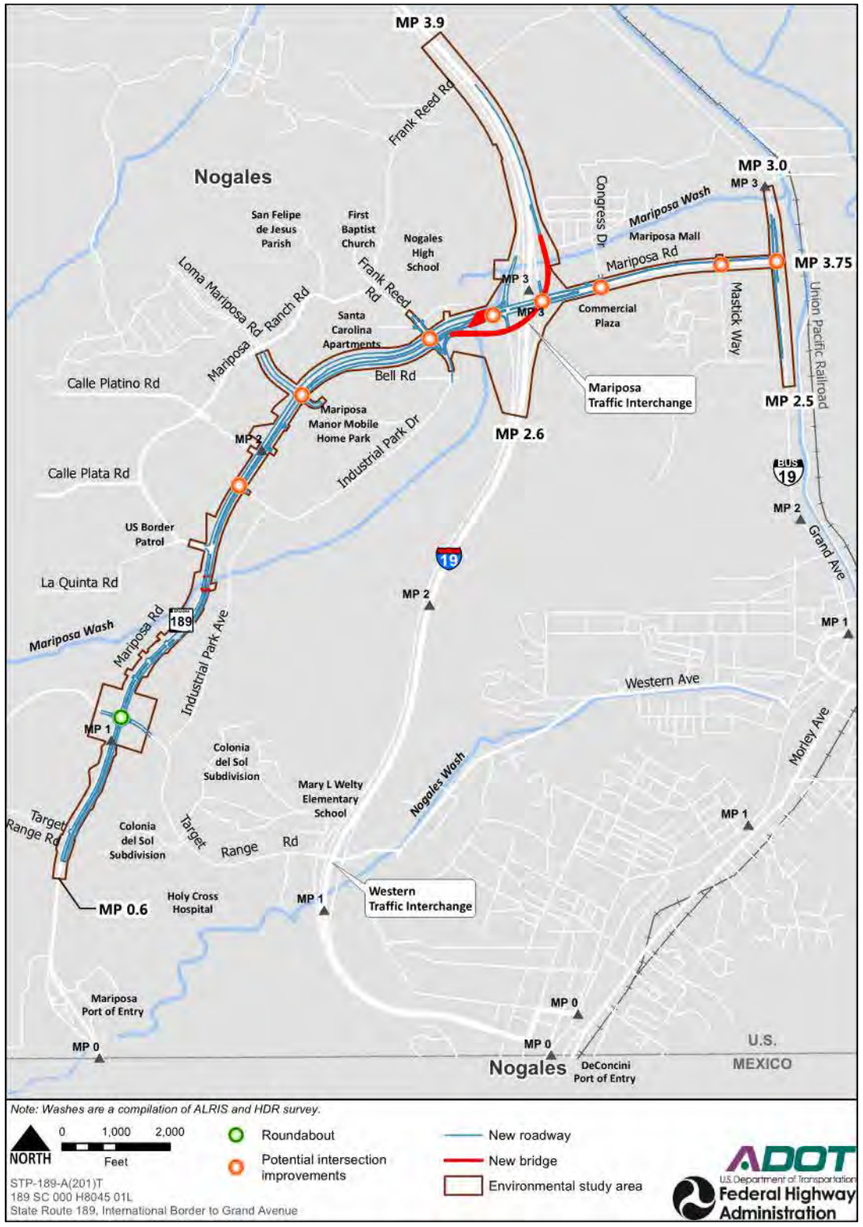


Figure ES-2. Ultimate Condition

Programmed and Estimated Cost

The current programmed funds for state route 189 include a total of $69 million scheduled in FY 19 that includes both design and construction. The estimate of probable project costs for constructing the Ultimate Condition all in one phase is $133.8 million (2016 dollars). This estimate includes $86.8 million for construction, $5.3 million for design, $10.3 million for Indirect Cost Allocation Plan (ICAP), and $31.4 million for right-of-way. The Ultimate Condition has a funding shortfall when compared with the funding currently programmed in FY 2019.

With the current design, an Interim Condition (Phase 1) can be implemented for the programmed year. The estimate of probable project costs for constructing the Interim Condition is $53.7 million (2016 dollars). This estimate includes $2.6 million for design and $4.5 million for right-of-way. The estimate of probable project costs for constructing the phased Ultimate Condition (Phase 2) is $93.0 million (2016 dollars). This estimate includes $3.7 million for design and $26.9 million for right-of-way. The total costs for the interim and phased ultimate condition is $146.7 million.

At this time, there is no time frame for when the funding shortfall could be addressed. When funds become available for the second phased Ultimate Condition, the improvements will be implemented at that time.

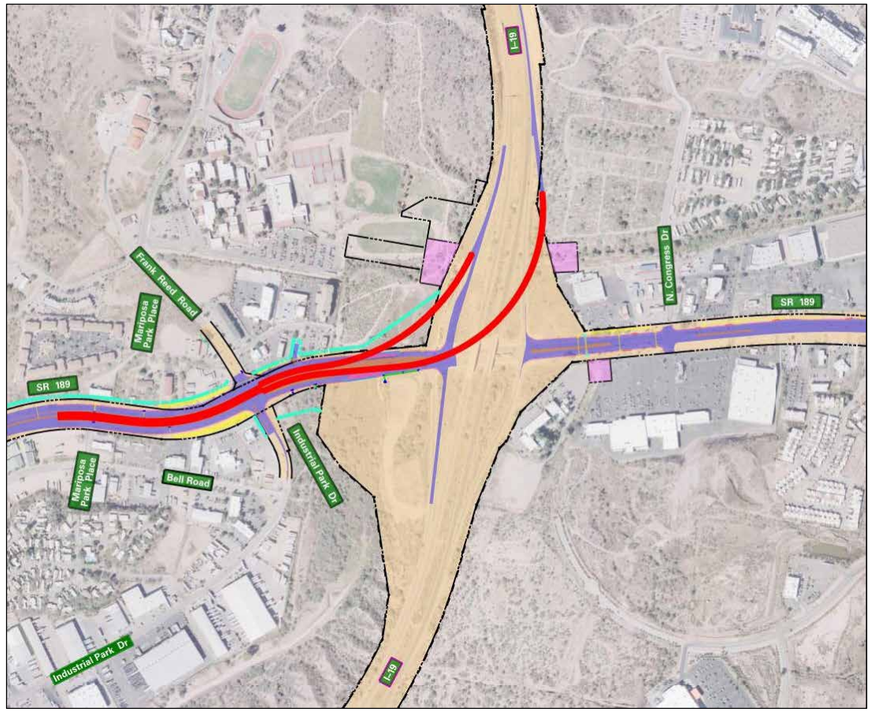
Full Build Out Option

On August 2nd, 2017, The Council of the City of Nogales passed a resolution which supports a full build out of the SR 189 improvements. The City recognizes that the (Phase 1) Interim Condition does not address all of the priority issues, including the improvements necessary to expedite the southbound traffic and grade separation at Frank Reed Road.

Consolidation of the Interim and Ultimate phases in one full build out option has a potential of reducing construction cost and opportunities to refine the design. Currently, the proposed full build out scenario is under analysis to develop a public-private partnership as a deliverable option.

Figure ES-3 shows a conceptual layout of a full build scenario which would address the grade separation at Frank Reed Road and provide flyover ramp for both northbound and southbound I-19 from SR 189. The current layout as presented in this document is phased between the interim and the ultimate condition. If the project is implemented in one project in lieu of being phased, the overall layout would be adjusted to optimize the design.

Figure ES-3. Full Build Out Option



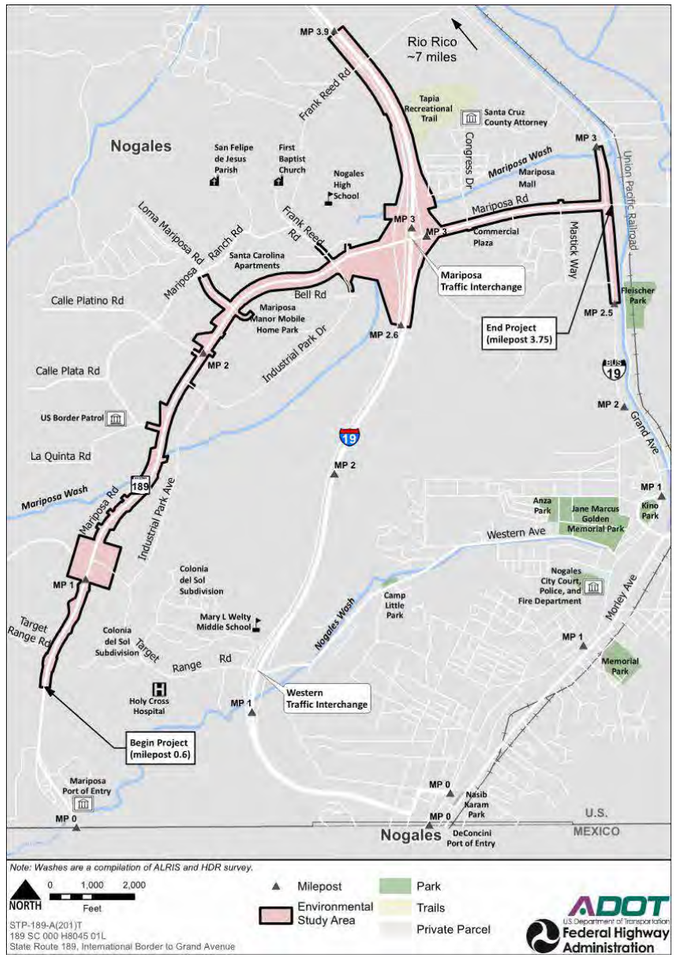
1.0 Introduction

1.1 Project Location

The study corridor is located in the City of Nogales, in Santa Cruz County, Arizona (Figure 1-1). The study area extends from milepost 0.6 at the Mariposa Land Port of Entry (LPOE) on SR 189 and extends north beyond I-19 to milepost 3.75 at Grand Avenue (also known as Business I-19 [B-19] or Tucson–Nogales Highway). Industrial development and areas of undeveloped land characterize SR 189 between the LPOE and I-19. Between I-19 and Grand Avenue, SR 189 passes through a commercial area that includes two large shopping centers.

I-19 runs generally north beginning at the U.S.-Mexico international border and ending in Tucson at the I-19 and I-10 traffic interchange.

Figure 1-1. Project location



1.2 Project Background

SR 189 connects the Mariposa POE at the U.S.-Mexico border with I-19 and Grand Avenue in Nogales. The purpose of the proposed action is to increase traffic-carrying capacity by improving the SR 189 corridor—especially at the Mariposa TI—and to improve operational efficiency by enhancing access control, improving intersections, and completing selected areas of roadway widening.

I-19 is a section of the CANAMEX Corridor, which connects Mexico, the U.S., and Canada. The CANAMEX corridor consists of a myriad of existing Interstate corridors and state highways. Through the Moving Ahead for Progress in the 21st Century Act, a transportation authorization bill signed into law on July 6, 2012, Congress recognized the importance of the portion of the corridor between Phoenix and Las Vegas and designated it as the future I-11. I-11 is intended to be a new high-capacity, multimodal transportation facility connecting the two cities. Extended, it has the potential to become a major multimodal north-to-south transcontinental corridor through the Intermountain West, connecting cities, trade hubs, ports, intersecting highways, and railroads.

CANAMEX was redesignated as I-11 in accordance with Fixing America's Surface Transportation Act, signed into law on December 4, 2015. At the same time, it extended the southern terminus of the I-11 corridor from Phoenix through Tucson to Nogales.

Implementation of I-11 would fill a significant gap by providing travel continuity—allowing significant commerce, tourism, and international trade opportunities across the western U.S., thus enabling economic development.

It is important to note that future planning, design, and NEPA documentation will determine more defined and specific I-11 route corridor alignment locations.

The proposed improvements to SR 189 are an important initial component to beginning the process of developing the groundwork for the future I-11 corridor. As noted later in Section 1.2, under *Meeting Transportation Planning Objectives*, in the *Supporting the CANAMEX and I-11 Corridors* subsection, upgrading and improving the SR 189 corridor is a critical first step in taking advantage of the Mariposa POE expansion in 2014 to increase trade capacity between the U.S. and Mexico with a much-improved transportation facility within a short-term timeframe.

Existing Conditions

The Mariposa POE is on the U.S. side of the twin cities of Nogales, Arizona, and Nogales, Sonora, Mexico; the two are known locally as *Ambos Nogales* (both Nogales). Nogales, Sonora, has a population of well beyond 200,000 and is the third-largest city in the Mexican state of Sonora. The population of Nogales, Arizona, according to the 2010 U.S. Census, was just under 21,000. Nogales is one of Arizona's largest international border towns.

Nogales Ports of Entry (DeConcini and Mariposa)

Nogales has both the Mariposa and DeConcini POEs within its city limits. They are approximately 1 to 1.5 miles apart, with the Mariposa POE located farther west. The DeConcini POE connects directly to Grand Avenue (Business I-19), which connects to I-19 just north of the POE. The Union Pacific Railroad (UPRR) Nogales

Subdivision Railroad also moves through the DeConcini POE. It links to the UPRR Sunset Route in Tucson, which generally parallels I-8 and I-10 in an east-to-west direction to the north, with Ferrocarril Mexicano (Ferromex) railroad corridor that travels south into Mexico at the DeConcini POE.

Arizona had $8.6 billion in exports to Mexico in 2014, which was a 22 percent increase over 2013's $7.2 billion. Arizona's exports to Mexico have increased steadily since 2009, growing at rates between 4 and 22 percent annually. Much of this growth has been manifested through the Mariposa and DeConcini POEs. In 2014, the state of Sonora obtained $332.6 million in direct foreign investment, a 148 percent increase over 2013. Such investment brings additional capital, creates jobs, and encourages the transfer of technology to the host country. Benefits to investor countries include access to an expanded labor force and expanded opportunities for promoting products in international markets (Pavlakovich-Kochi 2015).

In 2014, these POEs accounted for 82 percent of northbound truck crossings and 40 percent of northbound personal vehicle crossings of the six POEs in Arizona. The largest share of the trucks and personal vehicles crosses through the Mariposa POE (Pavlakovich-Kochi 2015). In addition, there were 866 train crossings through the DeConcini POE and 8,699 bus crossings primarily through the Mariposa POE (ADOT and Nevada Department of Transportation [NDOT] 2014a).

Mariposa Port of Entry

The Mariposa POE is one of the 10 busiest cargo ports along the U.S.-Mexico border and is responsible for processing, inspecting, and crossing the most significant share of commercial freight trucks, other commercial vehicles, buses, personal vehicles, and pedestrians. The DeConcini POE is responsible for all train traffic and lesser amounts of trucks, personal vehicles, pedestrians, and buses (General Services Administration 2015).

This proposed action would focus on the Mariposa POE with its direct connection to SR 189. The Mariposa POE is a full-service facility responsible for providing customs inspections of commercial vehicles (trucks and buses) and privately owned vehicles (POVs), and for processing the papers of individuals wishing to enter the U.S. Key facts regarding the Mariposa POE (General Services Administration 2015) includes the following:

- It is the busiest land port in Arizona for POVs.
- 2,832,290 northbound POVs are processed each year.
- 312,000 northbound commercial vehicles cross each year.
- 3,238,929 northbound pedestrians cross each year.
- It is the main entry point for fresh produce originating from Mexico and destined for the West Coast, handling nearly half of all agricultural commodities entering the U.S. from Mexico.

Approximately 312,000 heavy-duty commercial trucks annually pass through the Mariposa POE. Truck crossings through the Mariposa POE increased by 26 percent between 2004 and 2014 (Pavlakovich-Kochi 2015). Most of the trucks crossing through the Mariposa POE primarily transport agricultural products. Agricultural trade surges in the winter, with a peak volume of 1,400 incoming trucks per day (Every Truck Job 2011).

In 2010, FHWA conducted a study using integrated data sources to show freight movement between the U.S. and Mexico. The Freight Analysis Framework 3 2010 data provided forecasts through 2040. As shown in Table 1-1, the Freight Analysis Framework 3 projections show that the dollar value of annual imported and exported freight activity through Arizona's ports with Mexico—including the Mariposa POE—is expected to more than quadruple by 2040.

Table 1-1. Dollar values for United States-Mexico freight traffic through Arizona ports

Description	2009		2040	
	Weight (000s tons)	Value (millions 2009 dollars)	Weight (000s tons)	Value (millions 2009 dollars)
Import freight	4,513	10,755	13,524	38,028
Export freight	4,769	6,980	18,964	36,425
Total freight	**9,282**	**17,735**	**32,488**	**74,453**

Source: Federal Highway Administration (2010)

To provide for the forecast growth, in 2014 the Mariposa POE was expanded and modernized to keep pace with the anticipated growth in traffic using the facility. The expansion project added approximately 216,000 gross square feet to the Mariposa POE, and it can now process approximately two times the current volume of traffic. Key expansion efforts (General Services Administration 2015) included:

- Commercial primary booths were expanded from 4 to 8 booths.
- Commercial secondary inspection dock spaces were expanded from 33 to 56 spaces.
- Commercial exit booths were expanded from 2 to 5 booths.
- POV primary inspection booths were expanded from 4 to 12 booths.
- POV secondary inspection spaces were expanded from 4 to 24 spaces.
- New northbound pedestrian processing walkways and inspection facilities were added.
- Five new outbound inspection booths and supporting outbound buildings were added.

State Route 189

From the Mariposa POE to Grand Avenue, SR 189 is classified as a Principal Arterial street with a five-lane, undivided road with paved shoulders. It has two travel lanes in each direction separated by a center turn lane. Access to SR 189 is unrestricted. Two arterial streets, two collector streets, approximately eight local streets, and approximately 30 driveways connect directly with SR 189. SR 189 links to Grand Avenue, a principal arterial street at the northern terminus of the proposed action (ADOT 2008a).

Traffic moving through the Mariposa POE primarily uses SR 189 to gain access to I-19 or Grand Avenue. From 800 to 2,800 commercial freight trucks, daily, are destined for nearby warehouses in Nogales or Rio Rico to offload freight for storage and transfer to U.S.-registered trucks for distribution. In addition to Mariposa POE traffic, from 4,500 to 18,000 trucks of all types and POVs use SR 189 daily to gain access to Nogales High School, commercial services, warehouses, employment centers, and nearby residential areas (Chowdhury and Gorton 2011). East of Industrial Park Drive, trucks of all types and POVs traveling to local destinations make up 47 to 60 percent of the total traffic volume (Chowdhury and Gorton 2011). Local area growth in Nogales and the surrounding region has also caused increased travel demand in the area. Based on plans for currently undeveloped land, growth is expected to continue (Chowdhury and Gorton 2011).

Under existing traffic conditions, key roadways that intersect with SR 189 experience longer delays during the peak midday travel periods, including Frank Reed Road, both the south- and northbound ramps to I-19, and Grand Avenue; they currently operate at level of service (LOS) E, F, E, and E, respectively. With the expected increase in travel demand from both the Mariposa POE expansion and growth in local traffic, SR 189 corridor traffic operations and LOS are forecast to experience continued deterioration. Since SR 189 is a key link for the movement of goods and people between Mexico and the U.S., maintaining acceptable traffic operations in the corridor is critical for keeping the Nogales produce warehousing and manufacturing operations competitive in the global marketplace.

Meeting Transportation Planning Objectives

ADOT has recognized the importance of SR 189 as a critical link in the transportation system network for accessibility, mobility, efficiency, and LOS to improve the movement of goods, services, and people along this important trade route between the U.S. and Mexico. A number of recent studies have been completed to validate improvements to the SR 189 corridor as an important transportation planning objective; these studies are summarized below. The widening of SR 189, improvement of the Mariposa TI, and improvement of operational efficiency of the roads that intersect SR 189 through various measures were recommended in these documents for further study.

Mariposa/I-19 Connector Route Study: Final Report (ADOT 2008a)

ADOT's Connector Route Study was a seminal study of the future SR 189 corridor. It identified three alternatives for improving SR 189 to accommodate anticipated traffic growth. These alternatives included improving the existing SR 189 and building new connector routes between SR 189 and I-19 on two possible alignments. The study also examined three options for the Mariposa TI that included a diverging diamond interchange (DDI), a partial cloverleaf interchange, and a flyover ramp. The study concluded that improvements to existing SR 189 and the Mariposa TI could accommodate anticipated 2040 traffic at an acceptable LOS, and it identified the corridor improvement and access management alternative as the preferred corridor type.

This study included plans for adequate road capacity and safe traffic movement to and from the Mariposa POE. More specifically, the Connector Route Study evaluated the need for improved capacity and safety of the existing SR 189 and the feasibility and possible routing of a new road to connect the Mariposa POE with I-19. The Connector Route Study indicated that:

- Improvements are needed to the Mariposa TI to provide additional capacity; a system-wide approach is needed to collectively address traffic at the TI and east of I-19.
- SR 189 needs to be widened to increase capacity and accommodate traffic associated with existing and projected Mariposa POE traffic, as well as local traffic. Widening is needed from the Mariposa POE to east of I-19 because upwards of 1,600 commercial freight trucks a day (Chowdhury and Gorton 2011) are destined for Grand Avenue and locations east of I-19 during the peak season.
- By 2030, traffic volumes on SR 189 are expected to exceed the capacity of a five-lane principal arterial street; proposals for widening SR 189 should also evaluate options to limit access and means to reduce traffic volume on SR 189, such as a reliever route for commercial freight truck traffic.

Mariposa Port of Entry Bottleneck Study (University of Arizona 2008)

The bottleneck study focused on areas that impede the efficient movement of goods across the border and recommended low-cost, high-impact solutions. A *bottleneck* is a point where traffic flow is impeded; in this context, traffic must stop at the POE for inspection, which slows down traffic flow. At the Mariposa TI, the bottleneck study recommended re-timing the traffic signals, adding an additional left-turn lane, and widening the northbound on ramp. At Grand Avenue, the study recommended extending the southbound right-turn lane to improve traffic flow. Signal timing improvements were recommended at the Frank Reed Road/SR 189 intersection. Long term, the study recommended a new direct connection between Frank Reed Road and I-19.

City of Nogales General Plan (City of Nogales 2010a)

This plan acknowledges the heritage of Nogales, Arizona, and the complex urban fabric that the city shares with Nogales, Sonora, its sister city across the international border in Mexico. It identifies the Mariposa POE expansion as an opportunity to capture pass-through traffic and improve reinvestment in downtown Nogales. A planning tool for realizing the vision of the community, it identifies growth, redevelopment, and infill areas and provides a policy framework to guide development and solidify the city's position as a center for commerce and international trade. The Growth Areas Element identifies the Mariposa International Commerce and Industry Park—on SR 189 between the international border and I-19—as a modern industrial park for businesses that desire proximity to the international border.

Unified Nogales/Santa Cruz County Transportation Plan (ADOT 2010a)

The *Unified Nogales/Santa Cruz County Transportation Plan* indicated that Mariposa POE expansion would result in insufficient capacity and poor traffic operational characteristics on SR 189 from the Mariposa POE to Grand Avenue in 2030 and that SR 189 would need to be widened and improved to handle future traffic (ADOT 2010a). The plan also indicated that the portion of SR 189 linking the Mariposa TI to Frank Reed Road and to Grand Avenue currently operates at or near capacity, and improvements are needed as soon as they can be programmed and funded. The portion of SR 189 from the Mariposa POE to Frank Reed Road already regularly operates at capacity and needs expansion and other improvements to meet Federal and State transportation planning objectives.

Supporting the CANAMEX and I-11 Corridors

In addition to the designation of the CANAMEX High Priority Corridor in 1995, Fixing America's Surface Transportation Act designates I-11 as a future Interstate designated throughout Arizona to the Nevada border. The I-11 and Intermountain West Corridor were documented in the *I-11 and Intermountain West Corridor Study, Corridor Concept Report* (CCR) (ADOT and NDOT 2014a).

The purpose of the I-11 and Intermountain West Corridor Study was to determine the feasibility for a new high-capacity, multimodal transportation corridor and to establish and characterize likely routes for such a corridor. The CCR was the third phase of the study that included establishing the basis and justification for the project and corridor and the foundation for how the corridor would improve economic prosperity. The I-11 and Intermountain West Corridor recommended in the CCR is envisioned to be a continuous high-capacity trade corridor extending from Nogales, Arizona, to Las Vegas, Nevada, and potentially beyond toward Canada as part of the CANAMEX Trade Corridor.

A key study within the overall I-11 study framework—regarding the SR 189 corridor and I-19—was documented in the *Southern Arizona Future Connectivity Study Corridor, Feasibility Assessment Report* (ADOT and NDOT 2014b), completed in July 2014. The recommended alternative for this study involved locating the proposed I-11 corridor to follow existing roadway, rail, pipeline, energy, and information distribution routes from the northern terminus at I-8 and I-10 in Casa Grande, Arizona, south along I-10 to I-19, and along I-19 south to SR 189 and Grand Avenue to the Mariposa and DeConcini POEs (ADOT and NDOT 2014b).

The CCR was undertaken after completion of the *Southern Arizona Future Connectivity Study Corridor, Feasibility Assessment Report*. The CCR identified and located individual projects as discreet individual segments of independent utility (SIUs) to meet the NEPA requirements of logical termini and independent utility. Identifying SIUs allows more efficient implementation through the project development process while supporting the overall need for corridor continuity. As described in the CCR, SIU 1 consisted of developing the "Preferred alignment, corridor plan, and right of way requirements for SR 189; additional study of international freight movement needs at the Nogales Ports of Entry" (ADOT and NDOT 2014b).

Currently, ADOT and FHWA are preparing a Tier 1 environmental impact statement and conducting conceptual engineering that will be structured to select a recommended corridor alignment (approximately 2,000 feet in width) and preferred modal choice to accommodate future traffic needs from Nogales, beginning at the Mariposa TI and extending to Wickenburg, terminating at the US 93 and SR 71 TI, as recommended in the CCR. The project will include conceptual engineering in the form of an alternatives selection report and environmental analysis in a Tier 1 environmental impact statement with the intent to obtain a Record of Decision from FHWA.

1.3 Purpose and Need for the Project

The 2040 traffic operations analysis shows that improvements are needed in this corridor to provide for the efficient movement of goods, people, and information on the CANAMEX Corridor; to provide sufficient operational capacity on SR 189 to accommodate the expansion of the Mariposa LPOE and projected levels of traffic for the design year of 2040; and to reduce vehicle conflicts.

The purpose of the proposed action is to improve vehicular access, circulation, mobility, and LOS and to reduce vehicle conflicts on SR 189 from the Mariposa POE to the Mariposa TI and beyond to Grand Avenue by:

- providing sufficient capacity and LOS on SR 189 to accommodate the expansion of the Mariposa POE and future industrial and commercial growth along the SR 189 corridor
- improving intersections along SR 189 to reduce vehicle delays
- improving vehicular demand distribution to and from I-19 by providing additional egress and ingress to prevent overburdening the existing TI on this critical trade route
- reducing vehicle conflicts and improving traveler safety by implementing limited access controls and intersection improvements (traffic signals, widening, eliminating selected driveways, etc.)
- providing access to industrial and commercial land use growth areas in the SR 189 corridor, including the Mariposa International Commerce and Industry Park and Centro Commercial areas

1.4 Characteristics of the Corridor

Land Use

Industrial development and areas of undeveloped land characterize SR 189 between the LPOE and I-19. Between I-19 and Grand Avenue, SR 189 passes through a commercial area that includes two large shopping centers.

The Mariposa International Commerce/Industry Park area on Industrial Park Drive is a center for customs brokers, freight forwarders, and distribution centers. East of I-19, the land use transitions from industrial to commercial. The segment of SR 189 between I-19 and Grand Avenue is the commercial heart of Nogales, with banks, grocery stores, big-box discount stores, fast-food chains, and other businesses.

Produce Packing and Distribution Centers

A review of land use and input from the Nogales Fresh Produce Association (Chamberlain et al. 2011) confirmed that about 70 to 80 percent of existing produce packing and distribution capacity is in the Ruby Road or Grand Avenue corridors. The remaining 20 to 30 percent of Nogales' current fresh produce warehousing capacity is in the SR 189 corridor.

Manufactured Goods Distribution Centers

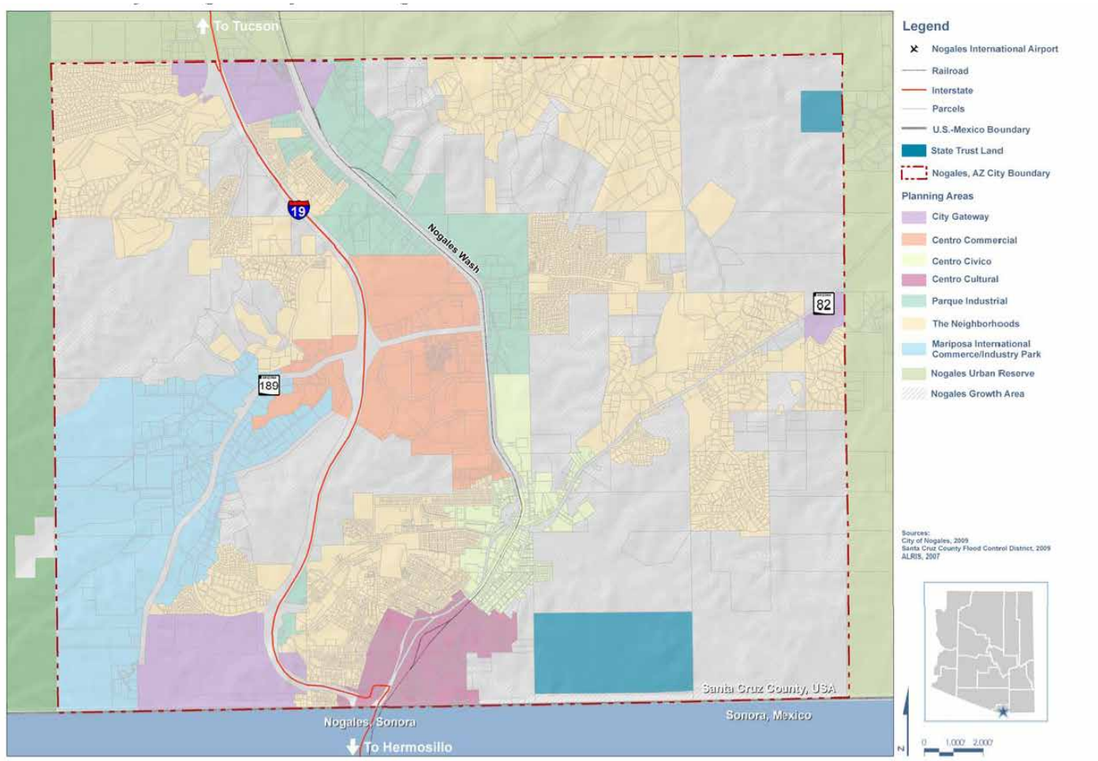
While produce packing and distribution functions are more dispersed, manufacturing is centered along SR 189 between the international border and I-19. Regional offices for such manufacturers as General Electric, MasterLock, and Alcatel-Lucent are also located in the corridor. Logistics services, United Parcel Service, and FedEx are located in the industrial park. After delivering their loads, truckers may visit packaging, agricultural, and other suppliers located in the SR 189 industrial park area for loads to haul back to Mexico (Chamberlain et al. 2011).

Industrial Growth Areas

The Ruby Road industrial center is nearly built out. Located between the Santa Cruz River and I-19, there is little additional land available for the development of new warehouses needed to accommodate anticipated growth in the produce trade (Chamberlain et al. 2011). New industrial sites along Grand Avenue are also limited.

The City of Nogales General Plan (The Planning Center 2010) identifies the Mariposa International Commerce/Industry Park as the principal growth area for uses to support trade with Mexico through the LPOE. Shown in Figure 1-2, the Mariposa International Commerce/Industry Park growth area extends north from the international border and west to the Coronado National Forest boundary. The Nogales General Plan describes this area as a dynamic, modern industrial area with opportunities for "additional industry, state-of-the-art packing and distribution centers, assembly/manufacture, technology/innovation, business incubators, corporate campuses, alternative energy generation (solar/wind) and other major employment centers requiring proximity to the international border." With limited room to grow elsewhere in Nogales, the Mariposa International Commerce/Industry Park is the focus of new industrial and commercial development. Other planning areas in the SR 189 corridor include the Parque Industrial Grand and Centro Commercial.

Figure 1-2. City of Nogales Growth Areas



Roadway Network

Functional classification is the process by which jurisdictions group streets and highways according to the character of traffic service they are intended to provide and the degree of land access they allow. Functional classification decisions for large roadway systems or networks that spread across jurisdictional boundaries are made by the jurisdictional agencies and metropolitan planning organizations in a collaborative manner. This activity is usually tied to continuing long-range transportation planning functions.

The manner in which the social and physical characteristics of an area are interrelated provides the framework for defining the functions of roadway facilities. The density and types of land uses, the density of street and highway networks, and the differing nature of travel patterns (for example, travel in rural areas generally involves longer trips) define roadway functions. Thus, urban and rural areas have fundamentally different characteristics relative to travel and the use of roadways. Consequently, different functional classification schemes exist for urban and rural areas.

Four relevant roadway functional classifications/facility types in the project area are defined in the *Unified Nogales Santa Cruz County Transportation Plan 2010*: Interstate (Freeway), Principal Arterial, Minor Arterial, and Major Collector. The following provides a brief discussion of each classification type.

Interstate (Freeway)

These facilities are high-speed, high-capacity, divided highways intended to serve regional travel. Access to freeways is fully controlled, with no driveways to abutting properties and no at-grade intersections. Access to intersecting arterial roadways is facilitated by a grade-separated TI. I-19 is the only freeway facility in the project area, and this facility is classified as an Interstate.

Principal Arterial

These facilities provide moderate capacity intended to serve regional and subregional circulation needs, while providing limited access to abutting properties and adjacent developments. Access is managed through the spacing of street intersections, driveways, and/or raised medians. On-street parking is prohibited, since this practice impedes traffic flow and reduces facility capacity. SR 189/Mariposa Road and Grand Avenue/B-19 are the only Principal Arterial roadways in the project area.

Minor Arterial

This classification of roadway facilities supports moderately long-distance traffic movements within counties and between less densely developed county areas and urban areas. This roadway type facilitates moderate access to abutting land and properties. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and street intersections. Generally, a raised median or a continuous left-turn lane separates opposing traffic flows. Minor Arterial roadways in the project area include West Target Range Road (between SR 189/Mariposa Road and I-19) and Western Avenue.

Major Collector

These facilities support short-distance (that is, less than 2 miles) traffic movements and provide a much higher level of access to abutting properties and adjacent development than do arterials. Given the increased access opportunities, these facilities have lower posted travel speeds, and the capacity of the roadway is reduced. Numerous Major Collector facilities exist in the project area. Those that are particularly relevant, or critical, to this study include Frank Reed Road, Industrial Park Drive, and Industrial Park Avenue.

Interchanges

An existing traffic interchange is located at I-19 and SR 189/Mariposa Road. This TI (Mariposa TI) is a standard diamond design with two signalized intersections providing access via on- and off-ramps in both directions of travel. The freeway, I-19, consists of two lanes in each direction, developed to the standard Interstate cross section of 38 feet, providing two 12-foot travel lanes, a 4-foot inside shoulder, and a 10-foot outside shoulder. Single-lane on- and off-ramps expand to two lanes at the intersections with SR 189/Mariposa Road.
SR 189/Mariposa Road is an 80-foot-wide, four-lane Principal Arterial highway with a center left-turn lane east and west of its intersection with the I-19 ramps. The cross section of this arterial roadway expands to 130 feet to accommodate left turns at the signal-controlled intersections with I-19 on-ramps.

In the general proximity of the Mariposa TI, access to I-19 is provided at Ruby Road (4.6 miles north) and Western Avenue (3 miles south). Each TI provides access in all directions from a diamond-type configuration. The ramp terminal intersections at the Ruby Road TI are controlled by signals, and the Western Avenue TI is stop sign controlled. Between Ruby and Mariposa Roads, entrance and exit ramps are provided to and from B-19 (2.5 miles north). I-19 passes over Western Avenue and Mariposa Road on grade-separated structures. At Ruby Road, I-19 passes under the crossroad on grade-separated structures. The B-19 exit ramp from I-19 crosses over northbound I-19 on a grade-separated structure.

The nearest major freeway-to-freeway TI is the I-10 and I-19 connection 61 miles north of the Mariposa TI in Tucson.

Utilities

Existing utilities within the project area were identified based on the results from the utility designation survey conducted for the project.

Major utility operators within the project area include the City of Nogales, AT&T, ADOT, CenturyLink, Mediacom, El Paso Natural Gas, Valley Telephone Cooperative, Inc, Valle Verde Water Company and UniSource Energy Services. The major existing utilities located within the project limits are presented in Table 1-2.

Table 1-2. Major utilities in the project area

Highway/ Cross street	Location	Utility description
State Route 189	Mariposa LPOE to Target Range Road	City of Nogales 18" sewer; UniSource Energy Service 6" gas line; AT&T underground telephone; UniSource Energy Service overhead power; ADOT culverts
	Target Range Road to Frank Reed Road	City of Nogales 18" sewer; UniSource Energy Service overhead and underground power; City of Nogales 12" and 18" water; AT&T underground telephone; UniSource Energy Service 4" gas line; ADOT culverts
	Frank Reed Road to Mariposa TI	AT&T underground telephone; UniSource Energy Service 4" and 6" gas line; ADOT culverts and storm drains
	Mariposa TI to Grand Avenue	AT&T underground telephone; UniSource Energy Service 4" and 6" gas line; ADOT culverts and storm drains
I-19	Mariposa TI to Frank Reed Road bridge	Three 14" diameter corrugated metal drainage culverts under I-19 just north of Mariposa TI

Several high-voltage electric transmission lines within the project area run parallel to SR 189 and cross SR 189 at five locations. There are multiple underground utility crossings of SR 189. Sewer lines crossing is just south of Mariposa Ranch Road, waterline crossings are west of the Frank Reed Road intersection, gas line crossings west of the Frank Reed Road intersection, and another gas line crosses between the Mariposa TI and Congress Drive.

A future transmission line project is being proposed within the corridor. The Hunt Nogales transmission project will construct 230- and 138-kilovolt transmission lines in an east-to-west direction which will cross south of La Quinta Road near the Mariposa Canyon Wash. At this time, start of construction has not been set.

Drainage

Stormwater runoff generally flows from southwest to northeast in the study area, with the ultimate outfall being the Mariposa Canyon, Ephraim Canyon, or Nogales Washes. The headwaters for Mariposa Canyon, Ephraim Canyon, and Nogales Washes originate in Mexico. The existing land use within the region is primarily steep desert foothills. However, most land uses near the SR 189 alignment are commercial development. As a result of the current land use, channelized flow is the predominant flow condition, with interspersed overland flow associated with commercial development.

Existing drainage and flood-control features were identified through field visits, as-built plans, and drainage reports on file with the Santa Cruz County Flood Control District and the City of Nogales. Notable existing features include the following:

- Mariposa Canyon flows to the north through the project area and outfalls into the Nogales Wash at approximately Grand Avenue.
- Ephraim Canyon Wash intersects the SR 189 alignment at the international border and outfalls into the Nogales Wash at approximately I-19 and Bejarano Street. Floodwaters originating from Mexico are dispersed through floodgates at the international border crossing.
- Nogales Wash flows to the north and intersects the SR 189 alignment at approximately Grand Avenue. The wash has been channelized as a concrete trapezoidal channel from approximately Washington Street to Detention Road.
- Federal Emergency Management Agency (FEMA) effective floodplains exist along Mariposa Canyon, Ephraim Canyon, and Nogales Washes.
- A large (45 inch by 73 inch) elliptical pipe drains on- and off-site flows along Grand Avenue. The pipe has an ultimate outfall at Mariposa Canyon Wash, just upstream from the confluence with Nogales Wash.
- A 10 foot by 5 foot reinforced concrete box and concrete channel, approximately 400 feet east of the Mariposa TI, drains off-site flows developing along the eastern right-of-way of I-19.
- A 4-foot-wide bottom concrete channel along the northwestern corner of the SR 189/Grand Avenue intersection conveys off-site flows along the western right-of-way limits of Grand Avenue. It ultimately drains to the Mariposa Wash.
- Three 14-foot-diameter corrugated metal pipes (CMPs) convey Mariposa Canyon flows beneath I-19. The northernmost pipe has a concrete-encased 16-inch water main traversing the length of the pipe.
- Mariposa Wash crosses beneath the SR 189 alignment in two separate locations via two 200-ft span concrete girder bridges. Both bridges contain substructure protection in the form of soil cement lifts. Additionally both bridges have riprap and gabion wire mattress features for abutment and fill slope protection.
- Both Mariposa Bridge No. 1 and Mariposa Bridge No. 2 contain extensive bridge erosion protection including soil cement guide banks, a 2-ft thick soil cement lining extending between the abutments, and concrete slope paving, gabion mattresses, and dumped rip rap.
- During field investigations it was noted that there was an approximately 4- to 5-ft lowering of the channel thalweg from the I-19 crossing up and through Mariposa Bridge No. 2. It appears to be a long term condition that could be associated with slope stability of the channel itself combined with localized contraction and bendway scour at the bridge.

Right-of-way

Between the Mariposa LPOE and Grand Avenue, the existing right-of-way width along SR 189 is between 200 and 430 feet. In the area around the Mariposa TI, the existing right-of-way width along I-19 is between 350 and 1,000 feet. The properties adjacent to SR 189 are mostly privately owned.

Structures

Two existing bridges are in the project area: Mariposa Canyon Bridge No. 1 and Mariposa Canyon Bridge No. 2. Both bridges were built in 1975. In 1994, Mariposa Canyon Bridge No. 1 was widened to the outside on the northbound side to a total width of 83 feet, 2 inches. Mariposa Canyon Bridge No. 2 was widened to the outside on both sides to a total width of 82 feet.

The original Bridge No. 1 is a three-span, continuous cast-in-place (CIP) concrete box girder structure. The bridge has span lengths of 57 feet, 6 inches; 75 feet; and 57 feet, 6 inches, with girders spaced at 6 feet, 8 inches on center. The bridge has a skew of 30 degrees. The abutment system consists of stub abutments supported on a single row of steel H-piles at both abutments. The piers consist of 3-foot, 6-inch-diameter concrete columns with concrete caps supported on steel H-piles

The original Bridge No. 2 is a three-span, continuous CIP concrete box girder structure. The bridge has span lengths of 61 feet, 80 feet, and 61 feet, with girder web spaced at 8 feet on center. The bridge has a skew of 47 degree and 30 seconds. The abutment system consists of a stub abutment supported on a single row of steel H-piles at abutment 1 and a full-height wall abutment supported on two rows of steel H-piles at abutment 2. The pier consists of a 3-foot, 6-inch-diameter concrete column with a concrete cap supported on steel H-piles. HP 10×42 steel piles were used for both abutment and pier foundation.

The widened Bridge No. 1 span configuration, skew, and superstructure elements match the original bridge. A similar abutment system was used to support the southeastern and northeastern wing walls, with the exception of 3-foot-diameter drilled shafts. HP 12x53 steel piles were used for both abutments. A pier system consisting of 3-foot, 6 inch-diameter columns supported on 4-foot-diameter drilled shafts was used for the widened portion of bridge.

The widened Bridge No. 2 span configuration, skew, and superstructure elements match the original bridge. A similar abutment system was used, except that two 3-foot-diameter drilled shafts were used to support the southwestern wing wall and HP 12x53 steel piles were used for both abutments. A pier system consisting of a 3-foot, 6-inch-diameter column supported on a 4-foot-diameter drilled shaft was used for the widened portion of the bridge.

Table 1-3 summarizes existing bridges in the project area.

Table 1-3. Existing bridges

Bridge	Structure no.	Superstructure type	Spans	Length	Width	Roadway width (one direction)
Mariposa Canyon Bridge No. 1	1796	CIP box girder	3	191 feet, 4 inches	83 feet, 2 inches	40 feet, 0 inches
Mariposa Canyon Bridge No. 2	1797	CIP box girder	3	206 feet, 8 ½ inches	82 feet, 0 inches	34 feet, 0 inches

Signs, Lights, and Freeway Management System Facilities

Existing Signs

Guide signs along Mariposa Road provide information about the border crossing. The southbound speed limit drops from 45 miles per hour (mph) to 25 mph to slow traffic as it approaches the border crossing. Transverse rumble strips and signs slow drivers and inform them as they are approaching the border crossing.

Guide signs near the Mariposa TI guide drivers to I-19 north and I-19 south ramps.

Existing Traffic Signals

Traffic signals exist at the following locations along SR 189/Mariposa Road:

- La Quinta Road
- Frank Reed Road
- Mariposa TI (on- and off-ramp intersections)
- Congress Drive
- Mastick Way
- Grand Avenue

Existing Lighting

Currently, the SR 189 corridor has intersection lighting at signalized intersections, with luminaire arms mounted on signal poles. Partial TI safety lighting is at the Mariposa TI. This includes ramp lighting at the northbound and southbound on- and off-ramps as they merge and diverge from I-19. Intersection lighting exists at the Mariposa TI signalized intersections.

Existing Freeway Management System Facilities

No freeway management system (FMS) elements and no framework facilities (dynamic message signs [DMS], closed-circuit television [CCTV] cameras, fiber or wireless network) currently exist on SR 189. Five ADOT traffic-count stations exist along SR 189. Table 1-4 summarizes the count station locations.

Table 1-4. Existing traffic count stations

Station number	Begin	End	Traffic count station milepost
1	International border and LPOE – Nogales	Target Range Road	0.6
2	Target Range Road	Industrial Park Drive (south)	1.3
3	Industrial Park Drive (south)	Frank Reed Road	2.15
4	Frank Reed Road	I-19 (Exit 4)/Mariposa Road	2.75
5	I-19 (Exit 4)/Mariposa Road	I-19 Nogales	3.11

Geotechnical Conditions

The following subsections discuss geologic and geotechnical conditions and existing pavement sections within the study corridor. The discussions are based on review of available data.

Topography

The study corridor traverses the eastern portion of a relatively broad alluvial valley that is bisected by southwest-to-north-northeast-flowing major drainages, including Mariposa Canyon and Ephraim Canyon Wash, both tributaries to Nogales Wash. The southern portion of the corridor traverses an alluvial fan that extends from the mountains to the east/southeast, toward Mariposa Canyon Wash to the northwest. Mariposa Wash is the principal drainage feature of the site area, originates in Sonora, Mexico, and flows generally to the northeast (SHB 1992). SR 189 crosses Mariposa Canyon at two locations between I-19 and the U.S.-Mexico border before turning east toward Nogales Wash. In general, the terrain along the study corridor is predominantly hilly and rolling, representative of the ridges and drainages of the dissected alluvial fan topography.

Regional and Local Geology

The study corridor is within the upper end of the Upper Santa Cruz River Basin in the southern portion of the Basin and Range physiographic province of the southwestern United States (Fenneman 1931; SHB 1992). The Basin and Range province topography is the result of tectonic extension in the middle and late Cenozoic period (15 to 17 million years before present), and is characterized by a series of parallel and elongated northwest-southeast-trending rugged mountain ranges separated by intervening valleys (SHB 1992). The mountain ranges represent uplifted structural blocks, and the intervening valleys are down-dropped basins. The intervening valley basins are partially filled-in with Tertiary- to Quaternary-Age sedimentary and volcanic deposits, creating the present landforms.

Information regarding the geologic units within the study corridor was obtained from the Arizona Department of Environmental Quality (ADEQ) (2009), SHB (1992a), and Simons (1974). Geologic units exposed within the study corridor consist of Quaternary-Age alluvium (referred to as the Younger Alluvium), Quaternary- to Tertiary-Age alluvium (Older Alluvium), and late Tertiary-Age Nogales Formation rock, as described and mapped by Simons (1974). The Older Alluvium overlies the Nogales Formation rock along the eastern edge of the basin. Based on review of the geologic map and geologic cross sections presented by Simons (1974), the geologic units in order

of decreasing areal extent are Older Alluvium in the dissected alluvial fan areas bordering the major washes, Younger Alluvium in washes and stream channels, and the Nogales Formation rock unit (lower member).

The Younger Alluvium is composed of unconsolidated gravel, sand, and silt in stream channels; it ranges from a few feet thick to about 100 feet thick. The Older Alluvium is an alluvial fan deposit and is slightly to moderately consolidated, is indicated by Simons (1974) as iron oxide-cemented, and it unconformably overlies the lower member of the Nogales Formation in the corridor. The Older Alluvium consists of interbedded cobbles, gravel, sand, silt, and clay; it typically is described as clayey to silty gravel and sand with some cobbles and clayey sand lenses. The Older Alluvium is up to about 600 feet thick. The oldest and most consolidated section of Older Alluvium is exposed on the eastern side of the basin and overlies the Nogales Formation. This section of Older Alluvium is strongly cemented and hard, locally faulted with tilted bedding, and is rocklike. Exposures of the strongly cemented Older Alluvium typically form near-vertical cliffs. To the west, the exposures of the Older Alluvium are less cemented, softer, and not faulted. The Nogales Formation consists of interbedded sandstone, claystone/mudstone, conglomerate, fanglomerate- and silica-rich tuffs, and is exposed in an existing cut near the eastern end of the project area, about ¼ mile west of Grand Avenue/B-19. The material in this cut is indicated to consist of sandstone and claystone (Speedie and Associates 1988).

Groundwater

Information regarding depth to groundwater within the study corridor was obtained from the Arizona Department of Water Resources (ADWR) groundwater site inventory (GWSI) database (ADWR 2015) and from ADEQ (2009). According to ADEQ, three groundwater aquifers in the Nogales area are used for municipal, domestic, and agricultural water supplies. These aquifers include the Younger Alluvium, the Older Alluvium, and the Nogales Formation. The Older Alluvium and Nogales Formation are understood to not have been extensively developed for water supply purposes. The Younger Alluvial aquifer is the most productive and is present along the major washes and riverbeds in the Nogales area. The regional groundwater flow direction is reported to be to the north-northwest (ADEQ 2009), which is parallel to the general surface water flow direction of Nogales Wash. Depth to groundwater in the Younger Alluvium (within major washes) was reported by ADEQ to range from near the ground surface to 35 feet below ground surface (bgs) (ADEQ 2009). Groundwater was encountered during the 1992 geotechnical investigation at depths of 21 to 29 feet bgs (Bridge No. 1) and 15 feet bgs (Bridge No. 2) within Mariposa Canyon, and at 14 to 16 feet bgs at the Mariposa TI overpass bridges.

Two ADWR GWSI index wells contained in the ADWR database are within the approximate study corridor limits. ADWR GWSI index wells are groundwater wells monitored on a regular basis (generally on an annual basis). The ADWR database provides historical hydrographs (depth/elevation of the groundwater level versus time) for these index wells. Statistics for the two wells are as follows:

Well Registry ID 571751

- Well location: about 1.3 miles west of the Mariposa TI
- Well type/use: environmental monitoring
- Well depth: 475 feet
- Wellhead elevation: 3,827 feet above mean sea level (amsl)
- Depth to groundwater level: 264.9 feet (8/11/2015)

Well Registry ID 603434

- Well location: about 0.3 mile southwest of the I-19/Western Avenue TI
- Well type/use: public water supply
- Well depth: 500 feet
- Wellhead elevation: 3,960 feet amsl
- Depth to groundwater: 204.6 feet (1/15/2015)

These reported depths to groundwater are expected to represent the static groundwater table at the well locations, since it is likely that the wells were permitted to recover before sounding the depth to groundwater.

Land Subsidence and Earth Fissuring

Land subsidence in the southwestern and western United States has occurred as a result of long-term groundwater withdrawal and overdraft. Associated with the land subsidence, earth fissures and potential earth fissure features have been identified in Arizona since the late 1980s. Earth fissures are tension cracks that form in deep alluvium-filled basins in response to the land subsidence. The fissures occur primarily at the alluvial basin edges in the vicinity of mountains and in areas where there are significant variations in the basin alluvium thickness over relatively short distances, such as above subsurface bedrock ridges, pinnacles, or knobs. Earth fissures commonly parallel nearby mountain fronts or buried bedrock highs and, therefore, the fissures often bisect surface drainage features.

Interactive online maps promulgated by ADWR and the Arizona Geological Survey (AZGS) indicate areas of land subsidence and identified or potential earth fissures within Arizona (ADWR 2016; AZGS 2016). A review of these maps indicates that neither active land subsidence areas nor earth fissures are within the study corridor.

Engineering Seismology and Local Faulting

Seismic hazard information for the study corridor was obtained from the U.S. Geological Survey (USGS) (2006). Relative to seismicity of the area, the study corridor is in the Sonoran Desert subprovince of the Basin and Range physiographic province, which is characterized by low, inclined, gently sloping, and deeply embayed (sinuous) mountain fronts indicative of inactive faults and long-term tectonic stability. No active Quaternary-Age faults are within the study corridor. Nearby Quaternary-Age faults outside the corridor include the Santa Rita Fault Zone and the Huachuca Fault Zone, described below:

The Santa Rita Fault Zone, about 20 to 30 miles south-southeast of Tucson and 15 miles north of Nogales (to the approximate nearest point of the fault zone), is a high-angle normal fault that trends northeast and is about 52 kilometers (32 miles) long. Estimated total displacement across the fault zone is about 2 to 3.5 meters (6.6 to 11.5 feet). Detailed surface geologic mapping, fault-scarp analysis, and trenching indicate that two fault rupture

events have occurred in the past 200,000 to 300,000 years. The youngest rupture event likely occurred about 60,000 to 100,000 years before present. Estimated slip-rate along the fault is less than 0.2 millimeters/year.

The Huachuca Fault Zone, about 43 miles east-northeast of Nogales, is a normal fault that trends north and is about 25 kilometers (15.5 miles) long. Estimated total vertical displacement across the fault zone is about 2 to 3 meters (6.5 to 10 feet). Surface geologic mapping and fault-scarp analysis indicate that one fault rupture event occurred in the past 100,000 to 750,000 years. Estimated slip-rate along the fault is less than 0.2 millimeters/year.

Based on the available information, neither the Santa Rita Fault Zone nor the Huachuca Fault Zone represents a seismic hazard to the SR 189 study corridor.

Estimated Earthquake Effects

Peak ground acceleration values for the study corridor were obtained from the USGS Seismic Design Maps tool (USGS 2014). An interpolated, probabilistic ground-motion value of the acceleration coefficient (A_S) for Site Class D (stiff soil conditions) for the indicated probability of exceedance was obtained for the approximate midpoint of the study corridor by latitude and longitude; it is presented in Table 1-5. The American Association of State Highway and Transportation Officials (AASHTO) 2009 Guide Specifications for LRFD Seismic Bridge Design were used as the basis for the peak ground acceleration and acceleration coefficient.

Table 1-5. Probabilistic ground motion in %g[a], stiff soil (Site Class D) values

Location	Location (latitude/longitude in degrees)	A_S 2% PE in 50 years (RP = 2,475 years) [a–e]
Approximate midpoint of study corridor	31.35794 -110.9578	0.092 g

Source: USGS (2014), based on AASHTO (2009)
[a] percent (%) of gravity
[b] A_S – acceleration coefficient for Site Class D
[c] PE – probability of exceedance
[d] RP – return period
[e] A_S value is for an assumed Site Class D "stiff soil" site with shear wave velocity of between 600 and 1,200 feet/second in the top 100 feet of the soil profile.

Liquefaction Potential

The approximate depth to the groundwater table, based on limited available ADWR well data (two wells), is about 200 to 260 feet below the existing ground surface. As noted above, depth to groundwater in the Younger Alluvium (major washes) was reported by ADEQ (2009) to be much shallower, ranging from near the ground surface to 35 feet bgs, and groundwater was encountered at depths of 12 to 29 feet bgs at bridge locations at the time of the 1992 geotechnical investigation. Several available construction and as-built plans and geotechnical reports included foundation data and boring logs for the bridge sites. Standard penetration test blow counts in the form of field N-values were included on the boring logs. Inspection of these data for the upper 50 feet of existing site soils suggests that there may be isolated silty sand and clayey sand layers about 5 feet in thickness within about 25 to 35 feet of existing grade; these may be of sufficiently low density to be susceptible to seismically-induced liquefaction. Some of these layers appear to contain sufficient clay fines such that susceptibility to liquefaction likely is low. Final geotechnical investigation for the SR 189 improvements should include determination of depth to groundwater and an evaluation of potential for liquefaction.

Subsurface Geotechnical Profile and Bridge Foundation Conditions

Information on the subsurface geotechnical profile and bridge foundations was obtained from available as-built and construction plans and geotechnical reports for the study corridor (ADOT 1969, 1971, 1994; SHB 1992a, 1992b, 1992c, 1992d).

Near-surface native soils (upper 5 feet bgs) along the existing roadway consist predominately of clayey sands with some to considerable gravel content. These soils are nonplastic to medium in plasticity, weakly to moderately cemented, and firm to hard. Existing roadway embankment fills consist of clayey sand similar to the native soils, since excavated soils from cut sections likely were used to construct the fills. Existing fill soils are nonplastic to medium in plasticity and moderately firm to hard, except for localized soft-to-firm zones. Between Bridge No. 1 (southernmost bridge over Mariposa Canyon) and the I-19 overpass, a layer of native soils consisting of silty to sand clays and sandy silt was encountered in several borings (SHB 1992a). This layer ranged from 2.5 to 6 feet thick, and was very soft to very firm. Construction plans for the widening of SR 189 (ADOT 1994) indicate that overexcavation of unsuitable soils to a depth of 2.5 to 3 feet and replacement with suitable subgrade material was specified for the full width of SR 189 for about 1,850 feet of roadway within the limits of Stations 49+00 to 120+00.

The geotechnical profile at the bridge sites is described as follows:

SR 189, Mariposa Canyon Wash Bridge No. 1: Stratified layers of silty sand, clayey sand, sand, silt and sandy clay, very soft to firm, extend to depths of 10 to 15 feet bgs. Very firm to hard silty gravel was encountered from depths of 10 to 30 feet in two of the bridge borings; silty sand, soft to very firm with a trace to some gravel and cobbles, was encountered from depths of 10 to 40 feet in one boring. Underlying the silty sand and gravel, clayey sand (moderately firm to hard and weakly to moderately cemented) with some to considerable gravel and cobbles was encountered at depths of 15 to 30 feet bgs and extended to the full depth of investigation of 70 feet bgs. The bridge widening is supported on driven steel H-piles at the abutments and drilled shafts bearing in the clayey sand at the piers and wing walls.

SR 189, Mariposa Canyon Wash Bridge No. 2: Clayey sand and sandy clay extended from the ground surface to a depth of 30 feet bgs. Underlying these soils, clayey sand (moderately firm to hard) with some to considerable gravel was encountered at a depth of 30 feet and extended to the full depth of investigation of 70 feet. The bridge widening is supported on steel H-piles at the abutments and drilled shafts at the piers and wing walls. The drilled shafts bear in the clayey sand layer.

Mariposa TI overpass bridges northbound and southbound: This area is characterized by stratified layers of gravelly sand, clayey sand, clayey silt, and silty to sandy clay, very soft to soft (clays) or firm to hard (sands and silts), extended to depths of 20 to 26 feet bgs. Sand with a trace of silt and some to considerable gravel and cobbles, and clayey sand and gravel with some to considerable cobbles extended from depths of 20 to 26 feet

bgs to the full depth of investigation of 70 feet. The overpass bridges are supported on drilled shafts bearing in the sand or clayey sand and gravel layers.

Rock (Nogales Formation) was not encountered at the SR 189 bridge sites. However, the existing bridges at the I-19/Western Avenue TI are supported on spread footings bearing on Nogales Formation sedimentary rock composed of Tertiary-Age lacustrine deposits including tuffaceous conglomerate, sandstone, and tuffite (a mixture of volcanic and sedimentary materials). The top of the Nogales Formation rock at I-19/Western Avenue was encountered at depths of 20 to 25 feet bgs.

Existing Pavement Sections

Based on available as-built plans, pavement history data, and materials design reports provided by ADOT Materials – Pavement (ADOT 2010, 2011, 2013, 2016), the existing SR 189 pavement structural sections consist of the elements presented in Table 1-6.

Table 1-6. Pavement construction history

Project no.	TRACS no.	Year	Direction	MP start	MP end	Lane no.	Select material (inches)	Aggregate subbase (inches)	Aggregate base (inches)	Asphaltic concrete (AC) (inches)	AC mill and overlay (inches)	Portland cement concrete (PCCP) plain jointed (inches)	Asphaltic concrete friction course (ACFC) (inches)	Remarks
F023-1-3	PMS00494	1976	NB and SB	0.54	2.31	1	12.0		6.0	3.5			0.5	
	PMS00639	1976	NB and SB	1.00	2.00	1	6.0			10.0			0.5	
F032-1-503	H0489 04C	1991	NB and SB	3.00	3.38	1					2.0			Understood to be AC overlay only
			NB and SB	3.00	3.38	2	10.0		6.0	5.0				
			NB and SB	3.38	3.75	1		15.0	6.0	8.0				
			NB and SB	3.38	3.75	2		15.0	6.0	8.0				
DE-032-1(5)	H2974 01C	1996	NB and SB	2.55	2.88	1			9.5	8.0			0.5	
			NB and SB	2.55	2.88	2			9.5	8.0			0.5	
			NB	2.88	2.98	1				3.0		10.0		AC base material for PCCP
			NB	2.88	2.98	2				3.0		10.0		AC base material for PCCP
CBI-189-A-(002)X	H5282 03C	2004	NB	0.36	0.45	2			4.0	8.0			0.5	
			NB	0.47	0.66	2			4.0	8.0			0.5	
CBI-189-A(006)X	H5282 06C	2006	NB	0.15	0.22	3			8.0	8.0				
			NB	0.22	0.28	3			4.0			12.0		May consist of doweled PCCP
			NB	0.28	0.3	3			8.0	8.0				
STP-189-A(202)A	H8098 01C	2011	NB and SB	0.73	2.44	1					3.0		0.5	Pavement rehabilitation project – milled 3 to 3.5 inches and replaced with AC overlay
			NB and SB	0.73	2.44	2					3.0		0.5	
			NB and SB	2.44	2.70	1					3.0			
			NB and SB	2.44	2.70	2					3.0			
			NB and SB	2.70	3.05	1					3.0			
			NB and SB	2.70	3.05	2					3.0			
CBI-189-A(203)A	H8200 01C	2012	NB and SB	0.34	0.66	1			4.0			12.5		Widening project – full width
			NB and SB	0.34	0.66	2			4.0			12.5		Widening project – full width
			SB	0.66	0.88	1				5.0				Widening project – AC overlay
			SB	0.66	0.88	2				5.0				Widening project – AC overlay
			NB	0.66	0.88	1			6.0	10.0			0.5	Widening project – travel lanes and shoulders
			NB	0.66	0.88	2			6.0	10.0			0.5	Widening project – travel lanes and shoulders
189-A(204)S	H8660 01C	2013	NB and SB	2.80	3.05	---				3.0		10.0		Taper section widening for dual left-turn lanes east and west of I-19 overpass bridges

Notes: NB = northbound, SB = southbound

2.0 Traffic Conditions

The following sections provide information related to conditions that exist in the base year and the design year of evaluation for the proposed action.

2.1 Existing Conditions

Existing Year 2011 Traffic Data

Information relating to the operational and geometric characteristics of the existing Year 2011 roadway system, particularly SR 189/Mariposa Road, was gathered through a variety of methods. Traffic counts available from the Multimodal Planning Division of ADOT were obtained and reviewed. Additional counts were conducted in March 2011 to establish traffic levels. These counts included 24-hour tube counts to determine traffic volumes on selected segments of SR 189. Both signalized and unsignalized intersections were monitored, and traffic levels and turning movements were recorded. In addition, a moving-car traffic survey was conducted to record and verify travel times through the corridor in both directions during the a.m. peak, midday, and p.m. peak periods.

Forecast Year 2014 Traffic Volumes

In December 2011 a *Draft Forecast Analysis Report* was prepared for the SR 189 project area. The report summarized the methodology for forecasting interim-year (2014) and long-range (2040) traffic volumes for use in preparation of the DCR and EA for SR 189 from the international border to Grand Avenue. As described in the *Draft Forecast Analysis Report*, traffic volumes on SR 189 consist of two components: local traffic and Mariposa LPOE traffic. These two components of traffic were forecast separately and then combined to derive the total volume of traffic anticipated in the corridor for both Years 2014 and 2040.

Comparison of Forecast Year 2014 Traffic Volumes with Current Year 2015 Conditions

In March 2015, updated counts were conducted to confirm the validity of the 2014 traffic forecasts and the associated methodology used to forecast both 2014 and 2040 traffic volumes. Table 2-7 provides a comparison of Year 2014 daily traffic volume forecasts with those observed in association with the March 2015 data collection for the two selected locations. As indicated in the table, observed traffic activity appears consistent with the forecast data in both locations.

Based on the results of these comparisons, it appears that the methodology used to forecast Year 2014 and Year 2040 traffic data seems reasonable. Therefore, it is recommended that future traffic analysis associated with the development of alternatives for the DCR continue to be based on previously forecasts volumes for Year 2040, and that additional updated counts are not required at this time.

Average Daily Traffic

Existing Year 2011 24-hour average daily traffic (ADT) data for the project area were collected specifically for this study by the consultant in March 2011 at nine locations over a period of 1 week. Table 2-1 summarizes traffic volumes recorded at the nine locations.

Turning movement counts also were conducted at seven signalized intersections, eight unsignalized intersections, and six unsignalized driveways. The counts were conducted during three separate 3-hour periods during the day: 7 a.m. to 10 a.m., 11 a.m. to 2 p.m., and 4 p.m. to 7 p.m. The moving car traffic survey of the corridor also was accomplished during these three periods to record travel time and traffic conditions.

Table 2-1. March 2011 traffic volumes by roadway segment

Roadway	Segment (count location)	ADT		AM peak	PM peak
		All traffic	% trucks		
State Route 189/ Mariposa Road	South of Camino de la Paloma	8,456	24.4	606	720
	West Target Range Road to Mariposa Ranch Road	8,891	21.2	663	724
	Mariposa Ranch Road to Frank Reed Road/North Industrial Park Drive	10,414	19.3	772	883
	Frank Reed Road/North Industrial Park Drive and Interstate 19	18,708	15.6	1,443	1,587
	Interstate 19 to Congress Drive	19,782	9.4	1,518	1,604
	Congress Drive to Mastick Way	20,809	8.5	1,661	1,734
	Mastick Way to Grand Avenue/B-19[a]	18,152	8.2	1,498	1,578
West Target Range Road	West of Interstate 19	4,724	11.4	385	392
West Western Avenue	East of Interstate 19	5,588	0.8	433	447

Source: Roadway Segment Tube Counts, Manifest_10108, Traffic Research & Analysis, Inc., March 25, 2011
[a] Total count estimated because of compromise of the count tube in the eastbound direction.

Tables 2-2 and 2-3 summarize the travel time survey along SR 189/Mariposa Road (northbound and southbound, respectively) between Freeport Drive at the Mariposa LPOE and Grand Avenue/B-19. Travel time runs revealed a dominant travel pattern in the corridor. Overall, travel time during the a.m. peak period is greatest in the northbound direction from the Mariposa LPOE. The typical or average northbound trip from Freeport Drive to Grand Avenue/B-19 took 7 minutes; the southbound trip was clocked at 6 minutes. This overall trend is reversed in the p.m. peak period, when travel times in the southbound direction are the greatest and longer than during the a.m. peak period. The typical or average southbound trip from Grand Avenue/B-19 to Freeport Drive took 8.6 minutes, whereas the northbound trip was only slightly worse than the morning peak at 7.3 minutes.

Table 2-2. Northbound SR 189 travel times

Segment			Average travel time (seconds)		
No.	From	To	AM peak 7 a.m.–9:35 a.m.	Midday peak 11 a.m.–1:10 p.m.	PM peak 4:22 p.m.–6:40 p.m.
1	Freeport Drive	West Target Range Road	72.5	75.1	91.1
2	West Target Range Road	Mariposa Ranch Road	40.8	41.3	36.8
3	Mariposa Ranch Road	West Industrial Park Drive	13.9	14.4	14.8
4	West Industrial Park Drive	Loma Mariposa Road	25.0	21.6	23.8
5	Loma Mariposa Road	Mariposa Park Plaza	16.1	18.3	18.3
6	Mariposa Park Plaza	North Frank Reed Road/North Industrial Park Drive	49.6	32.4	31.9
7	North Frank Reed Road/North Industrial Park Drive	I-19 SB ramps	46.8	54.2	43.0
8	I-19 SB ramps	I-19 NB ramps	12.1	13.5	19.3
9	I-19 NB ramps	North Congress Drive	26.3	42.6	31.2
10	North Congress Drive	North Mastick Way	33.9	56.2	41.0
11	North Mastick Way	North Grand Avenue/ B-19	80.1	91.7	84.1
Average total travel time (seconds):			**417.1**	**461.2**	**435.4**
Average total travel time (minutes):			**7.0**	**7.7**	**7.3**
Average total travel time (seconds): I-19 SB ramps to Grand Avenue/B-19 business			**152.4**	**204.1**	**175.6**
Average total travel time (minutes): I-19 SB ramps to Grand Avenue/B-19			**2.5**	**3.4**	**2.9**
Average total travel time (seconds): Freeport Drive to I-19 SB ramps			**264.6**	**257.1**	**259.8**
Average total travel time (minutes): Freeport Drive to I-19 SB ramps			**4.4**	**4.3**	**4.3**

Source: Moving Car Traffic Survey, Wilson & Company, March 15–16, 2011
Notes: NB = northbound, SB = southbound

Table 2-3. Southbound SR 189 travel times

Segment			Average travel time (seconds)		
No.	From	To	AM peak 7 a.m.–9:25 a.m.	Midday peak 11:11 a.m.–1:57 p.m.	PM peak 4:50 p.m.–6:50 p.m.
11	North Grand Avenue/B-19	North Mastick Way	27.6	31.4	38.7
10	North Mastick Way	North Congress Drive	41.4	76.1	67.7
9	North Congress Drive	I-19 NB ramps	39.9	55.1	40.0
8	I-19 NB ramps	I-19 SB ramps	13.2	13.6	11.6
7	I-19 SB ramps	North Frank Reed Road/North Industrial Park Drive	41.4	38.9	33.4
6	North Frank Reed Road/North Industrial Park Drive	Mariposa Park Plaza	18.8	17.2	19.1
5	Mariposa Park Plaza	Loma Mariposa Road	16.9	44.0	19.0
4	Loma Mariposa Road	West Industrial Park Drive	23.4	22.8	27.1
3	West Industrial Park Drive	Mariposa Ranch Road	26.6	27.5	40.7
2	Mariposa Ranch Road	West Target Range Road	44.2	47.8	60.7
1	West Target Range Road	Freeport Drive	66.1	66.1	157.8
Average total travel time (seconds):			**359.4**	**440.6**	**515.9**
Average total travel time (minutes):			**6.0**	**7.3**	**8.6**
Average total travel time (seconds): Grand Avenue/B-19 to I-19 SB ramps			**122.0**	**176.2**	**158.1**
Average total travel time (minutes): Grand Avenue/B-19 to I-19 SB ramps			**2.0**	**2.9**	**2.6**
Average total travel time (seconds): I-19 SB ramps to Freeport Drive			**237.4**	**264.3**	**357.8**
Average total travel time (minutes): I-19 SB ramps to Freeport Drive			**4.0**	**4.4**	**6.0**

Source: Moving Car Traffic Survey, Wilson & Company, March 15–16, 2011
Notes: NB = northbound, SB = southbound

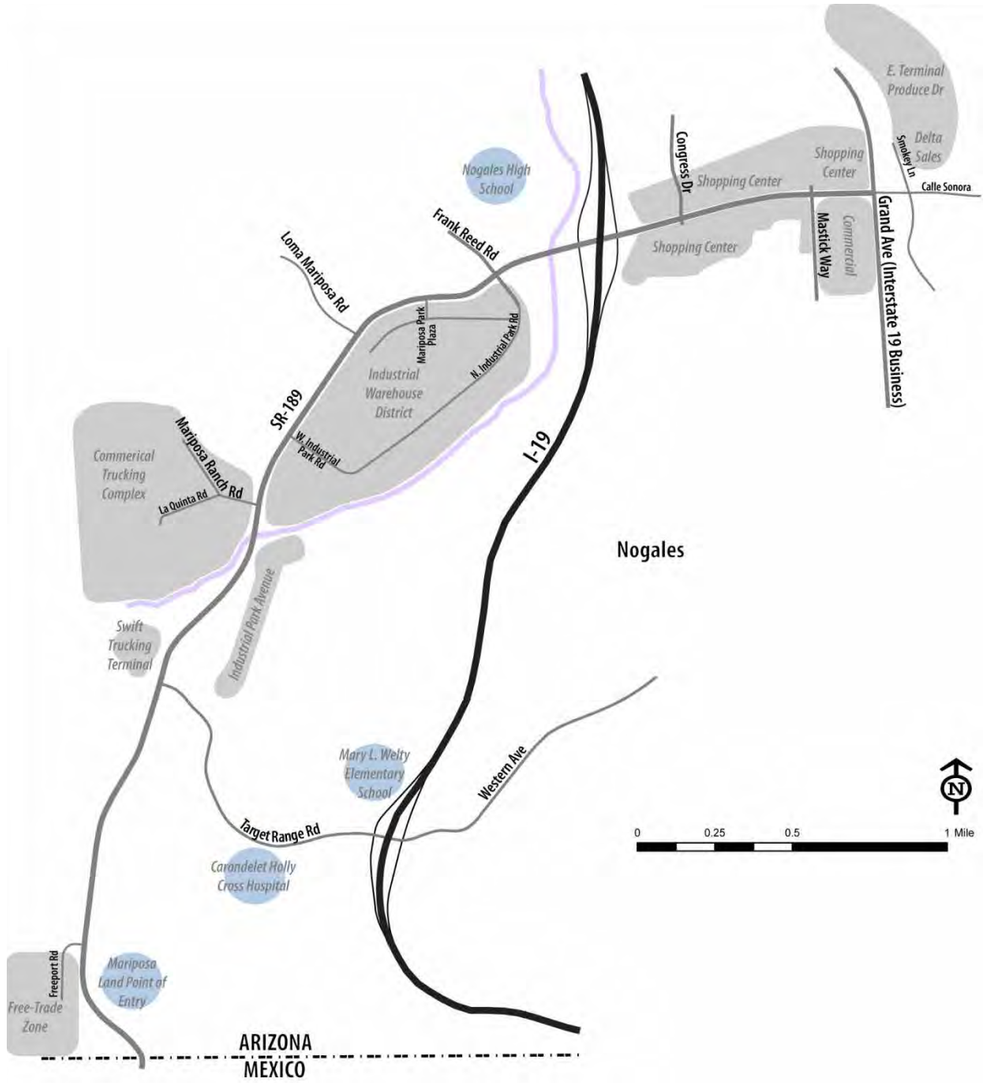
Travel times north of I-19 vary considerably throughout the day. The typical or average trip from I-19 to Grand Avenue/B-19 during the a.m. peak period takes 2.5 minutes and less than 3 minutes during the p.m. peak period. Travel in the opposite direction—that is, Grand Avenue/B-19 to I-19—takes about one-half minute less time during both the a.m. and p.m. peak periods. Intensive commercial activity in this portion of the corridor results in the midday trips requiring more travel time in both directions than during either the a.m. or p.m. peak periods

Major Traffic Generators

Ten major activity centers exist along the SR 189 corridor between the U.S.-Mexico border and Smokey Lane, east of Grand Avenue/B-19. Figure 2-1 shows the generalized location of these activity centers.

- Produce warehouses
  - Delta Sales – East of Grand Avenue/B-19 on Smokey Lane
  - East Terminal Produce Drive – One-quarter mile north of SR 189, east of Grand Avenue/B-19
- Commercial node – Southwestern and northwestern quadrants of the intersection of SR 189 with Grand Avenue/B-19
- Nogales High School – North Frank Reed Road
- Nogales Industrial Park – Southern side of SR 189 between North Frank Reed Road/North Industrial Park Drive
- Mariposa Ranch Road Commercial Trucking Complex – Northern side of SR 189
- Swift Trucking Terminal – Western side of SR 189 at North Target Range Road
- Freeport Drive Duty Free Zone – West of SR 189 directly north of the U.S.-Mexico border
- Nogales Point of Entry – East of SR 189/Mariposa Road approximately 1,000 feet north of the U.S.-Mexico border
- Mary L. Welty Elementary School – Northwestern quadrant of the I-19/West Target Range Road TI
- Carondelet Holy Cross Hospital – Southern side of West Target Range Road between SR 189 and I-19

Figure 2-1. Major activity centers



Figures 2-2, 2-3, and 2-4 show general schematics of the lane geometry and traffic control at the seven signalized and six unsignalized roadway intersections, as well as the six unsignalized driveways for which traffic counts were conducted. Figures 2-5, 2-6, and 2-7 show the peak hour traffic volumes reported from the 2011 turning movement counts at each location. A Union Pacific Railroad (UPRR) track, directly east of Grand Avenue/B-19, is crossed by Calle Sonora, which connects with SR 189 from the east. Data collection and subsequent analyses conducted for this study do not account for train activity on this track, nor do they account for interruptions to traffic at either intersection affected.

Level of Service Analysis

Transportation engineers and planners commonly use a rating system to measure and describe the operational status of roadway segments and interchanges/intersections constituting a local roadway network. This rating system is referred to as level of service (LOS), which yields a measurement of the performance of network components.

Level of Service Methodology

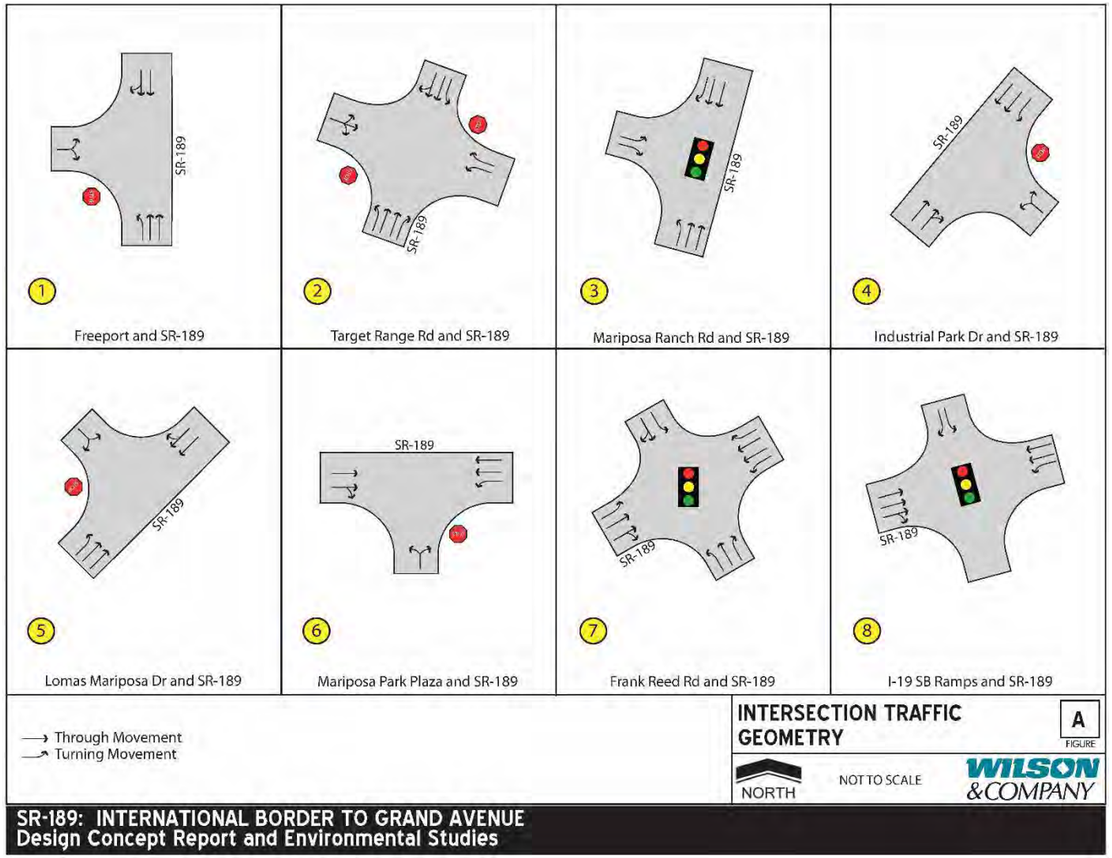
As defined in the Highway Capacity Manual 2010 (HCM 2010), LOS is a qualitative measure describing operating conditions associated with a traffic stream. The HCM 2010 defines a range of LOS parameters representing varying operating conditions at interchanges/intersections and the driver's perception of these conditions. Operating conditions are defined in terms of the average vehicle delay of all movements through an intersection, usually in seconds per vehicle.

According to HCM 2010, "vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average control delay per vehicle during a specified time period (for example, the PM peak hour)." Control delay is the portion of the total delay attributed to signal operations and includes initial deceleration, queue move-up time, stopped delay, and acceleration delay.

Level of Service Criteria – Signalized Intersections

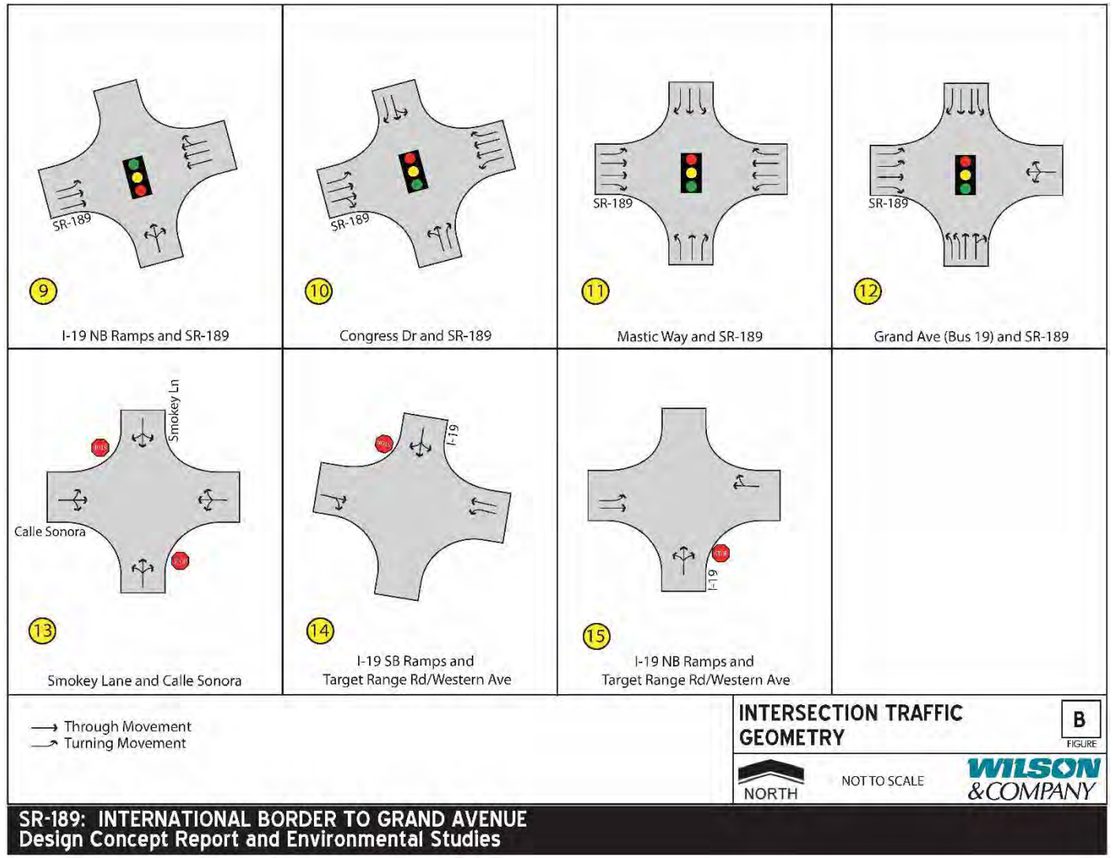
LOS associated with signalized intersections is derived through an operations analysis that measures many variables, including signal phasing (that is, progression of movements through the intersection), signal cycle length, lane geometry, and traffic volumes. The progression of movements is translated into specific vehicle operating characteristics, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Table 2-4 details the LOS criteria for signalized intersections.

Figure 2-2. Lane geometry at key corridor intersections 1 through 8



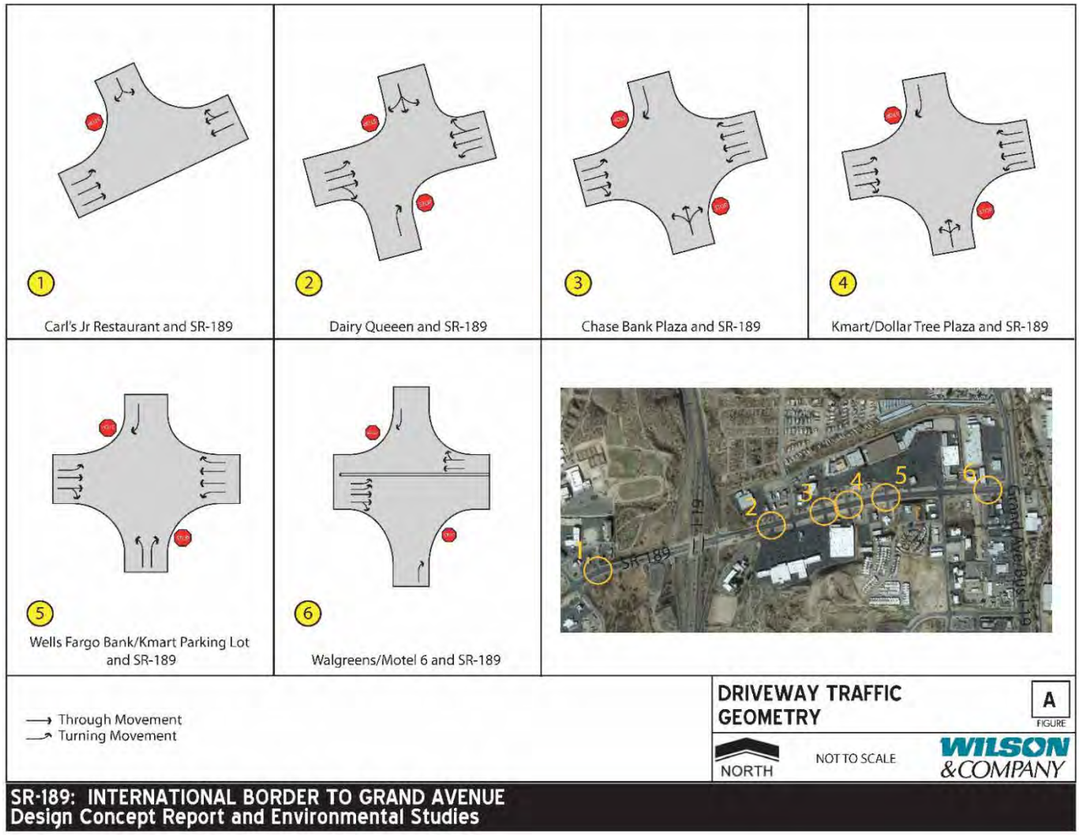
Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Figure 2-3. Lane geometry at key corridor intersections 9 through 15



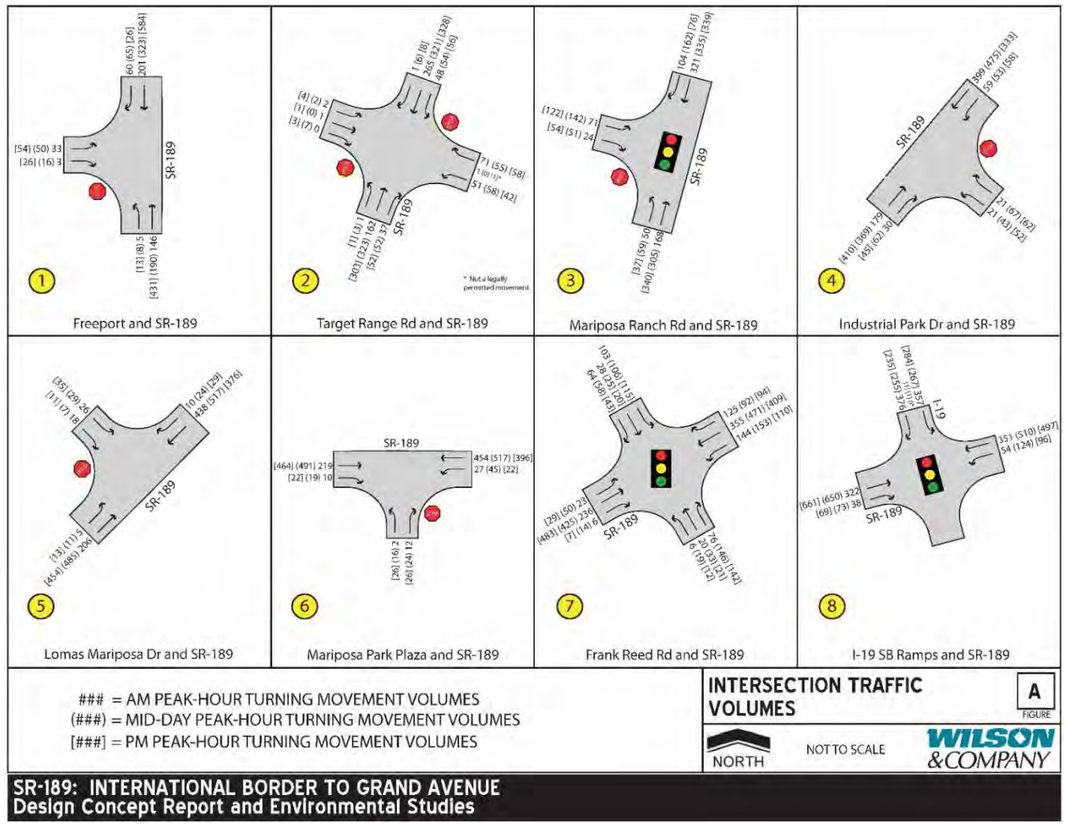
Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Figure 2-4. Lane geometry at key corridor driveways 1 through 6



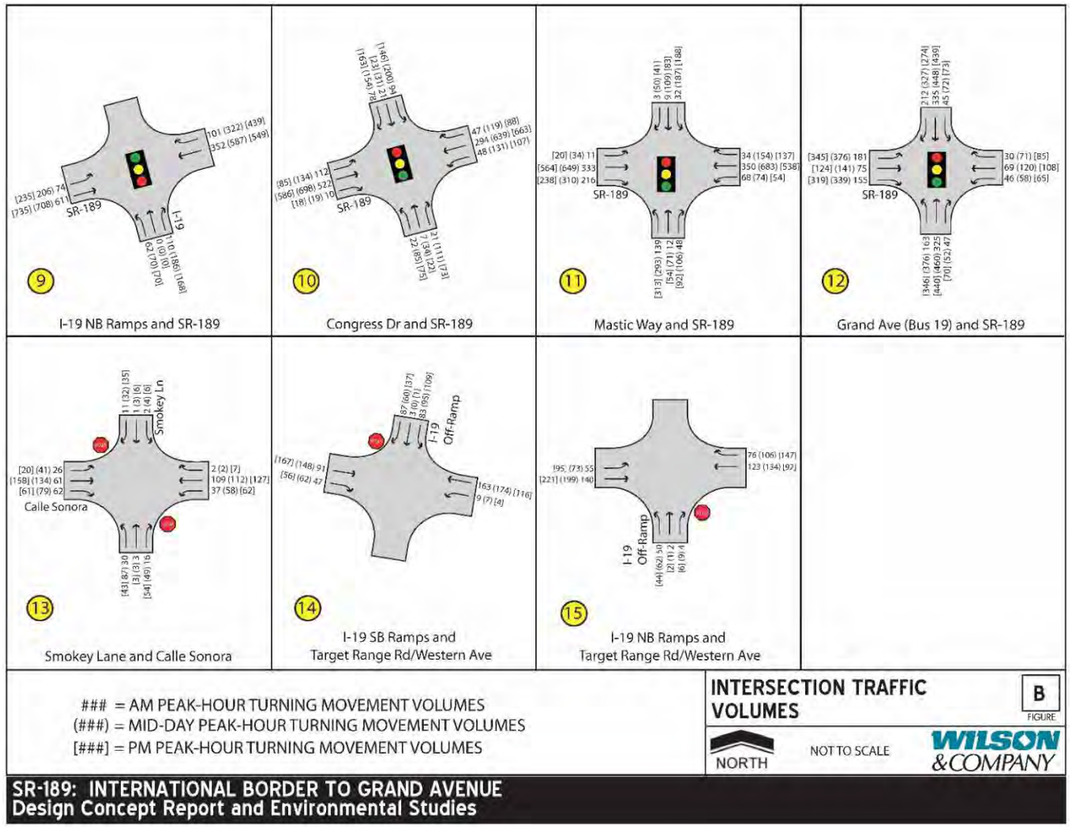
Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co,

Figure 2-5. Existing 2011 peak-hour turning movements at key corridor intersections 1 through 8



Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

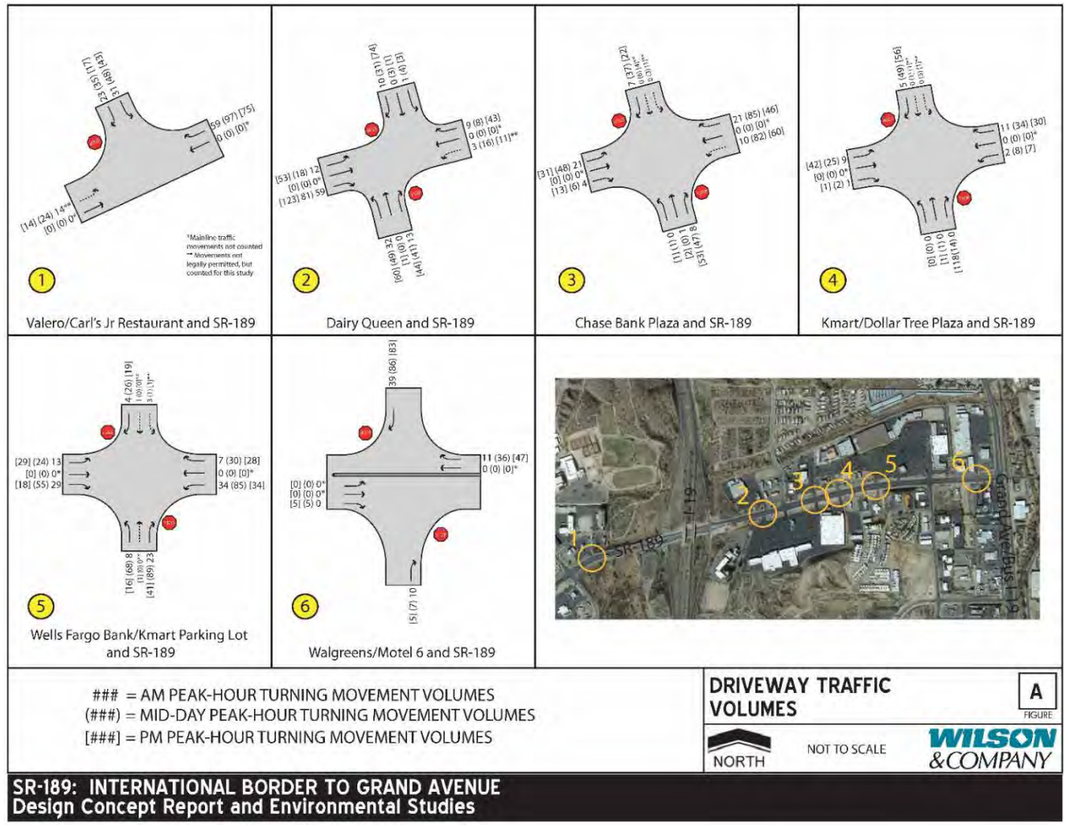
Figure 2-6. Existing 2011 peak-hour turning movements at key corridor intersections 9 through 15



Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

LOS has been analyzed for 19 intersections within the SR 189/Mariposa Road corridor, using turning movement counts presented earlier. Methodologies presented in the HCM 2010 were applied, and the interchanges/intersections were evaluated using the VISSIM traffic-simulation software, which permits analysis of overall LOS for signalized intersections and all-way and stop-controlled operations at unsignalized intersections. The Year 2011 turning movement counts presented earlier was normalized to reflect the average peak-hour of traffic specific to each interchange/intersection for the a.m., midday, and p.m. peak periods. The VISSIM model was then calibrated using the peak-hour travel speeds documented in Tables 2-2 and 2-3; signal timing within the corridor was provided by ADOT. The results of this analysis process are presented in Table 2-4.

Figure 2-7. Existing 2011 peak-hour turning movements at key corridor driveways 1 through 6



Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Level of Service Analysis Results

Results indicate that, overall, the corridor intersections operate at LOS D or better in Year 2011 during each of the analyzed peak periods, which is considered acceptable in an urban area. However, the approaches at two intersections experience LOS E delays:

- SR 189 and Frank Reed Road (North Industrial Park Drive) southbound
- SR 189 and Grand Avenue westbound

At each of these locations, these delays primarily result from the allocation of green time to the approach and could likely be improved with modifications to the traffic signal timing.

Table 2-4. Level of service analysis of existing 2011 intersection operations

Intersection ID	Name	Performance Measure	AM				MIDDAY				PM			
			Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
R-1	SR 189/N. Freeport Drive (Stop)	Approach Delay (Sec)	0	0	7	0	0	5	12	0	0	18	20	0
		Approach LOS	A	A	A	A	A	A	B	A	A	C	C	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-2	SR 189/Target Range Road (Stop)	Approach Delay (Sec)	0	0	2	7	0	0	6	7	0	0	4	7
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-3	SR 189/Mariposa Ranch Road (Signal)	Approach Delay (Sec)	11	4	37	0	9	7	39	0	5	5	35	0
		Approach LOS	B	A	D	A	A	A	D	A	A	A	C	A
		Intersection Delay (Sec)	11				14				10			
		Intersection LOS	B				B				A			
R-4	SR 189/W. Industrial Park Drive (Stop)	Approach Delay (Sec)	0	0	0	6	1	0	0	8	0	0	0	8
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-5	SR 189/Loma Mariposa Drive (Stop)	Approach Delay (Sec)	0	1	7	0	0	1	7	0	0	0	8	0
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-6	SR 189/Mariposa Park Plaza (Stop)	Approach Delay (Sec)	5	0	0	0	8	0	0	0	7	0	0	0
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-7	SR 189/Frank Reed Road (N. Industrial Park Drive) (Signal)	Approach Delay (Sec)	24	59	5	6	24	58	5	6	20	60	4	5
		Approach LOS	C	E	A	A	C	E	A	A	B	E	A	A
		Intersection Delay (Sec)	18				14				13			
		Intersection LOS	B				B				B			
D-1	SR 189/Valero Gas Station Entrance (Stop)	Approach Delay (Sec)	0	7	0	1	0	9	0	1	0	6	0	2
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-8	SR 189/I-19 SB Ramp (Signal)	Approach Delay (Sec)	0	24	29	10	0	26	26	11	0	25	27	10
		Approach LOS	A	C	C	A	A	C	C	B	A	C	C	A
		Intersection Delay (Sec)	22				21				21			
		Intersection LOS	C				C				C			
R-9	SR 189/I-19 NB Ramp (Signal)	Approach Delay (Sec)	16	0	11	29	16	0	19	27	17	0	22	26
		Approach LOS	B	A	B	C	B	A	B	C	B	A	C	C
		Intersection Delay (Sec)	18				22				23			
		Intersection LOS	B				C				C			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Table 2-4. Level of service analysis of existing 2011 intersection operations (continued)

D-2	SR 189/Dairy Queen Entrance (Stop)	Approach Delay (Sec)	8	4	4	0	12	7	8	0	10	7	6	0
		Approach LOS	A	A	A	A	B	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-10	SR 189/Congress Drive (Signal)	Approach Delay (Sec)	28	34	7	4	24	34	13	10	25	34	10	7
		Approach LOS	C	C	A	A	C	C	B	A	C	C	A	A
		Intersection Delay (Sec)	11				16				14			
		Intersection LOS	B				B				B			
D-4	SR 189/Dollar Tree Entrance (Stop)	Approach Delay (Sec)	0	3	0	0	8	5	1	0	6	5	1	0
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
D-5	SR 189/Wells Fargo Entrance (Stop)	Approach Delay (Sec)	6	4	1	0	10	4	1	1	7	4	1	0
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-11	SR 189/Mastick Way (Signal)	Approach Delay (Sec)	35	36	5	3	43	30	12	11	37	30	10	8
		Approach LOS	C	D	A	A	D	C	B	B	D	C	A	A
		Intersection Delay (Sec)	10				19				17			
		Intersection LOS	A				B				B			
D-6	SR 189/Walgreens Entrance (Stop)	Approach Delay (Sec)	5	5	1	0	3	7	4	1	1	7	4	0
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			
R-12	SR 189/Grand Avenue (Interstate 19 Business) (Signal)	Approach Delay (Sec)	30	18	40	56	41	27	37	59	40	26	37	57
		Approach LOS	C	B	D	E	D	C	D	E	D	C	D	E
		Intersection Delay (Sec)	30				37				37			
		Intersection LOS	C				D				D			
R-13	Calle Sonora/Smokey Lane (Stop)	Approach Delay (Sec)	7	6	3	1	9	6	4	1	9	6	4	1
		Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	n/a				n/a				n/a			
		Intersection LOS	n/a				n/a				n/a			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

2.2 Future Conditions

This chapter provides detailed information on the development of traffic volume forecasts for the Year 2040 and the 2040 Base/No-Build model network as well as a summary of network deficiencies observed from 2040 Base/No-Build condition modeling.

Forecast Year 2040 Traffic Volumes

In December 2011, a *Draft Forecast Analysis Report* was prepared for the SR 189 project area. The report summarizes the methodology for forecasting Year 2014 and Year 2040 traffic volumes for use in preparation of the DCR and EA for SR 189 from the Mariposa LPOE to Grand Avenue/B-19. The following section describes the methodology used to forecast Year 2040 traffic conditions and the results of a comparison between observed 2015 traffic volumes and forecast Year 2014 volumes.

Forecast Year 2040 Roadway Segment Volumes

As described in the *Draft Forecast Analysis Report*, traffic volumes on SR 189 consist of two components, local traffic and Mariposa LPOE traffic. These two components of traffic were forecast separately and then combined to derive the total volume of traffic anticipated in the corridor for Year 2040.

The first step in deriving future year forecasts was to adjust the March 2011, base conditions to account for the cold weather damage to produce that occurred in early January 2011. The freeze heavily damaged Mexican produce crops and resulted in lower truck volumes than would typically be anticipated in the corridor. The adjusted Year 2011 volumes then served as the foundation for determining anticipated increases in each of the two traffic components, as described below.

Forecasts of Mariposa LPOE traffic were based on the maximum processing capacity of the new LPOE facility, as documented in the *Traffic Impact Assessment for Mariposa Port of Entry Executive Summary* prepared by Stantec in 2009 for the General Services Administration (GSA). This GSA study provided hourly truck, car/bus, and staff/visitor volumes. These hourly volumes were extrapolated in the *Draft Forecast Analysis Report* to arrive at daily volumes, based on the current hours of operation and processing rates at the LPOE. Table 2-5 summarizes the resulting forecasts of LPOE traffic for Year 2040. The Year 2040 estimates assume the LPOE will be operating at maximum hourly processing capacity during each of its operating hours.

Table 2-5. Existing and future Mariposa LPOE peak season daily trip generation

Year	Trucks	Passenger vehicles	Daily traffic
Existing (2011)	2,800	6,600	9,400
Future (2040)	5,700	18,400	24,100

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

The local traffic component of the Year 2040 travel forecasts were derived by growing the adjusted March 2011 volumes using a 2.42 growth factor for local trucks and buses and a 1.63 growth factor for passenger vehicles. This corresponds to an approximate 3.1 percent annual increase in local truck/bus activity and a 1.7 percent annual increase in local passenger vehicle activity.

Data from Table 15 of the *Draft Forecast Analysis Report* were used as the basis for Table 2-6, which summarizes both the LPOE and local components, as well as the combined daily traffic in Year 2040, thus providing the foundation for the analysis of Year 2040 traffic conditions.

Table 2-6. Forecast year 2040 traffic Volumes

Segment	Trucks			Passenger vehicles			Daily traffic
	LPOE[a]	Local[b]	Total	LPOE[c]	Local[d]	Total	
Mariposa LPOE to Target Range Road	5,700	—[e]	5,700	18,400	4,570	22,970	28,670
Target Range Road to West Industrial Park Drive	4,000	490	4,490	16,400	7,180	23,580	28,070
West Industrial Park Drive to Frank Reed/North Industrial Park Drive	2,500	2,190	4,690	14,400	8,480	22,880	27,570
Frank Reed to I-19	2,300	3,640	5,940	12,000	20,150	32,150	38,090
East of I-19	920	2,430	3,350	7,400	26,750	34,150	37,500
West of Grand Avenue	900	2,360	3,260	1,000	25,760	26,760	30,020

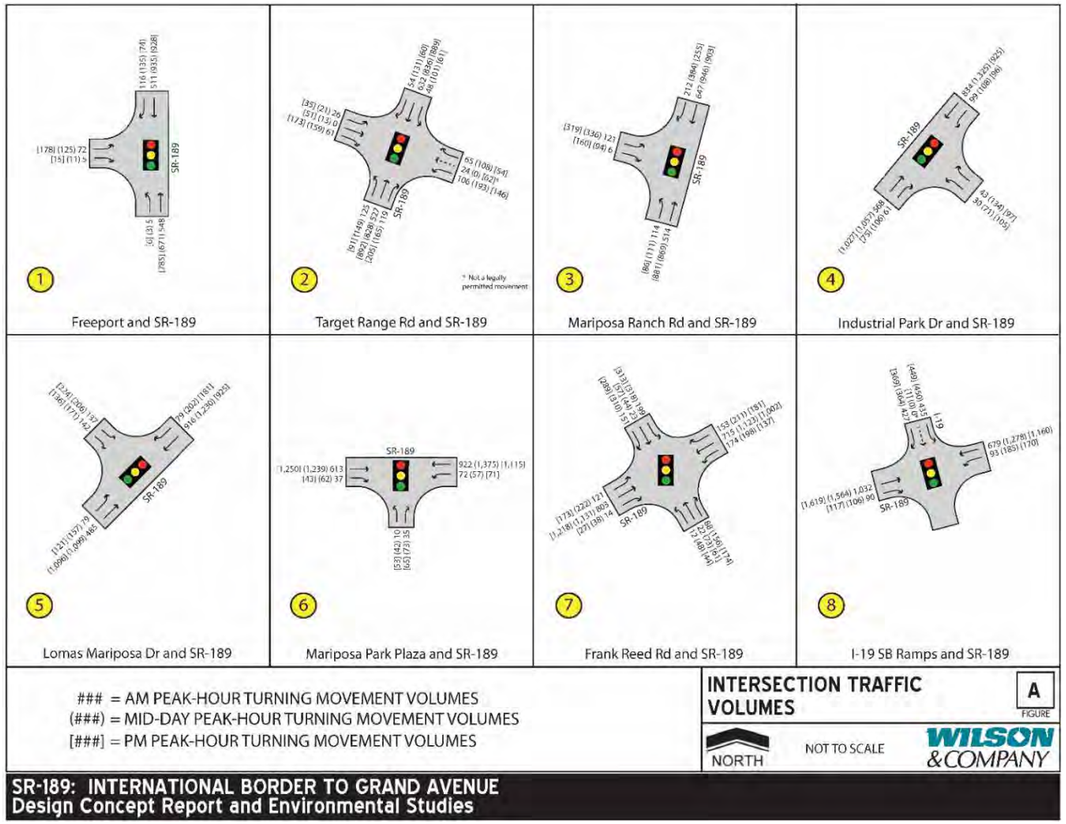
[a] Daily truck trip generation forecast reflects LPOE maximum capacity.
[b] Local trucks were forecast by applying a 2.42 growth factor to the 2011 estimated trucks and buses.
[c] Daily passenger vehicle trip generation forecast reflects LPOE maximum capacity.
[d] Local passenger vehicles were forecast by applying a 1.630 growth factor to the 2011 estimated trucks and buses.
[e] Indicates no local truck traffic to the Mariposa LPOE.

Interchanges and Intersections

Peak-hour turning movement volumes were derived from the Year 2040 segment volumes using methodology documented in *NCHRP 255, Highway Traffic Data for Urbanized Area Project Planning and Design*. This methodology translates future daily volume forecasts on roadway segments to peak-hour turning movements based on a variety of factors, including existing Year 2011 peak-hour factors, directional factors, and turn percentages.

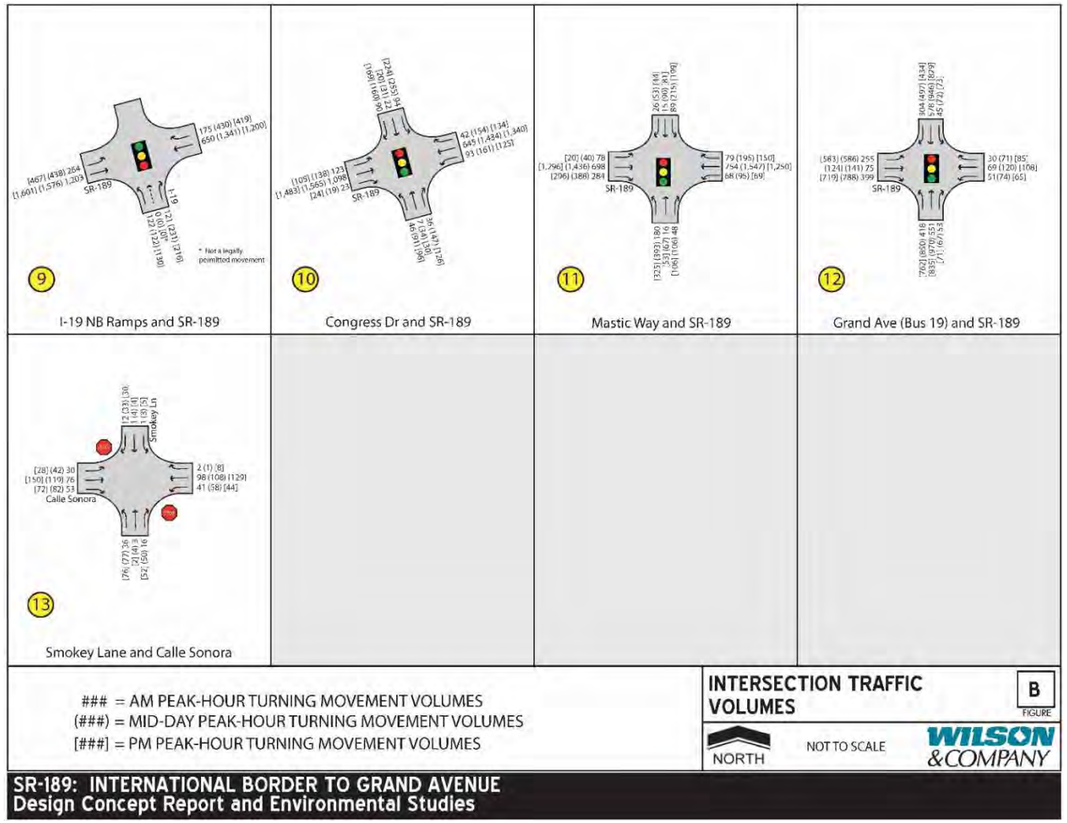
Turn movements were developed for the Forecast Year 2040 a.m., midday, and p.m. peak periods. The resulting volumes for the a.m., midday, and p.m. peak hours are summarized in Figures 2-8 and 2-9.

Figure 2-8. Forecast Year 2040 peak hour turning movements at key corridor intersections 1 through 8



Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Figure 2-9. Forecast Year 2040 peak hour turning movements at key corridor intersections 9 through 13



Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Validation of Traffic Forecasts

In March 2015, updated counts were conducted to confirm the validity of the methodology used to forecast Year 2040 traffic volumes. In 2014, a separate traffic study was prepared to develop near-term recommendations at the I-19 TI. In conjunction with that effort, the forecasting methodology described previously was employed to develop estimates of Year 2014 traffic volumes. Table 2-7 provides a comparison of Year 2014 daily traffic volume forecasts with those observed in association with the March 2015 data collection for two selected locations. As indicated in the table, observed traffic activity appears consistent with the forecast data in both locations.

Table 2-7. Comparison of Forecast Year 2014 daily traffic volumes with current Year 2015 conditions

Location	Fall 2014 Forecast (after expanded LPOE opens)	2015 observed
LPOE to Target Range Road	13,250	12,159
Frank Reed to I-19	21,590	21,975

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

The data were also reviewed to determine the consistency of the Year 2014 forecast peak-hour volumes with the observed traffic volumes. Table 2-8 summarizes this comparison for the a.m., midday, and p.m. peak hours. As indicated in the table, observed traffic activity appears consistent with the forecast data for each peak period at the two selected locations. In all cases, forecast volumes used in the analysis are slightly higher and, therefore, more conservative.

Table 2-8. Comparison of forecast Year 2014 peak period traffic volumes with current year 2015 conditions

Peak hour	Fall 2014 Forecast (after expanded LPOE opens)	2015 observed
LPOE to Target Range Road		
AM	666	631
Midday	964	948
PM	990	953
Frank Reed Road to I-19		
AM	1,280	1,253
Midday	1,793	1,659
PM	1,751	1,595

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Based on the results of these comparisons, it appears that the methodology used to forecast Year 2014 and Year 2040 traffic data seems reasonable. Therefore, it is recommended that future traffic analyses associated with the development of alternatives for the DCR and EA continue to be based on previously forecast volumes for Year 2040.

Comparison of Interim and Ultimate Plans

Performance of the No-Build or Base Condition, Interim Plan, and Ultimate Plan was evaluated based on travel time and intersection LOS. Travel times were recorded for eight directional segments along the corridor and were used to compare the effectiveness of the Interim Plan and Ultimate Plan with each other and with the No-Build Condition.

Table 2-9 summarizes the travel times, highlighting the best (green) and worst (red) condition for all eight directional segments. Intersection LOS also was evaluated at key intersections near the TI, from Loma Mariposa Road in the west to Congress Drive in the east. Results of this evaluation are summarized in Table 2-10 for the midday peak and in Table 2-11 for the p.m. peak.

Tables 2-12 and 2-13 compare LOS conditions at all intersections in the corridor for forecasts developed for the midday and p.m. peaks, based on the Interim Plan and Ultimate Plan, defined as a result of this study.

With the exception of Grand Avenue in the midday peak hour, the intersections associated with the Interim and the Ultimate Conditions performed at an acceptable LOS. The controlling movement is the left-turn movement from northbound Grand Avenue to westbound SR 189. Options to improve this intersection would be to add additional turn lanes and through lanes and/or optimize signal timings.

Table 2-9. Preferred alternative Year 2040 travel times

Alterative				MID		PM	
Base	**FROM**	**TO**	**DISTANCE (MILES)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**
	FREEPORT DR	GRAND AVE	3.4	17.5	11.6	17.0	12.0
	GRAND AVE	FREEPORT DR	3.4	12.6	16.2	11.7	17.5
	FREEPORT DR	I-19 SB RAMPS	2.6	13.9	11.3	14.1	11.1
	I-19 SB RAMPS	GRAND AVE	0.8	4.5	10.7	3.4	13.9
	GRAND AVE	I-19 SB RAMPS	0.8	3.3	14.6	3.0	15.9
	I-19 SB RAMPS	FREEPORT DR	2.6	9.5	16.5	8.8	17.8
	FREEPORT DR	I-19 NB	2.9	16.3	10.7	15.9	10.9
	I-19 SB	FREEPORT DR	2.9	10.4	16.8	9.7	17.9
Interim: EB-NB Direct Connector without Grade Separation at Frank Reed Road	**FROM**	**TO**	**DISTANCE (MILES)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**
	FREEPORT DR	GRAND AVE	3.4	10.1	20.1	10.1	20.2
	GRAND AVE	FREEPORT DR	3.4	9.7	21.0	9.2	22.1
	FREEPORT DR	I-19 SB RAMPS	2.6	6.7	23.2	6.8	22.8
	I-19 SB RAMPS	GRAND AVE	0.8	3.7	12.9	3.6	13.4
	GRAND AVE	I-19 SB RAMPS	0.8	2.3	20.7	2.4	20.2
	I-19 SB RAMPS	FREEPORT DR	2.6	7.5	20.9	7.0	22.3
	FREEPORT DR	I-19 NB	2.9	7.4	23.6	7.5	23.3
	I-19 SB	FREEPORT DR	2.9	8.8	19.8	8.1	21.4
Ultimate: EB-NB and SB-WB Direct Connector with Grade Separation at Frank Reed Road	**FROM**	**TO**	**DISTANCE (MILES)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**	**TRAVEL TIME (MIN)**	**VELOCITY (MPH)**
	FREEPORT DR	GRAND AVE	3.4	10.2	19.9	10.0	20.3
	GRAND AVE	FREEPORT DR	3.4	9.4	21.7	9.1	22.4
	FREEPORT DR	I-19 SB RAMPS	2.6	5.7	27.2	5.9	26.5
	I-19 SB RAMPS	GRAND AVE	0.8	3.8	12.6	3.5	13.9
	GRAND AVE	I-19 SB RAMPS	0.8	2.3	20.6	2.4	19.7
	I-19 SB RAMPS	FREEPORT DR	2.6	7.0	22.2	6.8	23.0
	FREEPORT DR	I-19 NB	2.9	6.3	27.4	6.5	26.8
	I-19 SB	FREEPORT DR	2.9	7.4	23.4	7.2	24.1

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Table 2-10. Preferred Alternative — Year 2040 intersection LOS for affected intersections, midday peak

Intersection ID	Name	Performance Measure	Base				A1 Interim				A1 Ultimate			
			Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
R-5	SR 189/Loma Mariposa Road (Signal)	Approach Delay (Sec)	109	66	132	-	24	18	55	35	22	15	48	36
		Approach LOS	F	E	F	A	C	B	D	C	C	B	D	D
		Intersection Delay (Sec)	91				26				24			
		Intersection LOS	F				C				C			
R-6	SR 189/Mariposa Park Plaza (Base-Signal; Interim,Ultimate-Stop)	Approach Delay (Sec)	76	-	114	39	Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.							
		Approach LOS	E	A	F	D								
		Intersection Delay (Sec)	72											
		Intersection LOS	E											
R-7	SR 189/Frank Reed Road (N. Industrial Park Drive) (Signal)	Approach Delay (Sec)	68	140	147	44	57	48	51	35	43	48	42	26
		Approach LOS	E	F	F	D	E	D	D	C	D	D	D	C
		Intersection Delay (Sec)	97				44				37			
		Intersection LOS	F				D				D			
D-1	SR 189/Carls Jr. Road (Stop)	Approach Delay (Sec)	-	189	20	34	Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.							
		Approach LOS	A	F	C	D								
		Intersection Delay (Sec)	29											
		Intersection LOS	D											
R-8	SR 189/I-19 SB Ramp (Signal)	Approach Delay (Sec)	-	43	82	14	-	46	15	8	-	50	16	7
		Approach LOS	A	D	F	B	A	D	B	A	A	D	B	A
		Intersection Delay (Sec)	46				19				18			
		Intersection LOS	D				B				B			
R-9	SR 189/I-19 NB Ramp (Signal)	Approach Delay (Sec)	35	-	44	39	29	-	11	11	30	-	11	12
		Approach LOS	C	A	D	D	C	A	B	B	C	A	B	B
		Intersection Delay (Sec)	41				13				13			
		Intersection LOS	D				B				B			
D-2	SR 189/Dairy Queen Entrance (Stop)	Approach Delay (Sec)	56	15	39	3	27	17	15	2	26	16	15	1
		Approach LOS	F	B	E	A	D	C	B	A	D	C	B	A
		Intersection Delay (Sec)	22				9				9			
		Intersection LOS	C				A				A			
R-10	SR 189/Congress Drive (Signal)	Approach Delay (Sec)	45	66	14	23	45	48	11	18	46	48	11	18
		Approach LOS	D	E	B	C	D	D	B	B	D	D	B	B
		Intersection Delay (Sec)	26				20				20			
		Intersection LOS	C				B				B			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Table 2-11. Preferred Alternative – - Year 2040 intersection LOS for affected intersections, PM peak

Intersection ID	Name	Performance Measure	Base				A1 Interim				A1 Ultimate			
			Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
R-5	SR 189/Loma Mariposa Road (Signal)	Approach Delay (Sec)	111	40	88	-	24	17	48	34	25	17	48	38
		Approach LOS	F	D	F	A	C	B	D	C	C	B	D	D
		Intersection Delay (Sec)	77				25				26			
		Intersection LOS	E				C				C			
R-6	SR 189/Mariposa Park Plaza (Base-Signal; Interim,Ultimate-Stop)	Approach Delay (Sec)	55	-	117	25	Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.							
		Approach LOS	D	A	F	C								
		Intersection Delay (Sec)	70											
		Intersection LOS	E											
R-7	SR 189/Frank Reed Road (N. Industrial Park Drive) (Signal)	Approach Delay (Sec)	52	262	141	52	56	45	41	23	43	40	38	19
		Approach LOS	D	F	F	D	E	D	D	C	D	D	D	B
		Intersection Delay (Sec)	115				35				31			
		Intersection LOS	F				C				C			
D-1	SR 189/Carls Jr. Road (Stop)	Approach Delay (Sec)	-	193	20	40	Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.							
		Approach LOS	A	F	C	E								
		Intersection Delay (Sec)	33											
		Intersection LOS	D											
R-8	SR 189/I-19 SB Ramp (Signal)	Approach Delay (Sec)	-	45	79	11	-	45	15	9	-	48	19	7
		Approach LOS	A	D	E	B	A	D	B	A	A	D	B	A
		Intersection Delay (Sec)	45				19				20			
		Intersection LOS	D				B				B			
R-9	SR 189/I-19 NB Ramp (Signal)	Approach Delay (Sec)	33	-	25	37	29	-	11	13	30	-	10	17
		Approach LOS	C	A	C	D	C	A	B	B	C	A	A	B
		Intersection Delay (Sec)	31				14				15			
		Intersection LOS	C				B				B			
D-2	SR 189/Dairy Queen Entrance (Stop)	Approach Delay (Sec)	41	15	16	2	22	16	9	1	23	16	10	1
		Approach LOS	E	B	C	A	C	C	A	A	C	C	A	A
		Intersection Delay (Sec)	10				6				6			
		Intersection LOS	A				A				A			
R-10	SR 189/Congress Drive (Signal)	Approach Delay (Sec)	40	72	10	16	48	46	7	13	46	48	7	13
		Approach LOS	D	E	A	B	D	D	A	B	D	D	A	B
		Intersection Delay (Sec)	22				16				17			
		Intersection LOS	C				B				B			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Table 2-12. Preferred Alternative – Year 2040 LOS for all intersections: Interim v. Ultimate Plan, midday and PM

Intersection ID	Name	Performance Measure	MID Interim				MID Ultimate				PM Interim				PM Ultimate			
			Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
R-1	SR 189/N. Freeport Drive (Signal)	Approach Delay (Sec)	6	10	30	-	6	10	29	-	8	11	38	-	8	12	38	-
		Approach LOS	A	A	C	A	A	A	C	A	A	B	D	A	A	B	D	A
		Intersection Delay (Sec)	10				10				12				13			
		Intersection LOS	A				A				B				B			
R-2	SR 189/Target Range Road (Signal)	Approach Delay (Sec)	21	44	16	44	21	45	15	50	19	37	35	73	19	38	33	86
		Approach LOS	C	D	B	D	C	D	B	D	B	D	C	E	B	D	C	F
		Intersection Delay (Sec)	32				33				33				34			
		Intersection LOS	C				C				C				C			
R-3	SR 189/Mariposa Ranch Road (Signal)	Approach Delay (Sec)	6	33	73	-	6	28	73	-	5	25	57	-	5	24	57	-
		Approach LOS	A	C	E	A	A	C	E	A	A	C	E	A	A	C	E	A
		Intersection Delay (Sec)	30				27				24				23			
		Intersection LOS	C				C				C				C			
R-4	SR 189/W. Industrial Park Drive (Base-Signal; Interim,Ultimate-Stop)	Approach Delay (Sec)	5	4	-	20	4	5	-	19	4	4	-	16	4	4	-	16
		Approach LOS	A	A	A	C	A	A	A	C	A	A	A	C	A	A	A	C
		Intersection Delay (Sec)	5				5				4				4			
		Intersection LOS	A				A				A				A			
R-5	SR 189/Loma Mariposa Road (Signal)	Approach Delay (Sec)	24	18	55	35	22	15	48	36	24	17	48	34	25	17	48	38
		Approach LOS	C	B	D	C	C	B	D	D	C	B	D	C	C	B	D	D
		Intersection Delay (Sec)	26				24				25				26			
		Intersection LOS	C				C				C				C			
R-6	SR 189/Mariposa Park Plaza (Base-Signal; Interim,Ultimate-Stop)	Approach Delay (Sec)	**Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.**															
		Approach LOS																
		Intersection Delay (Sec)																
		Intersection LOS																
R-7	SR 189/Frank Reed Road (N. Industrial Park Drive) (Signal)	Approach Delay (Sec)	57	48	51	35	43	48	42	26	56	45	41	23	43	40	38	19
		Approach LOS	E	D	D	C	D	D	D	C	E	D	D	C	D	D	D	B
		Intersection Delay (Sec)	44				37				35				31			
		Intersection LOS	D				D				C				C			
D-1	SR 189/Carls Jr. Road (Stop)	Approach Delay (Sec)	**Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.**															
		Approach LOS																
		Intersection Delay (Sec)																
		Intersection LOS																
R-8	SR 189/I-19 SB Ramp (Signal)	Approach Delay (Sec)	-	46	15	8	-	50	16	7	-	45	15	9	-	48	19	7
		Approach LOS	A	D	B	A	A	D	B	A	A	D	B	A	A	D	B	A
		Intersection Delay (Sec)	19				18				19				20			
		Intersection LOS	B				B				B				B			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

Table 2-13. Preferred Alternative – Year 2040 LOS for all intersections: Interim v. Ultimate Plan, midday and PM

Intersection ID	Name	Performance Measure	MID Interim				MID Ultimate				PM Interim				PM Ultimate			
			Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
R-9	SR 189/I-19 NB Ramp (Signal)	Approach Delay (Sec)	29	–	11	11	30	–	11	12	29	–	11	13	30	–	10	17
		Approach LOS	C	A	B	B	C	A	B	B	C	A	B	B	C	A	A	B
		Intersection Delay (Sec)	13				13				14				15			
		Intersection LOS	B				B				B				B			
D-2	SR 189/Dairy Queen Entrance (Stop)	Approach Delay (Sec)	27	17	15	2	26	16	15	1	22	16	9	1	23	16	10	1
		Approach LOS	D	C	B	A	D	C	B	A	C	C	A	A	C	C	A	A
		Intersection Delay (Sec)	9				9				6				6			
		Intersection LOS	A				A				A				A			
R-10	SR 189/Congress Drive (Signal)	Approach Delay (Sec)	45	48	11	18	46	48	11	18	48	46	7	13	46	48	7	13
		Approach LOS	D	D	B	B	D	D	B	B	D	D	A	B	D	D	A	B
		Intersection Delay (Sec)	20				20				16				17			
		Intersection LOS	B				B				B				B			
D-3	Chase Bank Entrance (Stop)	Approach Delay (Sec)	**Blacked-out cells indicate the critical access approach or driveway at this intersection has been eliminated or converted to right-in/right-out movements only, i.e., eliminating movements that cut across through traffic.**															
		Approach LOS																
		Intersection Delay (Sec)																
		Intersection LOS																
D-4	SR 189/Dollar Tree Entrance (Stop)	Approach Delay (Sec)	21	17	5	7	22	17	5	8	19	12	3	4	19	13	4	4
		Approach LOS	C	C	A	A	C	C	A	A	C	B	A	A	C	B	A	A
		Intersection Delay (Sec)	7				7				4				4			
		Intersection LOS	A				A				A				A			
D-5	SR 189/Wells Fargo Entrance (Stop)	Approach Delay (Sec)	42	8	9	6	41	9	10	6	78	6	5	4	74	6	5	5
		Approach LOS	E	A	A	A	E	A	A	A	F	A	A	A	F	A	A	A
		Intersection Delay (Sec)	9				9				8				8			
		Intersection LOS	A				A				A				A			
R-11	SR 189/Mastick Way (Signal)	Approach Delay (Sec)	90	79	39	16	86	93	40	15	58	50	35	16	58	55	35	16
		Approach LOS	F	E	D	B	F	F	D	B	E	D	C	B	E	D	C	B
		Intersection Delay (Sec)	43				44				32				33			
		Intersection LOS	D				D				C				C			
D-6	SR 189/Walgreens Entrance (Stop)	Approach Delay (Sec)	3	14	21	1	4	16	23	1	9	15	22	1	8	15	18	1
		Approach LOS	A	B	C	A	A	C	C	A	A	B	C	A	A	B	C	A
		Intersection Delay (Sec)	10				11				11				9			
		Intersection LOS	A				B				B				A			
R-12	SR 189/Grand Avenue (I-19 Business) (Signal)	Approach Delay (Sec)	65	76	38	99	66	81	40	87	63	38	41	72	64	39	38	76
		Approach LOS	E	E	D	F	E	F	D	F	E	D	D	E	E	D	D	E
		Intersection Delay (Sec)	63				65				50				50			
		Intersection LOS	E				E				D				D			
R-13	Calle Sonora/Smokey Lane (Stop)	Approach Delay (Sec)	11	7	1	1	9	7	1	1	9	7	1	1	9	6	1	1
		Approach LOS	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
		Intersection Delay (Sec)	4				3				3				3			
		Intersection LOS	A				A				A				A			

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

3.0 Evaluation of Alternatives

This chapter summarizes the development and evaluation of the range of alternatives that were studied for the proposed action to improve vehicular access, circulation, LOS, mobility, and traffic safety on SR 189 between the Mariposa POE and Grand Avenue, including the Mariposa TI at I 19 and SR 189. This section presents the information available and used at the time of selection. Since that time, elements of the Recommended Build Alternative have been further developed; therefore, values presented in Section 4.0, *Major Design Features of the Recommended Build Alternative*, may not match those presented in this section.

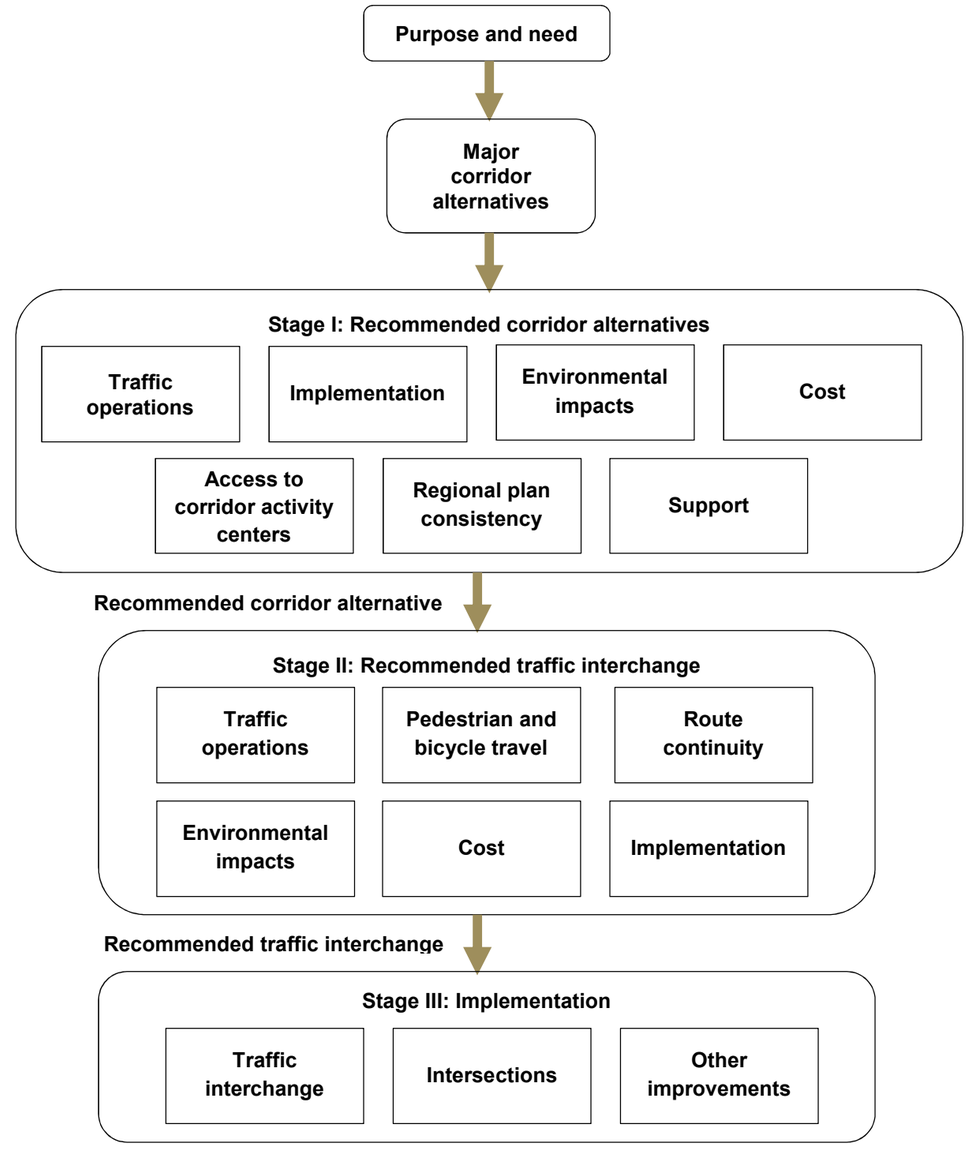
A *State Route 189, International Border to Grand Avenue, Alternative Screening Document* (ADOT 2015b) was prepared and is the basis of the alternatives evaluated in this document's companion EA. The screening document evaluated three corridor build alternatives and the No-Build Alternative. A detailed evaluation of the existing and 2040 design year traffic requirements for the EA's proposed action is documented in the *Year 2040 Traffic Operations Analysis Report* (Wilson & Company 2016).

Upon selection of the SR 189 recommended corridor build alternative, six Mariposa TI improvement options were evaluated and two were recommended for further analysis to become part of the overall SR 189 Recommended Build Alternative. The corridor alternatives and TI options were developed to meet the purpose and need of the EA's proposed action, as described in Part II, Project Purpose and Need,. The Mariposa TI options were evaluated independently as part of the Recommended Build Alternative in this section because FHWA requires a separate analysis when a proposed roadway project involves any changes in access that involve the U.S. Interstate Highway System. Figure 3-1 shows the steps involved to evaluate and select the recommended SR 189 corridor build alternative and Mariposa TI options, along with the criteria used to evaluate them. Alternatives Considered

A screening process described in the *State Route 189, International Border to Grand Avenue, Alternative Screening Document* was developed to identify, screen, and select reasonable, feasible, and practicable corridor build alternatives and TI options.

The corridor build alternatives and subsequent TI options were developed using criteria based on research, guidance, input, and recommendations by a study team consisting of representatives from ADOT, FHWA's Arizona Office, and their designated engineering and environmental consultants. Input on issues, concerns, and opportunities gathered from agencies, members of the public, and key stakeholders—including the City of Nogales, Santa Cruz County, and other public and private organizations—also informed the alternatives development process through agency and public scoping meetings and other forms of input, such as a study website and regular stakeholder meetings.

Figure 3-1. State Route 189 corridor build alternatives and Mariposa Traffic Interchange selection process



Source: Arizona Department of Transportation (2015b)

Corridor Alternatives

A corridor study resulted in the development of three corridor build alternatives for improving access, LOS, circulation, and mobility on SR 189 between the Mariposa POE and Grand Avenue. The initial corridor alternatives development process was based an analysis of the following:

- previous SR 189 and Mariposa POE studies to meet SR 189 transportation planning objectives
- consistency with the new I-11 High Priority Corridor in the Nogales area involving SR 189 and I-19 (as discussed previously in Section 1.2, *Project Background*)
- existing and planned future SR 189 corridor land uses
- existing and forecast future traffic conditions
- corridor traffic and commodity forecasts
- traffic operations and safety analysis
- corridor deficiencies analysis
- public, agency, and stakeholder involvement

The preliminary corridor improvement build alternatives were a corridor management alternative, an expressway alternative, and a connector route alternative. They are described briefly below, along with the No-Build Alternative.

Expressway Corridor

The expressway alternative would provide a direct, access-controlled connection between the Mariposa POE and I-19 at the Mariposa TI that follows the existing SR 189 alignment. Commercial truck and passenger vehicle traffic entering the U.S. through the Mariposa POE with destinations north of Nogales would travel by expressway to I-19. Traffic to the Mariposa International Commerce/Industry Park and other corridor activity centers would access the local street system via a collector-distributor frontage road system parallel to the expressway.

Connector Route Corridor

The connector route alternative would provide a direct access-controlled connection between SR 189 north of the Mariposa POE to I-19. The connection to I-19 would include improvements to the I-19/Western TI or a new system TI. Commercial truck and passenger vehicle traffic entering the U.S. through the Mariposa POE with destinations north of Nogales would travel the connector route to I-19. Traffic to the Mariposa International Commerce/Industry Park and other corridor activity centers would use the existing SR 189 corridor. This alternative would include improvements to the Mariposa TI.

Corridor Management

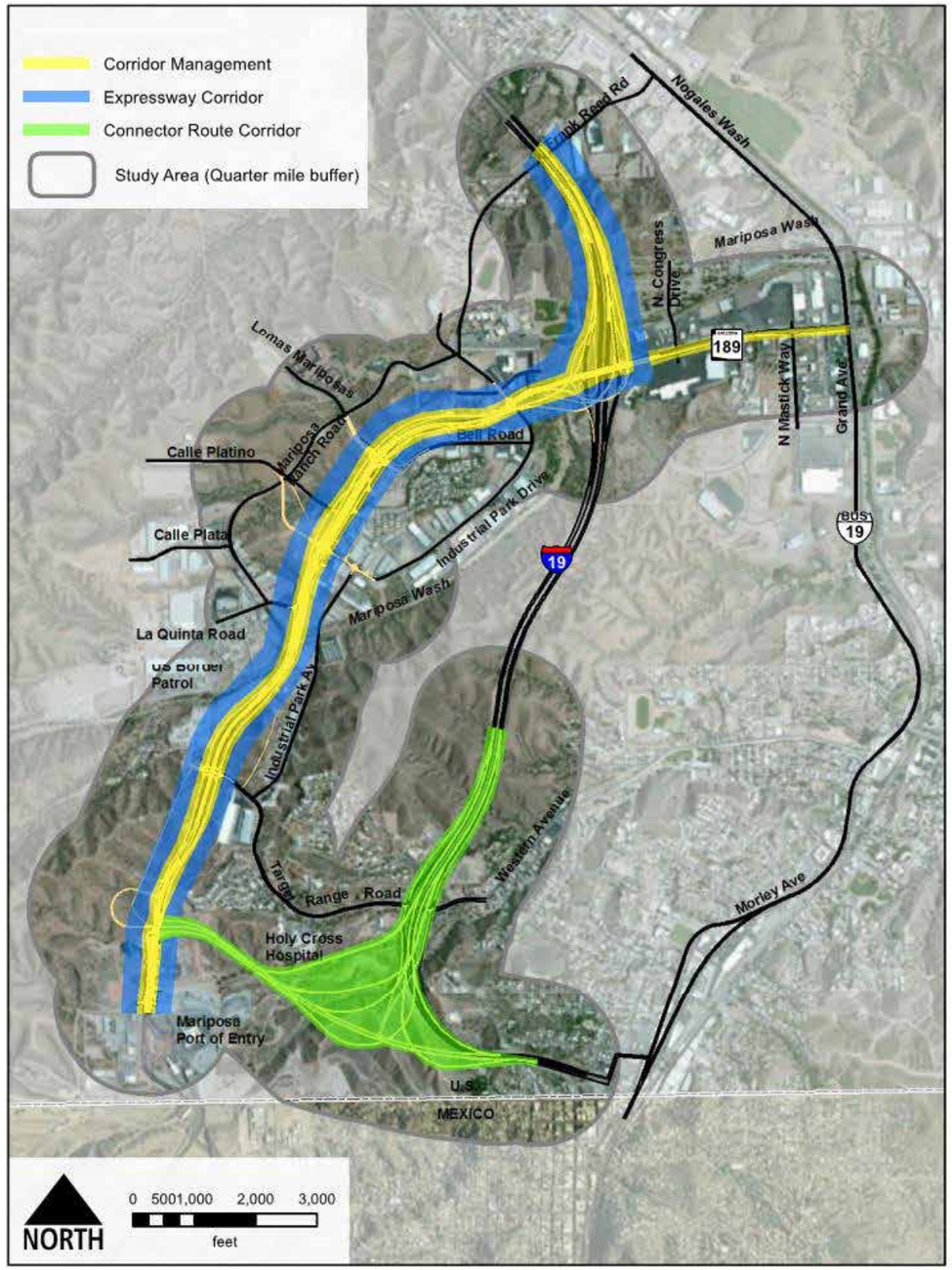
The corridor management alternative would improve traffic flow on existing SR 189 through intersection improvements and elimination or consolidation of existing driveways. Commercial and passenger vehicle traffic would continue to use the existing corridor for access to both I-19 and the industrial, commercial, and other activity centers in the corridor. This alternative would include improvements to the Mariposa TI.

No-Build Alternative

The No-Build Alternative assumes that no major improvements would be made to SR 189 or the Mariposa TI in the study area. Maintenance of the existing SR 189 and the Mariposa TI would continue. The No-Build Alternative serves as a baseline for comparing and evaluating the corridor build alternatives. This alternative provides a means to compare the impacts of the proposed action with the impacts of not undertaking the proposed action. It does not meet the purpose and need to implement improvements to the SR 189 corridor or the Mariposa TI.

Figure 3-2 shows the three corridor alternatives and the study area for the alternatives analysis.

Figure 3-2. SR 189 corridor alternatives and study area



3.1 Stage I Evaluation Criteria

Each of the three major corridor build alternatives includes upgrades and operational improvements to the Mariposa TI. A multidisciplinary set of criteria was used to evaluate each SR 189 corridor build alternative and the No-Build Alternative, which included the following performance measures:

- **Traffic Operations**: Travel time/travel speed on the corridor from the international border to the Mariposa TI and Grand Avenue would attain higher average travel speeds and LOS. Also included is an assessment of access consolidation, elimination or consolidation of driveways, and reduction of conflict points to reduce vehicle conflicts.
- **Implementation**: Opportunities and constraints for each corridor build alternative were measured by considering construction duration, construction phasing, potential roadway closures, and impacts on existing traffic. A corridor build alternative that minimizes these considerations was given a higher rating.
- **Environmental Impacts**: Potential natural, cultural, or human-made environmental resource areas were assessed to avoid, minimize, or mitigate potential adverse impacts for each corridor build alternative as part the overall planning, design, and engineering phase of the proposed action.
- **Cost**: Relative SR 189 corridor and Mariposa TI construction costs were evaluated for new road, ramps, structures, new right-of-way (ROW), and associated improvements required for the corridor build alternatives.
- **Regional Plan Consistency:** Relationship of the corridor build alternatives with existing and planned transportation infrastructure and compatibility with adopted transportation plans, as described in Part II, Section C, *Conformance with Regulations, Land Use Plans, and Other Plans*, of the EA.
- **Public and Stakeholder Preference**: General expectations and preferences of the public, local municipalities, agencies, other public officials, and key stakeholders for each of the corridor build alternatives.

3.2 Stage I Evaluation

Each corridor alternative was given a rating for each criterion, resulting in a total combined score. Three build alternatives were evaluated. The No-Build Alternative was used as a baseline to score and compare the build alternatives. The build alternative with the highest score would be considered as the recommended preferred corridor alternative.

Under the traffic operations category, the expressway alternative scored the more favorable rating. The higher rating for this alternative is attributable to the combination of reduced travel times and the reduction of vehicle conflicts by providing one-way frontage roads and an access-controlled route to I-19.

The corridor management alternative proved to be the more favorable alternative under the implementation category. This alternative would have shorter construction durations because of spot intersection improvements, which, in turn, would provide immediate traffic operational benefits. Access management opportunities can also be prioritized by identifying the critical spot improvements locations.

The screening process did not indicate a major differentiator among the build alternatives (including the No-Build) under the environmental impacts category. At this preliminary stage, additional on-site evaluations would be necessary to provide a detailed assessment of the environmental impacts.

Under the cost category, the corridor management alternative scored the more favorable rating. When compared with the build and No-Build alternatives, the corridor management alternative had the lowest construction cost. This alternative was assumed to have the smallest footprint, which reduces the amount of new right-of-way required and reduces the possibility of full takes from residences and businesses.

Both the corridor management and the expressway alternative proved to be the more favorable alternatives under the regional plan consistency category. Both alternatives would support anticipated growth in local traffic in the area.

A summary of each alternative, based on its relative strength and weakness against the criteria, is presented in Table 3-1. A detailed matrix of the how each alternative was scored with supporting data is provided in Appendix E of this report.

Table 3-1. Stage I evaluation criteria and rating scale summary

Evaluation category	Corridor build alternatives		
	Corridor Management	Expressway	Connector Route
Traffic operations	◑	◕	◑
Implementation	●	◔	◑
Environmental impacts	◑	◑	◔
Cost	●	◔	◑
Regional plan consistency	●	◕	◔
Public and stakeholder preference	◕	◔	◔

Rating guide

Weakness	○	◔	◑	◕	●	Strength

3.3 Stage I Preferred Corridor Alternative Recommendation

No-Build Alternative

As discussed previously, the No-Build Alternative serves as a baseline for comparing and evaluating the corridor build alternatives. This alternative allows comparison of the impacts of the proposed action with the impacts of not undertaking the proposed action, but it does not meet the purpose and need to implement improvements to the SR 189 corridor or the Mariposa TI.

Build Alternative

SR 189 Recommended Build Alternative

The corridor alternative screening process determined that the Corridor Management Alternative provides optimal implementation opportunities because it meets all elements of the purpose and need; has a much shorter construction duration; minimizes impacts on existing traffic, local businesses, and the environment; has the lowest construction cost; is most consistent with adopted local and regional transportation plans; and obtained the most support from stakeholders and the public. When comparing these benefits with the other alternatives, the corridor management alternative was identified as the Recommended Build Alternative.

In August 2014, ADOT and FHWA completed the process of screening the three corridor build alternatives. The result of this evaluation was consistent with public and stakeholder input on the recommended corridor alternative, and the Corridor Management Alternative was selected as the recommended build alternative, thus completing the Stage I evaluation of the corridor alternatives (see Figure 3-1). It will be the basis for evaluating and assessing potential impacts in the EA, along with the No-Build Alternative.

The corridor management portion of the Recommended Build Alternative between the Mariposa POE and Grand Avenue, with a length of approximately 3.7 miles, includes the following improvements:

- Build or modify exit and entrance ramps connecting SR 189 to northbound and southbound I-19, build a new multispan bridge over the Frank Reed Road intersection at SR 189 and/or I-19, widen I-19 to add northbound and southbound lanes connecting entrance and exit ramps between Frank Reed Road and SR 189, install retaining walls adjacent to the I-19 freeway entrance and exit ramps as needed, and install retaining walls adjacent to the SR 189 entrance and exit ramps as needed.
- Implement spot intersection improvements at the intersections of SR 189 with Target Range Road, La Quinta Road, Loma Mariposa Road, and Frank Reed Road, which will include, but not be limited to, roadway widening, drainage improvements, traffic signals, pavement marking, signs, and lighting.
- Widen SR 189 between I-19 and Grand Avenue to provide additional through lanes and right-turn bays.
- Widen the SR 189 main line corridor roadway, with new travel lanes and medians.
- Eliminate various existing driveways (to be determined) to control access along SR 189.
- Make drainage improvements along SR 189 to include inlets, pipes, culverts, basins, and related improvements.

- Implement additional traffic signalization (to be determined), pavement markings, signs, and roadway lighting at the proposed ramps, TI areas, and SR 189 corridor.
- Implement access management strategies along SR 189.

The Corridor Management Alternative is being further evaluated and assessed based on public, agency, and stakeholder input as well as environmental impact evaluation, design, engineering, and traffic modeling to further develop and refine the most efficient design.

3.4 Mariposa TI Options Considered

After the Recommended Build Alternative was selected, the six Mariposa TI options were developed and evaluated as part of the Stage II screening evaluation (see Figure 3-1). The proposed improvements associated with the Mariposa TI coincide with the improvements identified for the Corridor Management Alternative as part of the overall improvements under the Recommended Build Alternative. The Mariposa TI options were evaluated as independent options as part of the Recommended Build Alternative because FHWA requires a separate analysis when a proposed roadway project involves any changes in access that involves the U.S. Interstate Highway System.

The six TI options evaluated for the alternatives analysis are presented in Table 3-2.

Table 3-2. Stage II Mariposa TI options

Option	Description
A	Diamond with flyover
B	Diamond with flyover and southeast quadrant loop ramp
C	Diamond with inside flyover
D	Diamond with inside flyover and grade separation at Frank Reed Road
E	Single point urban interchange (SPUI)
F	Diverging diamond interchange (DDI)

The following is a detailed description of each of the six TI options being considered.

Option A – Diamond with Flyover

Option A consists of a flyover ramp from eastbound SR 189 to northbound I-19. The flyover is a two-lane ramp that merges into one lane before entering northbound I-19. The entrance to the flyover is east of the Frank Reed Road and SR 189 intersection. The entrance to northbound I-19 from the flyover ramp is north of the existing northbound I-19 entrance ramp. The entrance and exit ramp merges/diverge movements occur on the outside. Improvement along SR 189 includes widening in the eastbound direction west of the Mariposa TI to add a third through lane. Reconstruction or widening of the Mariposa Wash bridge structure would accommodate the flyover bridge structure.

Option B – Diamond with Flyover and Southeast Quadrant Loop Ramp

Option B consists of a flyover ramp from eastbound SR 189 to northbound I-19. The flyover is a two-lane ramp that merges into one lane before entering northbound I-19. The entrance to the flyover is east of the Frank Reed Road and SR 189 intersection. The entrance to northbound I-19 from the flyover ramp is north of the existing northbound I-19 on-ramp. The entrance and exit ramp merges occur on the outside. This option would modify the southbound I-19 exit and entrance ramps. The southbound I-19 ramp/crossroad intersection is reconstructed west of the existing location. Reconstruction of the intersection allows room for the loop ramp, which would allow vehicles to avoid the left-turn movement to head east on SR 189. Improvement along SR 189 includes widening in the eastbound and westbound direction east and west of the Mariposa TI to add a third through lane. Reconstruction or widening of the Mariposa Wash bridge structure would accommodate the flyover bridge structure.

Option C – Diamond with Inside Flyover

Option C consists of a flyover ramp from eastbound SR 189 to northbound I-19. The flyover is a one-lane ramp entering northbound I-19. The entrance to the flyover is east of the Frank Reed Road and SR 189 intersection. The entrance to northbound I-19 from the flyover ramp is in the median of northbound I-19. The entrance and exit ramp merge/diverge movements occur on the inside. Improvement along SR 189 includes widening west of the Mariposa TI to accommodate the flyover structure. Reconstruction or widening of the Mariposa Wash bridge structure would accommodate the flyover bridge structure.

Option D – Diamond with Inside Flyover and Grade Separation at Frank Reed Road

Option D consists of a flyover ramp from eastbound SR 189 to northbound I-19 and also from southbound I-19 to westbound SR 189. The flyover is a one-lane directional ramp in each direction entering and exiting I-19. The flyover entrance and exit is west of the Frank Reed Road and SR 189 intersection. At the Frank Reed Road intersection, the flyover ramp will be grade separated from the intersection. The entrance and exit to I-19 from the flyover ramp is in the median north of the Mariposa TI. The entrance and exit ramp merge/diverge movements occur on the inside. Improvement along SR 189 includes widening west of the Mariposa TI to accommodate the flyover structure. Reconstruction or widening of the Mariposa Wash bridge structure would accommodate the flyover bridge structure.

Option E – Single Point Urban Interchange

Option E consists of shifting the ramp/crossroad intersections toward the center of the TI. The existing I-19 bridges are two-span. Going with this option would require reconstruction of the I-19 bridge to a one-span structure. Due to the increased span, the bridge structure depth would also be increased and the I-19 profile would need to be raised to accommodate the change in vertical clearance. Widening of the Mariposa Wash bridge may be required to accommodate the SPUI configuration.

Option F – Diverging Diamond Interchange

This option's diamond interchange moves the cross street traffic to the left side of the roadway between the signalized ramp intersections. The left-turn signal phase at the ramp terminals is eliminated. Vehicles on the cross street wanting to turn left are allowed to continue to the ramps without conflicting with opposing through traffic and without stopping. DDIs appear to be most applicable where there are heavy left turns onto the ramps or moderate to heavy left turns from the ramps (ADOT 2012). Improvement along SR 189 includes widening west and east of the Mariposa TI to accommodate the DDI configuration. Reconstruction of the bridge over Mariposa Wash is also required to accommodate the DDI configuration.

3.5 Stage II Evaluation Criteria

A multidisciplinary set of criteria was used to evaluate the TI alternative type. Performance of each alternative was determined with respect to:

- **Traffic Operations**: Intersection LOS along the SR 189 corridor. Higher LOS indicates better performance. Ramp intersection LOS at the TI. Higher LOS indicates better performance.
- **Pedestrian and Bicycle Travel**: Assessment of pedestrian and bicycle circulation through the TI. Minimal restrictions to pedestrian and bicycle circulation indicate better performance. Average intersection delay in the corridor. Lower average intersection delay indicates better performance.
- **Route Continuity**: Assessment of how vehicles can continue on I-19 through the proposed TI. The ability for vehicles to continue on I-19 or reverse direction through the TI option indicates better performance.
- **Environmental Impacts**: Potential environmental elements that may need to be addressed in design.
- **Cost**: Assessment of the locations and types of structures required to support the TI option. A reduction in the amount of bridge required indicates a higher rating. Assessment of the locations and types of structures required to support the TI option. A reduction in the amount of retaining walls required indicates a higher rating. Assessment of the amount of new right-of-way required for the TI options. Options that require the least amount of new right-of-way indicate a higher rating.
- **Implementation**: Assessment of the implementation opportunities and constraints for each TI option would be measured by how the option can be phased to provide shorter construction durations. Assessment of the implementation opportunities and constraints for each TI option would be measured by considering impacts to adjacent businesses resulting from potential roadway closures and impacts on existing traffic.
- **Design Considerations**: Assessment of profile grades for ramps. A grade of 3 percent or less is desirable. Assessment of general expectations of the public for the corridor. Assumes that drivers are anticipating a standard diamond TI that is consistent with most TIs in the corridor. Assessment of weaving distance from the Frank Reed Road and SR 189 intersection to the I-19 entrance ramps. Desirable weaving distance is 1,000 feet.
- **Stakeholder and Public Input**: Preference of TI option based on outreach efforts and the November 2014 meeting that allowed members of the public to provide input on the TI options. The stakeholder and public input will be documented in the EA. Stakeholder meetings have been held with Santa Cruz County, City of Nogales, Nogales Unified School District, Fresh Produce Association of the Americas, Holy Cross Hospital, Nogales-Santa Cruz County Chamber of Commerce, Trucking Industry, Port Authority Board, and Pima Association of Governments.

3.6 Stage II Evaluation

Each of the three major improvement alternative types includes upgrades to the Mariposa TI. The second stage of screening evaluated the Mariposa TI options. The Stage II selection process identified the preferred TI concept to support the overall corridor improvement. Each TI option was evaluated and scored based on the criteria established for Stage II. The evaluation process is described in a narrative format with tables showing the scoring results.

Stage II Traffic Operation Analysis

Based on the series of roadway intersection and TI options, a traffic operations analysis was conducted for corridor segments and intersections to identify operational deficiencies for 2040.

Much of the forecast 2040 corridor congestion is a result of passenger vehicles and trucks waiting to turn left from eastbound SR 189 onto I-19 northbound. Reconfiguration of the Mariposa TI will be required to accommodate long-range traffic growth. For the Stage II evaluation, six Mariposa TI options were incorporated into the traffic operations analysis to evaluate the performance of each option at the system-wide level, at the TI level, and at the intersection level. The system-wide performance measures are based on the entire model network and include all of the vehicles traveling on the arterials. The limits of the system that was evaluated extended from Freeport Drive to Grand Avenue along SR 189.

Notable Observations and Initial Recommendations

The VISSIM analysis indicated that growth in truck and passenger vehicle border crossings at the Mariposa LPOE and growth in traffic from development in the Mariposa International Commerce/Industrial Park and the Centro Commercial district will cause traffic operations at key intersections to deteriorate through the 2040 planning horizon.

Mariposa TI

Much of the forecast 2040 corridor congestion is a result of passenger vehicles and trucks waiting to turn left from eastbound SR 189 onto I-19 northbound. While ADOT has implemented a dual eastbound left-turn lane, modified the northbound ramp, and improved traffic signal timing at the Mariposa TI, reconfiguration of the TI will be required to accommodate long-range traffic growth. Initial VISSIM modeling indicates that reducing the delays at the TI will improve overall corridor traffic operations.

International Border to I-19

With the exception of the southbound left turn from Frank Reed Road and the southbound left turn from the I-19 southbound off-ramp, the delays to other signal-controlled movements result from long signal cycle lengths and limited green time allocation to the specified movements. Additional lane capacity would not notably improve delay times. Construction of a dual southbound left-turn lane on Frank Reed Road would improve delays to this movement. Additionally, it would provide more storage, minimizing the potential blockage of driveways by the southbound left-turn queue. The Mastick Way intersection could benefit from additional eastbound right-turn lane storage.

I-19 to Grand Avenue

Improvements to the Mariposa TI will increase congestion at the Mariposa Road and Grand Avenue intersection. Improvements at the SR 189 and Grand Avenue/B-19 intersection include southbound left-turn lanes and right-turn lanes.

VISSIM Traffic Simulation Analysis

VISSIM traffic simulation analysis shows that if congestion at key intersections can be addressed along with implementing access management strategies, the existing five-lane cross-section with two travel lanes in each direction and a center two-way left-turn lane can accommodate 2040 traffic at an acceptable LOS. For the evaluation of the six TI options, the VISSIM model was modified to include the Forecast Year 2040 conditions to predict anticipated levels of delay and intersection performance with the roadway geometry. The VISSIM analysis conducted for the Stage II analysis was used to compare the six TI options. With the selection of the TI options identified for further study, additional refinement of the VISSIM model will be required before moving forward. The results of the VISSIM analyses for the recommended build option will be documented in the traffic operations analysis report.

Summary of Segment Performance

The segment performance evaluation indicates that Option D (Diamond with Inside Flyover and Grade Separation at Frank Reed Road) has the shortest travel times out of the six TI options. Option D allows LPOE traffic to avoid the Frank Reed Road intersection. This reduces the volume of conflicting traffic traveling through the Frank Reed Road intersection and provides smoother progression and shorter queues through the Mariposa TI. There is one notable location of congestion for Option D, where the off-ramp from I-19 southbound merges onto SR 189 westbound in proximity to the signalized Loma Mariposa Road intersection. At this location, merging can be difficult during periods of heavy traffic. Providing a ramp that ties into SR189 sooner may provide additional weaving distance and provided better merging onto SR189.

Summary of System-wide Network Performance

The system-wide measurements, including average delay, average speed, average stops, and vehicles served, are summarized in Figure 3-3. Notable observations regarding the system-wide measurements include:

- TI Options A, B, and D consistently performs near the best among all of the options.
- TI Options C, E, and F consistently perform near the worst among all of the options.

The range of vehicles served by the TI options is from 1,041 to 1,215, which is a gap of 174 vehicles, or 17 percent of the total vehicles. Option D had the lowest number of vehicles served because of a location where extreme congestion was observed. The location is just east of the Loma Mariposa Road intersection, where the off-ramp from I-19 southbound merges onto SR 189 westbound in proximity to the signalized Loma Mariposa Road intersection. Merging will be difficult during periods of heavy traffic since the westbound queue at Loma Mariposa Road often extends beyond the southbound off-ramp merge point. As mentioned in the previous section, providing a ramp that ties into SR189 sooner may provide additional weaving distance and provided better merging onto SR189.

Figure 3-3. Performance of Mariposa TI options

Evaluation of TI Options

Option B required the most ROW and entailed the most impacts on local businesses of all the TI options. This option also introduced additional bridge structures, which would increase costs and construction durations. Option B performed much like Option A in the traffic operations category. When comparing these two options, Option A involved less ROW, less cost, and shorter construction durations. Therefore, Option B was eliminated based on these factors.

Option C did not perform well under the traffic operation criteria for ramps, intersections, travel time, or driver expectancy. Option C did not perform well under any of the design considerations, including profiles grades that exceeded 5 percent. With the high volume of heavy trucks that would be using this corridor, the steep grades would not be beneficial to the corridor. Option C also scored poorly on driver expectancy or weaving distance requirements. Based on these factors, Option C was eliminated from further study.

Options E and F both exhibited significant vehicle queues between Frank Reed Road and the TI for the future 2040 traffic volumes. This queuing would adversely affect the Frank Reed Road intersection LOS. In the traffic operations category, both Options E and F performed the worst among the TI options. Both options would also require longer construction durations and greater impacts on local businesses. For these reasons, Options E and F were eliminated from further study.

When comparing the rating criteria, performance indicators, and benefits among the Mariposa TI options, the top performing TI options were:

Option A – Diamond with Flyover

Option D – Diamond with Inside Flyover and Grade Separation at Frank Reed Road

Option A demonstrated a reasonable performance for each of the evaluation criteria, especially with regard to providing acceptable traffic operation performance levels, lower cost, and shorter construction durations. In addition, Option A minimizes impacts on existing traffic, provides route continuity, and meets drivers' expectancy, which relates to drivers' readiness to respond to situations, events, and information in predictable and successful ways. Option A also would have the least impact on local businesses and the environment in general.

The high rating for Option D is mainly attributable to its superior level of traffic operations performance between the Mariposa TI entrance and exit ramps and Frank Reed Road. Option D demonstrated the most significant decrease in travel times, at 15 percent, or approximately 1 to 2 minutes in travel time savings when compared with Option A. Reducing travel times and intersection delays has the benefit of lowering the operational cost for vehicles and businesses using the corridor. Option D also scored high with regard to design considerations, with ramp grades at 3 percent and good weaving distances.

Based on the technical criteria used for the TI screening process and input and support from stakeholders, Option D was selected for further study and analysis as part of the Mariposa TI portion of the Recommended Build Alternative.

A summary of each TI option, based on its relative strength and weakness against the criteria, is presented in Table 3-3. A detailed matrix of how each option was scored for the Stage II evaluation is provided in Appendix F of this report.

Table 3-3. Stage II evaluation criteria and rating scale summary

Evaluation category	TI Option					
	A	B	C	D	E	F
Traffic operations	◑	◕	◔	◕	○	◔
Pedestrian and bicycle travel	○	○	●	●	◑	◔
Route continuity	●	●	●	●	○	○
Environmental Impacts	◑	◔	◑	◑	◕	◕
Cost	◑	◔	◕	◔	◕	◕
Implementation	●	◕	◑	○	◔	◔
Design considerations	◑	◑	○	◕	◕	◕
Public and stakeholder preference	◕	◕	◕	◕	◑	◕
Rating guide						
Weakness	○	◔	◑	◕	●	Strength

3.7 Stakeholder and Public Outreach

The preliminary corridor alternatives have been presented to the public and stakeholders through many outreach activities, starting with the May 2011 agency scoping meeting and continuing with stakeholders' meetings in June and September of 2011 and April 2012; a public meeting in May 2012; and stakeholder meetings with area property owners and business interests in June 2012. On August 15, 2012, the City of Nogales passed a resolution supporting and encouraging the selection of the Corridor Management alternative, along with dismissal of the Expressway and Connector Route alternatives. On the same day, the Board of Supervisors of Santa Cruz County voiced similar support for the Corridor Management alternative and dismissal of the Expressway and Connector Route alternatives. The outreach activities resulted in the Corridor Management alternative receiving the most support from the public and stakeholders. Appendix C provides a summary of stakeholder and public comments.

The corridor improvement ideas were presented in the *SR 189 Alternatives Summary Matrix* (ADOT 2013a) and included the Corridor Management alternative, an Expressway alternative, and a Connector Route alternative. In August 2014, ADOT and FHWA completed the process of screening the three corridor alternatives. The result of this evaluation was consistent with the public and stakeholder input on the recommended corridor alternative. The Corridor Management alternative will be considered as the selected corridor build alternative, as well as the No-Build alternative.

Stakeholder Outreach

A series of meetings were scheduled with stakeholders to provide current project information on various options and project schedule and to hear their concerns and answer questions prior to the public meeting. The stakeholders provided comments and recommendations for the corridor management alternative and the Mariposa TI options. For the purpose of this report, only comments and recommendations related to the Mariposa TI are presented. Any comments and/or recommendations related to the Corridor Management alternative will be documented and considered in the DCR as the recommended build alternative gets refined.

Based on feedback received at the stakeholder meetings, notable comments that have been documented are as follows:

- Resolutions were passed by the City of Nogales and Santa Cruz County in favor of the Option D TI that was presented in the screening report.
- The City of Nogales inquired about provisions for southbound frontage roads along I-19. Each TI option can be evaluated to accommodate future frontage roads. Further discussion will be required to ensure that there are future plans to construct a frontage road system along I-19.
- The Nogales-Santa Cruz County Chamber of Commerce expressed concerns regarding Frank Reed Road due to the high school near the intersection. The organization prefers a grade separation at Frank Reed Road and has a preference for Option D.
- The trucking industry has identified eastbound SR 189 to northbound I-19 as the critical movement. It has a preference for Option D and a lesser preference for Option C.
- The Port Authority Board indicated a preference for Option D, or a hybrid of the two.

Public Outreach

ADOT and FHWA held a public meeting on November 18, 2014, to seek input on the six TI options. The stakeholder and public input received at the public meeting was used in the evaluation of the TI options (Table 3-4). ADOT provided a summary of the public comments received during the comment period. This screening document incorporates the comments classified under the "Traffic Interchange Ramp Option Alternatives" category. The following table summarizes the comments received for each TI option.

Table 3-4. Comments received regarding the Mariposa TI options

Option	Number of comments received
A – Diamond with Flyover	2
B – Diamond with Flyover and Southeast Quadrant Loop Ramp	2
C – Diamond with Inside Flyover	0
D – Diamond with Inside Flyover and Grade Separation at Frank Reed Road	1
E – Single Point Urban Interchange	1
F – Diverging Diamond Interchange	2

Based on the feedback received at the public meeting, notable comments that have been documented are as follows:

- Option A was noted as being the best option for the increase in the trucking industry.
- Feedback received for Option B indicated that this option will address traffic exiting and entering I-19 and will be safer for produce trucks.
- Support for Option C was also observed along with a recommendation for related improvements at the existing Frank Reed Road underpass at I-19.
- Option D was noted as an option that will reduce congestion, eliminate the mix of pedestrian and vehicle conflicts, and reduce the mix of commercial and inexperienced drivers at Frank Reed Road.
- Feedback received for Option F indicated that this option appears to be the best improvement versus cost option.

In general, based on the public meeting summary, opposition to any of the TI options was not apparent. The overall consensus from the public feedback was that public and stakeholders support implementing a new TI solution. In summary, based on stakeholder support and its evaluation rating during the TI screening process, the study team identified Option D as the Recommended Build Alternative.

Public Hearing

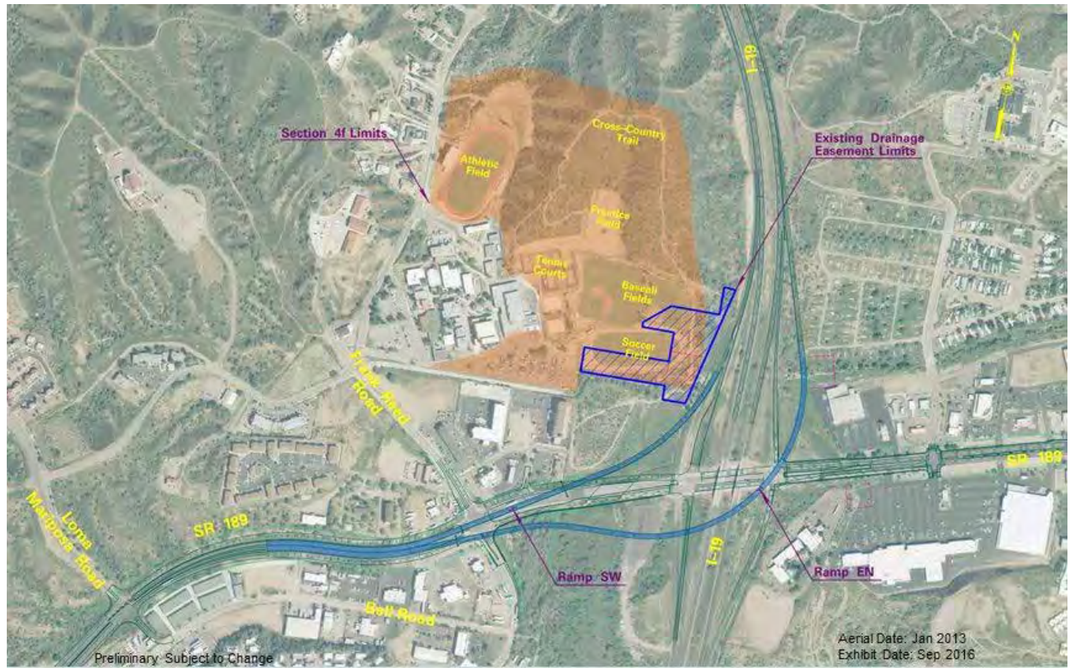
As part of the NEPA process for the SR 189 improvement project, the public, agencies, public officials, and other stakeholders were invited to review and comment on the Draft EA prepared by ADOT. The Draft EA was made

available for public review during a 30-day comment period from January 13, 2017, through February 14, 2017. A public hearing was held regarding this project to improve SR 189. The purpose of this hearing was to gather input on the Draft EA, which documented the proposed improvements to the SR 189 corridor. The meeting was held on Tuesday, January 31, 2017, from 5:30 to 7:30 p.m., with a presentation at 5:45 p.m., at Nogales High School, 1905 North Apache Boulevard, in Nogales. Public comments made on the Draft EA and at the public hearing, along with ADOT's responses to public comments, may be reviewed in Appendix A, Draft EA and Public Hearing Comments of the Final EA/FONSI. A public hearing summary report and other public hearing materials, along with transcripts of the public hearing, may be reviewed in Appendix B, Public Hearing Summary Report and Other Materials of the Final EA/FONSI.

3.8 Refinement of Option D to Incorporate Right-Hand Versus Left-Hand Exit and Entrance Ramps Along I-19

Option D as presented in the previous sections incorporates a left-hand merge for vehicles entering northbound I-19 and a left-hand exit for vehicles exiting SB I-19. Driver expectancy for the left-hand exit and entrance was a concern during the study process. An evaluation was conducted to revise the ramp geometry to eliminate this issue and provide a typical right-hand exit or entrance to I-19. Various configurations were developed and presented to the agencies and stakeholders. The Recommended Build Alternative that incorporates the study team's input is presented in the next chapter. The figure that was presented to stakeholders with the refinements is shown in Figure 3-4. The design concept shown in the figure was selected to provide driver expectancy and maneuverability for large freight trucks using the exit and entry ramps at I-19. Other factors included less ROW and accessibility impacts on adjacent properties and reduced cost when compared to the original configurations due to increased structural cost. Additional information can also be found in the SR 189 Environmental Assessment report.

Figure 3-4. Refinements presented to stakeholders



3.9 Stage II Preferred TI Option Recommendation

Throughout the Mariposa TI analysis process, Option D was considered the best-performing TI option with respect to traffic operations. However, ADOT has only $65 million currently allocated for the construction of SR 189 improvements in FY 2019. The cost of implementing Option D is estimated in the range of $134 million, which exceeds the funds currently allocated for improvements along the SR 189 corridor and at the Mariposa TI. Based on the preliminary estimates, this equates to a $69 million funding shortfall. The study team and key stakeholders developed and agreed on a long-term strategy to implement the improvements needed for the SR 189 corridor to meet the purpose and need of this proposed action. The strategy is based on planning and developing an interim and ultimate configuration solution for the Mariposa TI.

Based on the planned funding identified in FY 2019, in order for a build alternative to be developed that incorporates the key features of Options A and D, an alternative was developed that could be constructed in phases. A hybrid of Options A and D was developed to allow Option A to be developed initially. A future phase will incorporate the key features of Option D. The key features of Option D include grade separation of the flyover ramps over the Frank Reed Road intersection. Option D by itself could not be constructed in phases because it had to be constructed entirely to be operational. A split ramp concept allowed Option A to be constructed for the interim phase. The ultimate phase will construct the south-to-west flyover ramp, while the east-to-north flyover

ramp could remain open. Upon completion of the south-to-west flyover ramp, the east-to-north flyover ramp could be modified to provide grade separation at Frank Reed Road.

Option A has been put forth as an interim configuration solution because it can be implemented with the funding currently allocated in ADOT's Five-Year Transportation Facilities Construction Program. The interim solution will be constructed first at the Mariposa TI because it can be built with the current funding. The interim configuration improvements consist of an outside flyover ramp from eastbound SR 189 to northbound I-19. The flyover will be a one-lane ramp as it enters northbound I-19. The entrance to the flyover will be just east of the SR 189/Frank Reed Road intersection. The entrance to northbound I-19 from the flyover ramp will be north of the existing northbound I-19 entrance ramps. The entrance and exit ramp merges/diverge movements will occur on the outside of the northbound lanes. The TI improvements on SR 189 include widening in the eastbound direction west of the Mariposa TI to add a third through lane. Reconstruction or widening of the Mariposa Wash bridge structure will accommodate the flyover bridge structure.

The ultimate configuration solution closely emulates Option D and will be built at the Mariposa TI after the interim TI improvements are completed, if additional funds become available in the near future. The ultimate configuration improvements consist of a flyover ramp from eastbound SR 189 to northbound I-19 and from southbound I-19 to westbound SR 189. The flyover will be a one-lane directional ramp in each direction entering and exiting I-19. The flyover entrance and exit will be west of the SR 189/Frank Reed Road intersection on the inside of SR 189. At the Frank Reed Road intersection, the flyover ramp will be grade-separated from the existing intersection. The entrance and exit to I-19 from the flyover ramp will be on the outside north of the Mariposa TI.

The entrance and exit ramp merge/diverge movements will occur on the outside of the existing I-19 traffic lanes. Improvements along SR 189 will include widening west of the Mariposa TI to accommodate the flyover structure. Reconstruction or widening of the Mariposa Wash bridge structure will accommodate the flyover bridge structure.

Figure 3-5. Mariposa TI interim condition

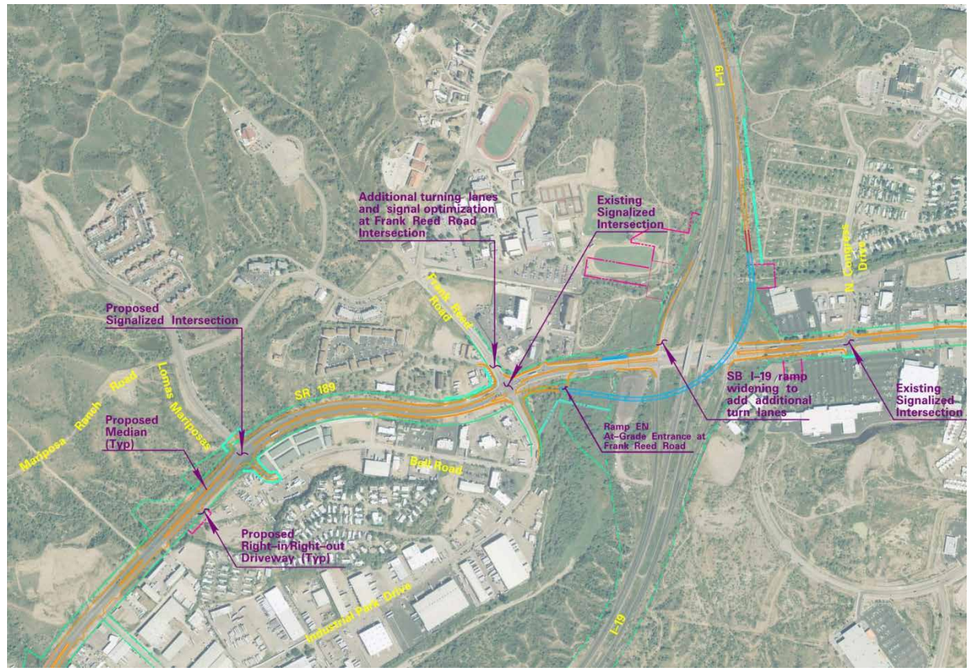
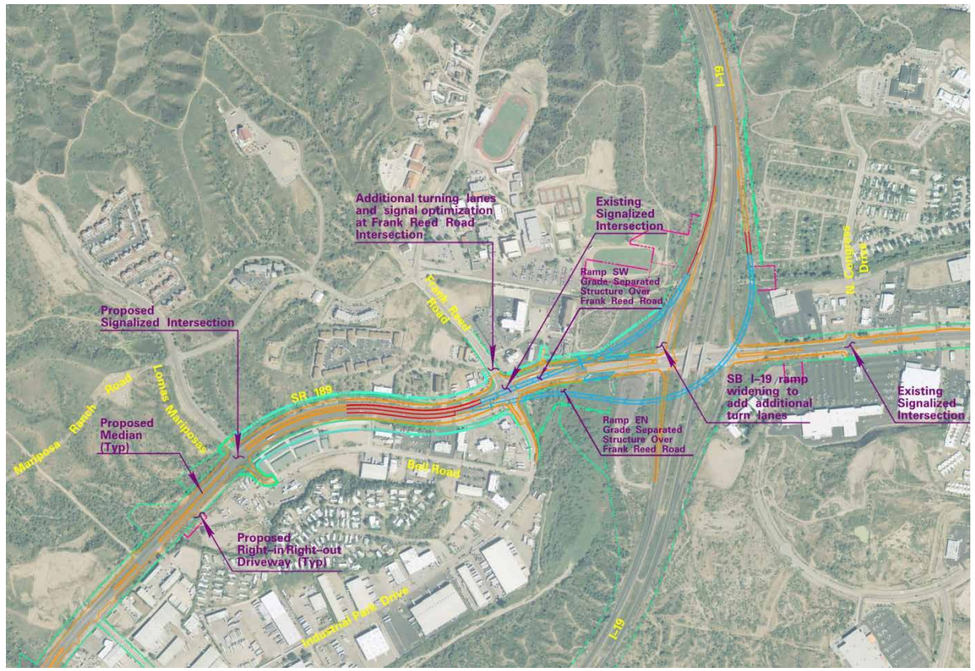


Figure 3-6. Mariposa TI ultimate condition



3.10 Intersection Options for the Target Range Road Intersection

During the study process, various local stakeholders, agencies and technical groups had input on what the recommended solution should be at the Target Range Road intersection. The current profile grade along SR 189 is approximately 4.5%. The west leg of the intersection is for private access to a trucking facility. The east leg of the intersection is Target Range Road. Three options were developed for intersection that met the needs of the area and provided acceptable LOS at the intersection.

- Traffic Signal – Traffic operations consists of signals controlling all phases of movement through the intersection.
- Roundabout – A configuration that contains no traffic signals or stop signs. Drivers will yield to traffic in the roundabout and exit to their desired street.
- Median U-Turn – This configuration eliminates the left-turns from both the minor and major approaches at the main intersection. Left-turns are executed away from the main intersection via U-turns at the median opening downstream of the intersection.

Based on the traffic analysis for each of the three intersection options, the roundabout provided the best overall levels of service for the intersection. While delays for Target Range Road increased under the roundabout alternative, the delays for SR 189 decreased enough to offset this and to lower the overall average intersection delay (Wilson & Co. 2016). The traffic performance of each intersection option is presented in Figure 3-7.

Figure 3-7. Traffic Signal at Target Range Road Intersection

SR 189 & Target Range Road Intersection Mid-Day Peak Performance

Approach	Movement	Signalized						Roundabout						Indirect Left					
		Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Movement Delay	Movement LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Movement Delay	Movement LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Movement Delay	Movement LOS
WB	Right	32	C	43	D	32	C	31	C	96	F	15	B	39	D	86	F	59	E
	Through																		
	Left					49	D					144	F					101	F
SB	Right					44	D					11	B					28	C
	Through			45	D	45	D			36	D	38	D			36	D	32	C
	Left					44	D					44	D					74	E
NB	Right	32	C			11	B					3	A					15	B
	Through			21	C	21	C			13	B	13	B			24	C	20	B
	Left					32	C					19	B					59	E
EB	Right					15	B					1	A					60	E
	Through			15	B	18	B			7	A	36	D			65	E	97	F
	Left					24	C					34	C					108	F

Source: Year 2040 Traffic Operations Analysis Report, February 2016, by Wilson & Co.

In September 2016, the intersection options were presented to the local stakeholders in Nogales, AZ. Table 3-5 compares the intersection options with evaluation criteria that were presented to the stakeholders.

Table 3-5. SR 189 and Target Range Road Intersection Comparison

Evaluation Criteria	Target Range Road Intersection Configuration		
	Traffic Signal	Roundabout	Median U-Turn
Traffic Operations	Good	Better	Best
Safety (Number of Conflicts)	Good	Best	Better
Access Management	Good	Better	Best
Intersection Access	Better	Best	Good
ROW	Best	Good	Better
Long-term Cost	Good	Better	Best
Capital Cost	Best	Good	Better
Adaptability	Better	Good	Best

After the presentation, majority of the stakeholders supported the roundabout option. The three intersection options are presented graphically in Figures 3-8, 3-9, and 3-10. Although each of the intersection configurations acceptably meets the design criteria, Table 3-5 provides an un-weighted evaluation of the options related to design criteria. After the presentation and discussion, a majority of the stakeholders supported the roundabout option, primarily because that option provided the best Intersection Access. On the west side of SR189 just north of the Target Range intersection, There is a series of private properties that have existing NB and SB access on SR 189. The roundabout option allowed this access to be maintained while the traffic signal and median U-turn options would limit those movements and require a longer route for vehicles to achieve the same movement. At the time of this study, it was of significant importance to maintain existing access as much as possible and to avoid any potential takes of the properties due to inadequate access. In Table 3-5, the three proposed intersection options meet the project need; however, based on the stakeholders support and the significant importance to maintain existing access, the roundabout was selected as the recommended intersection option.

Figure 3-8. Traffic Signal at Target Range Road Intersection

Figure 3-9. Roundabout at Target Range Road Intersection

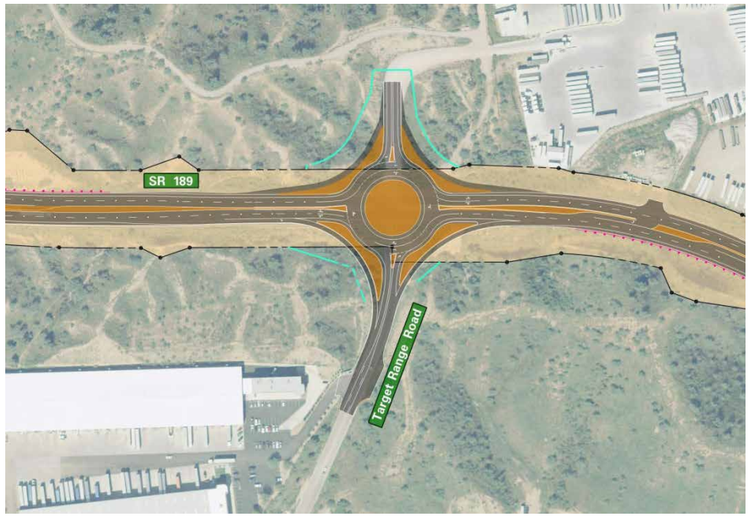
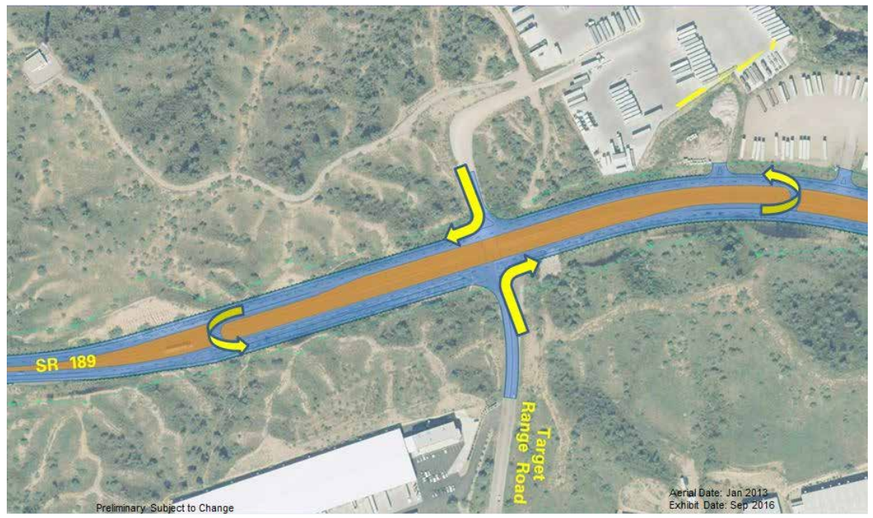


Figure 3-10. Median U-Turn at Target Range Road Intersection



4.0 Major Design Features of the Recommended Build Alternative

This section describes the design controls and design features for the Recommended Build Alternative for SR 189, I-19, and the Mariposa TI improvements within the study limits. The Recommended Build Alternative's major design features are depicted in Figure 4-1 (interim) and Figure 4-2 (ultimate) and are described in detail in the following sections.

4.1 Design Criteria

The notable design criteria for SR 189, service TI ramps, crossroads, and directional ramps are presented in Table 4-1.

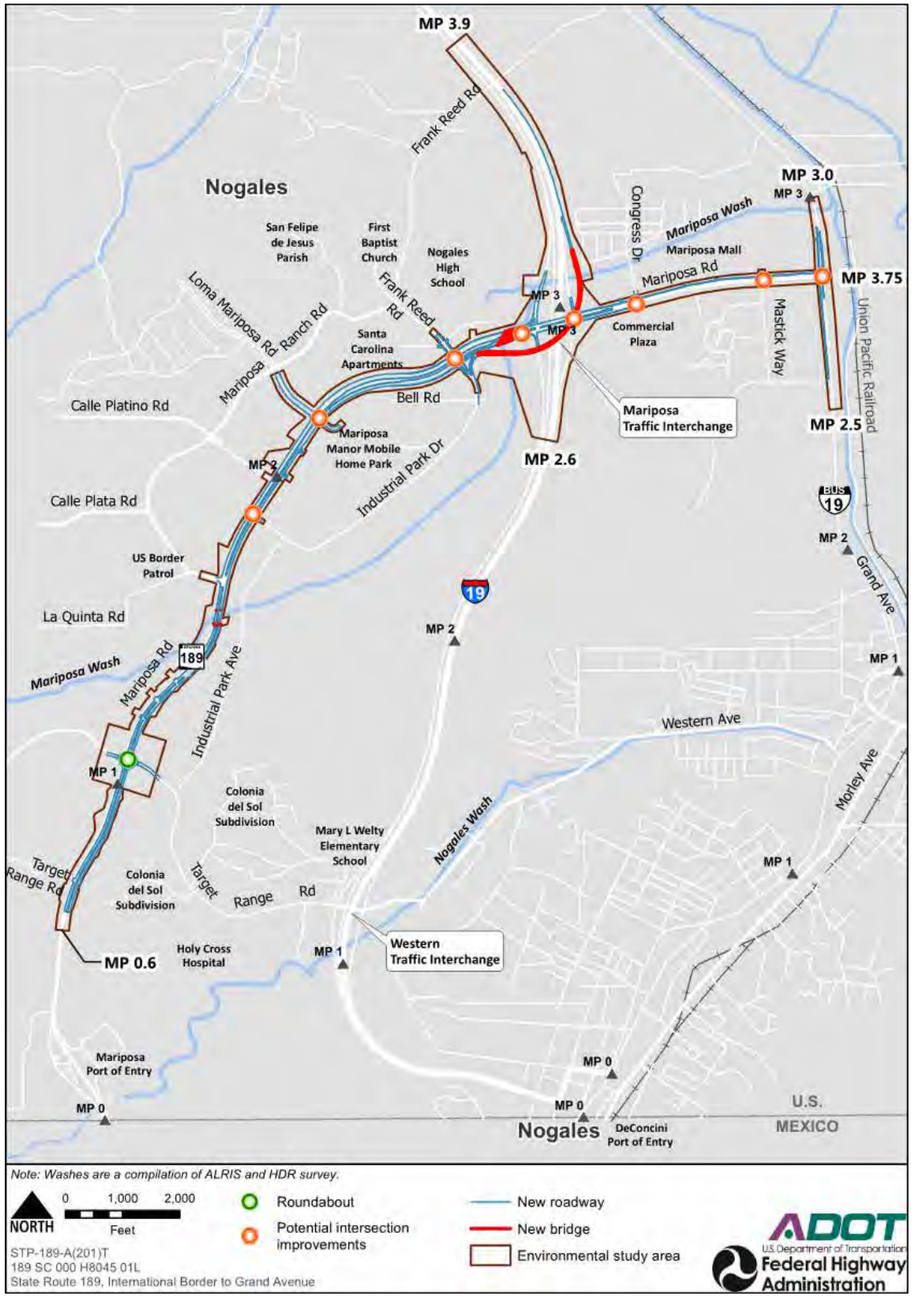
Table 4-1. Design controls for proposed project elements

Item description	Design control
SR 189	
Design year	2040
Design vehicle	WB-67
Design speed	50 mph, 40 mph
Superelevation	Match existing (0.06 foot/foot maximum)
Cross slope	Match existing (2.0%)
Lane width	12 feet
Shoulder width (median and outside)	12 feet
Maximum horizontal curve	3 degrees, 27 minutes
Maximum gradient	3%
Taper rate	50:1
Slope standards (cut and fill slopes)	Varies, 3:1 maximum
Minimum vertical clearance (highway structure)	16 feet, 6 inches
Service TI ramps	
Design year	2040
Design vehicle	WB-67
Design speed for nose of gore (exit ramps)	60 mph
Design speed for nose of gore (entrance ramps)	55 mph
Design speed for ramp body	50 mph
Design speed for ramp terminal	35 mph
Superelevation	0.06 foot/foot maximum

Table 4-1. Design controls for proposed project elements

Item description	Design control
Lane width	12 feet
Pavement width (exit ramp)	22 feet, plus 2 feet offset to barrier
Pavement width (entrance ramp)	22 feet, plus 2 feet offset to barrier
Maximum horizontal curve	6 degree, 53 minutes
Maximum gradient	+4.0%, –5.0%
Slope standards (cut and fill slopes)	Varies, 3:1 maximum
Crossroads	
Design year	2040
Design vehicle	WB-67
Design speed	40 mph
Superelevation	Normal crown
Cross slope	2%
Lane width (adjacent to raised median)	14 feet
Lane width (without curb)	12 feet
Lane width (outside lane with curb)	14 feet
Maximum horizontal curve	6 degree, 53 minutes
Maximum gradient	+4.0%, –5.0%
Taper rate	45:1
Slope standards (cut and fill slopes)	Varies, 3:1 maximum
Minimum vertical clearance (highway structure)	16 feet, 6 inches
Directional ramps	
Design year	2040
Design vehicle	WB-67
Design speed	55 mph (main body); 65 mph (at main line exit)
Superelevation	0.06 foot/foot (maximum)
Road width	28 feet (32 feet with barrier) (one-lane ramps)
Lane width	12 feet
Maximum horizontal curve	5 degrees, 15 minutes
Maximum gradient	4% upgrade; 5% downgrade
Taper rate	65:1

Figure 4-1. Interim Condition



Note: Washes are a compilation of ALRIS and HDR survey.

NORTH
0 1,000 2,000
Feet

Roundabout
Potential intersection improvements
New roadway
New bridge
Environmental study area

STP-189-A(201)T
189 SC 000 H8045 01L
State Route 189, International Border to Grand Avenue

ADOT
U.S. Department of Transportation
Federal Highway Administration

Figure 4-2. Ultimate Condition

Note: Washes are a compilation of ALRIS and HDR survey.

NORTH
0 1,000 2,000
Feet

Roundabout
Potential intersection improvements
New roadway
New structure
Environmental study area

STP-189-A(201)T
189 SC 000 H8045 01L
State Route 189, International Border to Grand Avenue

ADOT
U.S. Department of Transportation
Federal Highway Administration

4.2 State Route 189

The Recommended Build Alternative was developed to provide the capacity needed for the projected 2040 travel demand and to conform to current geometric design criteria and design practice. This alternative was also developed to accommodate the anticipated growth in traffic while continuing to provide access to existing and future industrial and commercial land uses in the corridor.

Two implementation conditions are presented in the DCR. The descriptions of each implementation condition are presented in the following section. The Recommended Build Alternative plans that show the recommended improvements are presented in Appendix A.

Interim Condition

On SR 189, raised median is proposed to replace the continuous left-turn lane that separates opposing traffic flows. Pavement widening is required in the corridor to allow for the 16-foot-wide median. The proposed raised median is part of the access management strategy to promote the through movements and reduce side-street friction throughout the corridor. Other access management strategies include driveway modifications and right-in/right-out driveways. Spot improvements will also be implemented at critical intersection locations. At the Mariposa TI, the Interim Condition will provide an east-to-north flyover to connect eastbound SR 189 to northbound I-19. The entrance ramp from SR 189 is at grade at the intersection of Frank Reed Road and SR 189. The exit ramp from southbound I-19 will be widened as it approaches SR 189.

Ultimate Condition

In addition to the improvements on SR 189 for the Interim Condition, the Ultimate Condition adds an additional southbound-to-westbound flyover and significant widening to accommodate the flyover. The exit ramp from I-19 will provide connectivity for southbound I-19 vehicles travelling toward the Mariposa LPOE. This southbound-to-westbound flyover will also be grade-separated at the Frank Reed Road intersection. The Interim Condition eastbound to northbound ramp will be modified to be grade-separated at the Frank Reed Road.

The Recommended Build Alternative plans are included in Appendix A. Corridor intersection improvements for the Recommended Build Alternative is presented in the following subsections.

Freeport Drive

No improvements are planned at this intersection since this is outside of the project limits. Recent improvements were made at this intersection, along with the Mariposa LPOE improvements. The project limits for the Recommended Build Alternative will begin at the end of the existing PCCP limits just north of the Mariposa LPOE.

West Camino de la Paloma Road at North Target Range Road

Improvements at this location include widening at the intersection, median openings to allow right and left-turn movements, and northbound and southbound stacking lanes to allow left-turn movements from SR 189.

West Target Range Road

The proposed configuration of this intersection will be a roundabout. Three existing driveways are north of the Target Range Road intersection and west of SR 189. The driveway access to these properties will be restricted to northbound left turns into the properties and right out access only when leaving the properties for southbound traffic. The roundabout will provide northbound access for those properties.

Calle Platino

Improvements at this location include widening at the intersection, median openings to allow right and left-turn movements, and will be stop controlled.

La Quinta Road

Only minor revisions are planned at this location but the existing intersection configuration will remain.

Industrial Park Drive

The dirt driveway north of Industrial Park Drive will be eliminated. This improvement was recommended with the goal of consolidating access points to decrease travel times along the corridor. The Industrial Park Drive will still have the same access as it does today.

Loma Mariposa Road

In the Interim Condition, the existing T-intersection configuration will remain. The improvements at the Loma Mariposa Road intersection for the Interim Condition include additional lanes in the westbound approach; extension of the eastbound left-turn lane bay; and expansion of the southbound approach to include a left-turn and right-turn lane.

In the Ultimate Condition, a new connection to Bell Road will be made with the addition of a barrier-separated through lane and left-turn lane to accommodate the flyover exit-ramp traffic; and the addition of a westbound receiving lane to accommodate the additional through lane from the flyover. The additional lane capacity will provide acceptable LOS for the future travel demand.

Mariposa Park Place Driveway

In the Interim Condition, a median opening will be provided a left-turn into Mariposa Park Place and a left out from Mariposa Park Place to SR189.

In the Ultimate Condition, this access point to SR 189 will be modified to be right-in/right-out only access in the Recommended Build Alternative.

Frank Reed Road and North Industrial Park Drive

The improvements at the Frank Reed Road intersection for the Interim Condition include an added eastbound through lane to provide entry to the flyover, an additional westbound through lane, an additional northbound right-turn lane to access the flyover, extension of the northbound left-turn and right-turn bays, and an additional northbound receiving lane to allow free-flow right-turn lanes from the westbound approach. In the southbound approach an additional left-turn lane will be added as well as a right-turn lane.

In the Ultimate Condition, modifications will be made that include the removal of the northbound right-turn to access the flyover. A new south-to west flyover ramp will be grade separated over Frank Reed Road. The Interim Ramp EN will be reconstructed to be grade separated over Frank Reed Road. The additional lane capacity will provide acceptable LOS for the future travel demand. The recommended improvements will also decrease travel times along the corridor. Separation of heavy truck traffic will meet the needs of the local stakeholders.

Shell Loop Road

Access to SR 189 from this driveway will be modified to right-in/right-out only access. This recommended improvement is needed to reduce cross traffic along the corridor, which will decrease travel times along the corridor.

Interstate 19 Southbound and Northbound Ramps

In the Interim Condition, improvements in the area of the I-19 ramp connection to SR 189 include an additional lane in the westbound direction and a right-turn lane in the westbound direction at the southbound on ramp in the Interim Condition. This recommended improvement was recommended to decrease travel times along the corridor.

In the Ultimate Condition, the southbound I-19 off-ramp will be reconstructed to be re-aligned to tie into SR 189 east of the existing southbound I-19 off-ramp. The reconstruction of the ramp was done to allow for the future Ramp SW to be incorporated while minimizing the ROW needs.

Dairy Queen Driveway

An additional eastbound and westbound through lane will be provided in area of this existing driveway. This recommended improvement will provide acceptable LOS for the future travel demand and mitigate the queuing associated with the SR 189 approaches.

Congress Drive

The improvements at this intersection include an eastbound right-turn lane for the Recommended Build Alternative. Improvements also include southbound dual left-turn lanes and a right/thru lane; a northbound right-turn, left-turn and through lane. This recommended improvement will provide acceptable LOS for the future travel demand.

Dollar Tree Driveway

This access point to SR 189 will be modified to right-in/right-out only access in the Recommended Build Alternative.

Wells Fargo Driveway

The improvements at this intersection include a westbound receiving lane for the southbound right-turn lane under the Recommended Build Alternative. This recommended improvement will provide acceptable LOS for the future travel demand.

Mastick Way

No improvements are proposed at this location.

Walgreens Driveway

No improvements are proposed at this location.

Grand Avenue

Improvements in this area include an additional through lane in the westbound direction; no changes in the eastbound direction; and a third left-turn lane in the northbound direction. This recommended improvement will improve the LOS and travel times, but not at an acceptable LOS. Site constraints limit the amount of area available for improvements. Other challenges of why the improvements may not yield an acceptable LOS are the proximity of the railroad and the businesses along the west side of Grand Avenue that prohibit further widening of Grand Avenue. Coordination with agencies and local stakeholders will continue as the study progresses.

Previous recommendations provided for an additional southbound through lane to be added in addition to the improvements noted previously. The City of Nogales passed a resolution to avoid impacts to properties on the west side of Grand Avenue. In order to comply with the resolution, the southbound through lane was eliminated and all widening was pushed to the east side of Grand Avenue. No new ROW is anticipated along the east side of Grand Avenue however drainage and utility relocation will be required.

4.3 Interstate 19 Traffic Interchange

The Recommended Build Alternative was developed to provide the capacity needed for the projected 2040 travel demand and to conform to current geometric design criteria and design practice. This alternative was also developed to accommodate the anticipated growth in traffic while continuing to provide access to existing and future industrial and commercial land uses in the corridor. Interim and Ultimate Condition TI configurations were developed in response to stakeholder and public feedback.

Two conditions are presented in the DCR. Descriptions of each build alternative for the TIs are presented in the following subsections. The improvements were recommended to decrease travel times along the corridor.

Interim Condition

At the Mariposa TI, the Interim Condition will provide an east-to-north flyover to connect eastbound SR 189 to northbound I-19. The entrance ramp from SR 189 will be at-grade at the intersection of Frank Reed Road and SR 189.

Ultimate Condition

At the Mariposa TI, the Ultimate Condition will modify the east-to-north flyover to be grade separated at Frank Reed Road. An additional southbound-to-westbound flyover is included in this build alternative. The entrance ramp from I-19 will provide connectivity for southbound I-19 vehicles travelling toward the Mariposa LPOE. This southbound-to-westbound flyover will also be grade-separated at the Frank Reed Road intersection.

The Recommended Build Alternative plans are included in Appendix A.

During the Stage II TI screening process, Option D was the TI configuration that appealed to local stakeholders in the area. Resolutions were passed by the City and County in favor of the Option D TI that was presented in the screening report. Implementing this TI option will require the multidirectional flyover ramp and grade-separated structures to be constructed in the first phase. Based on technical analysis and financial considerations, key features from TI Options A and D were incorporated into the Ultimate Condition to address the stakeholders' input. The Ultimate Condition includes the grade-separated structure and multidirectional flyover ramps. A schematic of the Option D TI is presented in Appendix B.

4.4 Access Control

The right-of-way along the SR 189 corridor is currently not access controlled. The existing businesses adjacent to the corridor can access SR 189 using an existing driveway or shared access through a dirt road.

At the Target Range Road intersection, the right-of-way along the SR 189 corridor is currently not access controlled. With the new roundabout configuration, new access control is proposed to allow the roundabout to operate efficiently.

Access control already exists at the Mariposa TI. Access control on I-19 will be maintained in accordance with ADOT and FHWA Access Control Policy requirements.

4.5 Right-of-way

The proposed right-of-way requirements are shown on the Recommended Build Alternative plans in Appendix A. The total estimated right-of-way needed for the Interim is approximately 7.28 acres and the Ultimate Build Alternative is approximately 5.65 acres. The majority of the right-of-way requirements are from privately owned properties. Potential easement locations and limits will be determined during final design. A list of affected parcels for the interim and ultimate condition is documented in the Final EA, Part IV, Section B, *Land Ownership, Jurisdiction, and Land Use*, 2. Environmental Consequences – Recommended Build Alternative, Table 4-1 – SR 189 property acquisition – interim configuration, and Table 4-2 – SR 189 property acquisition – ultimate configuration.

4.6 Drainage

Analysis Criteria

The following sections describe the proposed concepts for the drainage design. The drainage design concepts were developed based on guidelines from the following documents:

- ADOT Roadway Design Guidelines (2014)
- ADOT Highway Drainage Design Manual – Hydrology Volume 2 (2014)
- ADOT Highway Drainage Design Manual – Hydraulics (2007)

Notable items include:

- As presented in Table 603.2B, the pavement drainage systems shall be designed for a 50-year storm frequency at depressed road locations. For non-depressed roads, the storm drain system shall be designed for a 10-year frequency.
- Depressed road criteria apply to any road with ponded depth (ignoring any drainage system) in excess of 30 inches. In this case, the storm drain systems shall be designed such that the hydraulic grade line is a minimum of 6 inches below top of grate.
- As presented in Table 603.2C, allowable spread on all roads shall not exceed the road gutter width, shoulder, and/or distress lane. On roads with more than one lane in each direction, the spread may encroach upon one-half of the adjacent lane for a 10-year storm frequency.
- The allowable spread should meet the criteria given in Table 603.2C; one-lane ramps shall have a 12-foot unponded width. Allowable spread on two-lane ramps shall not exceed the road gutter width, shoulder, and one-half of the adjacent lane for a 10-year storm frequency.
- Allowable ponding depth on highways shall not exceed the curb height for a 10-year storm frequency.
- The capacity of detention basins and ditches that are parallel to the road and convey road drainage should be designed to meet the requirements of the 10-year storm frequency. Detention basins and ditches that intercept off-site flows should be designed for a 50-year storm frequency, except where other conditions require a greater storm frequency.
- The 100-year storm frequency is also checked to ensure that there are no adverse impacts on properties adjacent to the freeway right-of-way.
- For higher roadway embankments where flow overtopping the edge of road is remote, the headwater depth to culvert height ration (HW/D) should be limited to 1.5.
- FEMA and local jurisdiction regulations apply for floodplain development.
- Revetment and bridge embankment protection shall be designed in accordance with ADOT Hydraulics manual and applicable Federal Highway Administration documents including HEC-11, HEC-14, and HEC-23.
- Bank protection for abutments shall provide one foot of freeboard for the design flow conditions.
- Use of dumped riprap shall be limited to velocities less than 12ft/s.
- Detention/retention basin side slopes would be a minimum 6:1.
- Detention/retention basins will be based on the design storm frequency as identified in Table 603.2A in the Roadside Design Guidelines, Emergency spillways shall be designed to accommodate the peak discharge from the 100-Yr frequency storm.
- No detention/retention basins shall be designed to retain water longer than 36 hours after the 24-hour design storm event has passed.
- Regional concrete-lined channel side slopes would be 2:1.

Existing Models and Studies

A limited number of studies have been performed in the project area. A list and description of each study that has been acquired is provided below:

- Santa Cruz County, Arizona DIRM and Map Modernization Project, TDN Section 4 – Hydrology, June 2007, completed by Stantec for Santa Cruz County. This report was part of the Technical Data Notebook (TDN) for developing FEMA effective mapping and formally changing the county's floodplain mapping to the Digital Flood Insurance Rate Map (DFIRM) mapping system. The mapping became effective on December 2, 2011. The hydrology section included information on the characteristics of the watershed and subbasins, as well as hydrologic routing and parameters.
- Flood Insurance Study – Santa Cruz County, Arizona and Incorporated Areas, Vols. 1–3, December 2011. This report is the effective flood insurance study for the county. The report includes effective flood widths, depths, velocities, and associated riverine characteristics. Additionally, the effective discharge rates for various locations along the washes are included for reference.

Coordinated efforts to locate additional reports discussing the development within the corridor and surrounding region has not yielded further documentation. Final design will require additional information to assess drainage infrastructure that appears to have been constructed within the region.

Proposed Drainage Improvements by Others

Plans for future flood control drainage improvements have been identified in the project area. This information was collected through meetings and from exhibits identifying those improvements as provided by the Santa Cruz County Flood Control District. The features have not been further designed beyond initial study concepts. At the time of this report, there is no change to the regulatory flows or floodplains within the project limits. Final design may be required to investigate further the projects and their potential impacts on regional flooding if the concepts are carried further or folded into the regional flood control plan for the region. These projects include but are not limited to:

- Ephraim Canyon Watershed – Large regional detention/retention facility immediately west of the I-19 alignment at the location of the Ephraim thalweg crossing. Exhibits indicate there could potentially be a small reduction in the floodplain limits near the SR 189 and Grand Avenue/B-19 intersection.
- Mariposa Canyon Watershed – Large regional detention/retention facility located 1 mile upstream from Bridge No. 1 at SR 189. Exhibits indicate a reduction in the floodplain limits throughout the additional reach of Mariposa Canyon Wash to the confluence with Nogales Wash.

On-site Drainage

Currently, several typical roadway sections are proposed within the project limit. The configurations are dependent upon on the extents of proposed pavement widening and median section improvements. For the on-site analysis, three typical scenarios were identified for the variable roadway section:

- Normal crown with raised median and guard rail – embankment curb assumed as edge treatment
- Superelevated section with raised median and guard rail – embankment curb assumed as edge treatment
- Full build – fully developed roadway section with raised median and curb and gutter edge treatment

The road cross section is proposed as normal crown geometry, except in areas of superelevation. Areas identified as containing a super elevated roadway section allow runoff to flow toward the inside median. Catch basins and storm drain systems will collect the accumulated roadway runoff with either raised median or vertical curb end treatment. Areas with embankment curb as the edge treatment will utilize concrete or riprap spillways for pavement drainage control.

ADOT Standards C-15.20, C-15.40, and C-15.80 catch basins are used to intercept the flows along the main line and right-of-way. Runoff collected in the catch basins will be conveyed in storm drains. A series of detention ponds are utilized to mitigate increased on-site runoff and provide first flush of the stormwater as per ADOT's Best Management Practices. Currently, ADOT is revising its stormwater policy, and the basin design would need to be reevaluated during final design. See State Route 189, International Border to Grand Avenue Draft Drainage Report for onsite analysis of Existing, Interim, and Ultimate roadway conditions.

The complete infrastructure needed for the on-site drainage system will be determined during final design. The following describes site-specific considerations:

- Spillways will be required to control pavement runoff developing along embankment curbs.
- At the Frank Reed Road and SR 189 intersection, existing on-site drainage facilities include catch basins and storm drain piping. The proposed roadway improvements will require extending and expanding the existing system to include additional inlets to capture and control runoff. The outfall along the northwestern abutment section of Bridge No. 2 at Mariposa Canyon Wash will be utilized for both Interim and Ultimate Phase conditions.
- As per ADOT Best Management Practices and MS4 Permit the increased runoff from the additional pavement proposed in both the interim and ultimate condition detention facilities will be mitigated and treated before it is conveyed to the final outfall, Mariposa Wash.
- The Target Range Road and SR 189 intersection will utilize a roundabout as traffic control. On-site drainage will be required to maintain a safe roadway passage. Due to increased pavement a local on-site basin will be required for water quality control and mitigation of peak stormwater runoff.
- Additional pavement, particularly within the region of the Frank Reed Road and SR 189 intersection, will be added for the Ultimate Condition. Therefore on-site drainage systems and water quality treatment will need to be reconfigured to accommodate the additional flows.
- Due to the vertical configuration of east-to-north flyover ramp there will be a sump within the ramp located approximately 123-ft upstream from Mariposa Wash Bridge No. 2. Deck drains will be required to control discharge and mitigate ponding within the ramp roadway section. Due the grades of the ramp and existing terrain, the ramp inlets will drain directly into the Mariposa Wash. Water quality treatment will be administered

through the ramp inlets with oil and grit separation provided within the structure itself. Additionally measure will be taken to mitigate against additional contaminants being discharged directly into the wash which is a tributary to the Nogales Wash and Santa Cruz River which are listed as impaired water ways with ADEQ.

- In order to limit right of way takes and reduce the over project foot print the roadway runoff from Bell Road to Frank Reed is captured and conveyed northeast within the existing right of way. The runoff is treated for first flush runoff and released into the Mariposa Wash both up and downstream of the Mariposa Bridge No. 2 crossing. Conveying the discharge along the right of way will have the added benefit of reducing discharge conveyed southward toward Bell Road which has been a known region of flooding.

Off-site Drainage

A drainage master plan has not been developed for the region associated with the project area. Therefore, a schematic of the existing freeway was overlaid onto an existing contour surface, as provided by Santa Cruz County Flood Control, to develop subbasin watershed boundaries and determine the flow path for existing off-site conditions. Based on the watershed sizes the ADOT Rational Method Tool was utilized to assess peak discharges at cross culverts and other off-site facilities controlling storm water discharge.

Culverts identified as requiring extension due to roadway widening were assessed with FHWA's HY8 Culvert analysis program. ADOT Standards C-13.20 and C-13.25 as well as ADOT Standards B Series for Pipe Culvert Headwalls were utilized for proposed configurations. Riprap sizing and placement is based on Ch. 11 of the Highway Drainage Design Manual Volume 3 Hydraulics Second Edition, See State Route 189, and International Border to Grand Avenue Draft Drainage Report for analysis of offsite hydrology and assessment of cross culvert hydraulics for Existing, Interim, and Ultimate Phase conditions.

Section 404 of the Clean Water Act

The U.S. Army Corps of Engineers (USACE) administers Section 404 of the Clean Water Act (CWA), which regulates the discharge of dredged or fill material into waters of the United States (jurisdictional waters), including wetlands. USACE regulates jurisdictional waters through permitting, using nationwide and individual permits.

Types of waters that are regulated include wetlands, ephemeral washes, perennial streams, springs, riverbeds, and special aquatic sites. Functional values are a key component in determining the associated permitting and mitigation of jurisdictional waters.

The proposed freeway will require the placement of structures such as bridge substructures into jurisdictional waters, leading to the discharge of dredged or fill material into Mariposa Canyon Wash.

It is anticipated that a nationwide permit will be required for the SR 189 project in the interim condition and that an individual permit will be required in the ultimate condition. On February 8, 2005, FHWA, ADOT, and USACE entered into an operating agreement that applies to transportation projects that will require both an FHWA action under the National Environmental Policy Act and a USACE individual permit under Section 404 of the CWA (USACE 2005). The operating agreement commits FHWA, USACE, and ADOT to integrating the National Environmental Policy Act and Section 404 of the CWA in the transportation planning, decision-making, and implementation processes. According to the operating agreement, when avoidance of jurisdictional waters is not practicable, minimization of impacts will be achieved, and unavoidable impacts will be mitigated to the extent possible. The permitting process for Section 404 requires CWA Section 401 certification. This certification is regulated by ADEQ for jurisdictional waters, except on tribal land. Since these initial agreements were made, many regulatory and landscape changes have occurred. New jurisdictional delineations will be performed, and all permitting requirements will be met between production of the draft and the final EA documents.

ADOT will prepare a water quality certification application in accordance with Section 401 of the CWA as part of the Section 404 permitting process. The application will be submitted for review and approval by ADEQ. The steps outlined below will be taken by ADOT to satisfy provisions of Section 401(b)(1) of the CWA in accordance with Section 404 (USACE 2005):

- Minimize impacts by limiting the degree or magnitude of the freeway and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts.
- Rectify impacts by repairing, rehabilitating, or restoring the affected environment.
- Reduce impacts over time through preservation and maintenance operations during the life of the freeway.
- Compensate for impacts by replacing, enhancing, or providing substitute resources or environments.
- Monitor impacts and take appropriate corrective measures.

Floodplain Encroachment

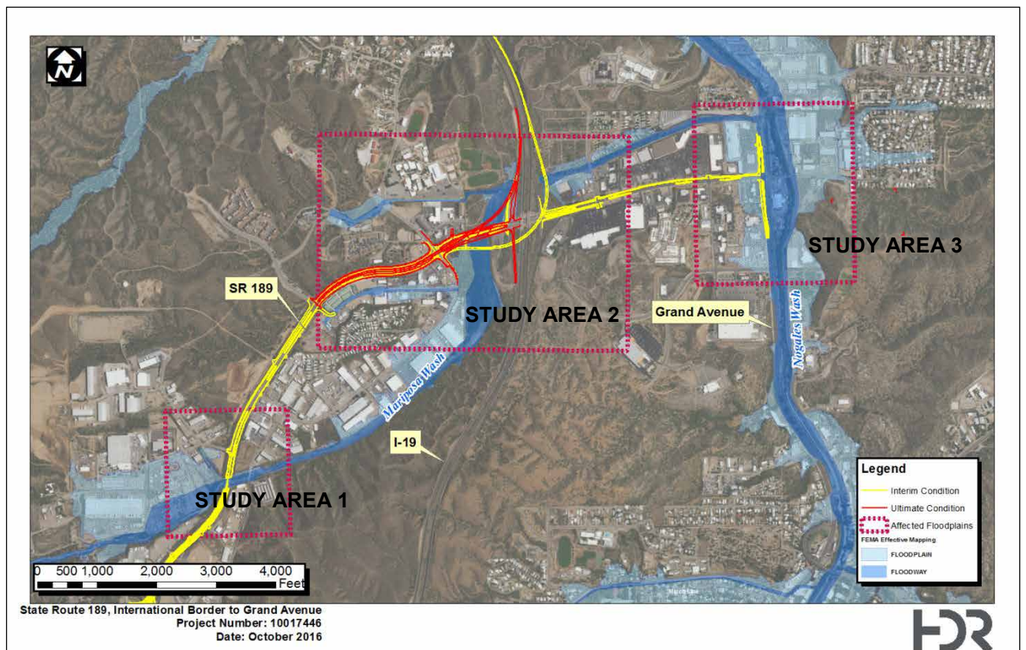
All projects within FEMA regulatory floodways must undergo an encroachment review to determine their effects on flood flows and possible impacts on regulatory floodplains/floodways.

A review of FEMA Flood Insurance Rate Maps (FIRMs) indicates that portions of the proposed alignment alternatives will affect the 100-year floodplain (see Figure 4-3). Impacts on floodplains typically occur when the topography of the project area is substantially modified by either placement or removal of material within the floodplain. The alignment for SR 189 is above the elevation of the effective floodplain elevation, but could potentially reduce the overall conveyance capacity of the existing floodplain. Impacts within the effective floodway will primarily result from the widening of bridges along Mariposa Canyon Wash and additional structural features introduced into the floodplains as part of the ramp configurations at the SR 189/I-19 TI. As shown in Figure 4-3, there are three areas in which the project limits potentially impact effective floodplains. The FEMA Effective model associated with the Mariposa Wash was acquired and each section has been reviewed further to assess potential project impacts and further understand existing hydraulic conditions within the floodplains. The model was supplemented with LiDAR data collected as part of this study. Additionally a two dimensional model was developed to further the understanding of the hydraulics developing within the project limits. FEMA effective discharge rates as identified in the effective Flood Insurance Study for the county were utilized for a preliminary assessment of the floodplain impacts due to the proposed bridge modifications and the placement of ramp piers within the regulatory floodwaters.

Area 1 – Mariposa Canyon Wash Bridge No. 1

As shown in Figure 4-3, Mariposa Canyon Wash is conveyed from the southwest to the northeast through the existing bridge. Floodwaters are directed through the structure with the extended soil cement abutment protection which wraps around the fill slopes and extends well below the channel bottom. Upstream the left overbank is inundated with floodplain waters associated with backwater effects due to the rapid contraction of flow at the bridge. Downstream from the structure the floodway and floodplain are nearly identical. There is little to no overbank discharge within the surrounding floodplains. Proposed Improvements to the existing roadway are minimal within the location. Existing abutments will not be extended and therefore it is anticipated that there will be change to the existing structure and a “no rise” in water surface elevation is assumed at this location. No further analysis was conducted at this location.

Figure 4-3. Effective floodplains within the project limits



Area 2 – Mariposa Canyon Wash Bridge No. 2 to Interstate 19

Area 2 extends from the Loma Mariposa Road access point to approximately 1,200 feet east of the Mariposa TI. As shown in Figure 4-3, Mariposa Canyon Wash traverses from south to north through Bridge No. 2, then turns 90 degrees to flow directly east beneath I-19 by way of three 14-foot-diameter CMPs approximately 550 feet north of the SR 189 alignment. During the widening of SR 189 in 1994 a 2-ft thick CSA scour floor and 9- to 18-ft thick CSA guidebanks were constructed to mitigate the scour vulnerable conditions identified at the structure. Additional protection at the toe of the CSA included large diameter dumped riprap and gabion mattress.

The existing CSA guidebanks direct the flow through the structure and protect the bridge abutments from the high velocities associated with contraction of the floodplain. It should be noted that post guidebank construction it appears that a long term lowering of the channel bed has continued to impact the region downstream from the crossing.

Field reconnaissance identified the channel incision as extending from the headwall of the 14-ft diameter pipes at the I-19 Ramp A crossing to Mariposa Bridge No. 2. The feature appears to be a long term condition that is migrating through the bridge spillway section.

Throughout Study Area 2 a large majority of flow is contained within the main channel. However, effective floodplain mapping indicates discharge break out over the left bank and depicts a wide expansive floodplain inundation which is partially developed with commercial properties. The expansive floodplains appear to be in part

due to the limited conveyance capacity of both Mariposa Bridge No. 2 and the existing 14-ft CMP's beneath I-19. Both features create large backwater pools.

Additional overbank discharge is indicated downstream of the large CMPs. It appears to be primarily due to the limited capacity of the wash section and development within the available overbanks, reducing the floodplain capacity.

Interim Condition

In the Interim Condition widening of SR 189 at Bridge No 2 will require an extension of the existing abutments downstream of their current location. As previously discussed, there is extensive scour mitigation features located throughout the structure. Due to the shift in location of the abutments, the existing soil cement lifts will be impacted and require widening to maintain structure stability. Additionally the existing scour floor will be extended to protect the existing and expansion abutment foundation from localized erosion due to the structure as well as the identified long term lowering of the channel bed.

Approximately six (6) piers from the Ramp EN construction will be located in the effective floodplains of Mariposa Wash. The piers are located upstream from Mariposa Bridge No. 2 and downstream from the 14-ft culvert outfall. Analysis indicates the water surface floodplain impacts associated with the construction is minimal (>0.2ft) and scour depths of 29-ft at the constructed piers. Additionally there is a separate foundational feature located on the eastern bank of Mariposa Canyon Wash. It lies on the edge of the western floodplain limits and does not appear to significantly impact floodwaters characteristics.

Roadway design indicates very minimal fill slope intrusion which can be further reduced by utilizing the 2:1 CSA slopes to protect the embankment. The total affected floodplain area would be 1.5 acres, with 100 percent of that area categorized as Zone AE.

Ultimate Condition

The widening of SR 189 at Bridge No 2 would require extension of the existing abutments both up- and down-stream of their current location. Due to the shift in location of the abutments, it was deemed as not structurally feasible to maintain the existing structure and rely on a widening of the deck in both directions. Therefor full bridge replacement will be required in the Ultimate condition. Replacement alternatives include complete bridge replacement and/or superbox structures, hydraulically similar to box culvert in which a concrete floor slab is built as a continuous grade control structure throughout the crossing.

As with the Interim Condition the CSA guidebanks are extended in order to stabilize the flow patterns through the structure and maintain floodwaters within the limits of ROW. Impacts to the floodplain waters would be more extensive due to the increase structure length. Several measure of mitigation could be incorporated during final design in order to mitigate against any increases in floodway/floodplain waters. Mitigation measures for consideration include:

- Earthwork – Ramp A is relocated further to the east. Providing the opportunity for a potential increase in downstream conveyance capacity by removal of the existing ramp fill material. Opening up the floodpool associated with the I-19 crossing and potentially reducing the tailwater influence at Mariposa Bridge No. 2.
- Structure – A widening of the crossing structure may increase capacity and reduce headwater impacts.
- Pilot Channel – As noted previously there appears to be a long term scour condition developing between the 14-ft culverts and the bridge. A dedicated pilot channel may increase capacity, offsetting the increase headwaters, while providing an added benefit of promoting a stable slope condition within the stream bed.
- Abutment Removal – The abutment constructed for Ramp EN during the Interim Condition is removed during the Ultimate Design construction. The removal will require excavation of material in order to remove and replace the structure with a pier. This may provide additional grading opportunities to meet the no rise criteria required to avoid the CLOMR/LOMR process.

Approximately four (4) piers from the Ramp SW construction will be located in the effective floodplains of Mariposa Wash. The piers are located downstream from Mariposa Bridge No. 2. Analysis indicates the water surface floodplain impacts associated with the construction is minimal (>0.2ft) and scour depths of 29-ft at the piers.

While Bridge No. 2 is the primary feature within the effective floodplain limits of this region, several other features could also affect regulatory floodplains because of proposed design features. Those additional features have been identified as the following:

- **Bell Road Improvements** – Current design include a new access to Bell Road from the Loma Mariposa Road and SR 189 intersection. These improvements include an extended roadway section that is in the effective mapping of the Mariposa Canyon Wash Tributary 2 (Reference FIRM Panel 04023C0627C).
- **Industrial Park Drive Improvements** – The current design includes improvements to the southern portion of the Industrial Park Drive and SR 189 intersection. Specifically, the southeastern corner includes access to the Ultimate Condition ramp, allowing east-to-north traffic movement for I-19 access. The access point includes an extended ramp section within the floodplain limits of Mariposa Canyon Wash.
- **Flyover Ramps** – The future flyover ramps will require multiple piers for stability. In all, thirteen of the 9-foot-wide piers are within the mapped floodwaters, including eight within the floodway limits. Additionally, a separate full height bridge abutment is on the western bank of Mariposa Canyon Wash. This feature along with fill slopes from the widened intersection will lie partially within the regulatory floodplain.
- **Single Barrel 10-foot-by-5-foot Box Culvert** – As previously mentioned, an existing 10-foot-by-5-foot box culvert is just east of the Mariposa TI. Based on current design, the box will require extension based on the expansion of SR 189. The proposed outfall of the box culvert lies within the effective floodplain of the Mariposa Canyon Wash.
- **I-19 Ramp A** – Because of the widening of SR 189, the southbound ramp (Ramp A)of I-19 will require a realignment and expansion. In the Ultimate condition the ramp alignment will be relocated to the east and further away from the floodplain limits. However during design the fill slopes should be reviewed to assess impacts, if any, to the regulatory floodwaters.

Area 3 – Congress Drive to Grand Avenue

As shown in Figure 4-3, Area 3 extends from the intersection of Congress Drive and SR 189 to the terminus of the project at SR 189 milepost 2.87, at the intersection of SR 189 and Grand Avenue/B-19. The effective FEMA mapping indicates wide floodway and floodplain limits in the region associated with the confluence of the Nogales and Mariposa Canyon Washes immediately north of the intersection.

There are currently no plans to raise or adjust the existing roadway profiles on either SR 189 or Grand Avenue. Therefore, the widening of the roadway may potentially increase the capacity of the roadway sections of Grand Avenue and SR 189 and also potentially will have minimal to no impacts on the overall floodway/floodplain drainage patterns in the region.

As indicated by Santa Cruz County Flood Control representatives, there is high scour potential within Mariposa Wash and Nogales Wash. Both local and general scour calculations will be required to assess the stability of the structures within the perinial environments. To determine foundation depths required for structural stability a coordinated effort between the hydraulics, geotechnical, and structural engineers will be required throughout the design.

Assessment of the “no rise” water surface elevations will progress into the 30% and final design plans. If future assessments reveal that the preferred alignment has a significant impact on the developing floodplains, and mitigation measures are not feasible, then a separate Conditional Letter of Map Revision will be developed to address floodplain impacts and revised extents of the floodplains. Continued assessment of the impacts to the FEMA Effective Floodplains will be required throughout the development of the final design plans. If future assessment reveals mitigation measures are not feasible or successful in meeting both Federal and Local Floodplain requirements, a separate Conditional Letter of Map Revision will be required to begin the process of map revision. See State Route 189, International Border to Grand Avenue Draft Bridge Hydraulics Report for floodplain analysis and results.

The integration of the SR 189 off-site system and the existing flood control features within the region would require extensive coordination. Regional parties and their associated interests would include:

- FEMA – floodplain development and management
- Santa Cruz County Flood Control District – floodplain development and management
- ADOT – operation and maintenance of proposed facilities

4.7 Earthwork

Excavation material will be generated at the roadway widening sections that are in cut. The new elevated profiles for grade-separated structures will require extensive fill material for the flyover ramps. The earthwork volumes are based on an assumed shrinkage factor of 12 percent and do not take into account the structure backfill requirements behind the bridge abutments and retaining walls. The earthwork was evaluated for both the Interim and Ultimate Conditions.

The earthwork associated with the crossroads and ramps at each location was added to the main line earthwork to obtain the total earthwork for the Interim and Ultimate Conditions. The earthwork volumes shown do not take into account the special backfill requirements that may be necessary behind the retaining walls. The earthwork summary is presented in Table 4-2.

Table 4-2. Earthwork requirements

Location	Excavation (cubic yards)	Embankment (cubic yards)	Borrow required (cubic yards)
Interim Condition	135,188	69,896	0
Ultimate Condition	102,549	183,000	80,451

4.8 Traffic Design

The following sections describe the proposed concepts for guide signs, pavement marking, lighting, FMS, and traffic signals. The traffic design concepts were developed based on guidelines from the following documents:

- Manual on Uniform Traffic Control Devices (FHWA 2009)
- Arizona Supplement to the Manual on Uniform Traffic Control Devices (ADOT 2009a)
- ADOT Traffic Signals and Lighting Standard Drawings (2015, with updates)
- ADOT Signing and Marking Standard Drawings (2015, with updates)
- ADOT Manual of Approved Signs (2015, with updates)
- ADOT Intelligent Transportation System Design Guides (2015, with updates)
- ADOT Traffic Guidelines and Processes (2015, with updates)
- ADOT Traffic Control Design Guidelines (2010 version)

During final design, coordination will continue with any current design and construction projects underway within this corridor.

Signs and Pavement Markings

Interim Condition

Changes to signs along SR 189 would include adding one new advance overhead guide sign on a cantilever structure for SR 189 eastbound and one ground-mounted guide sign for Frank Reed Road northbound to guide traffic to the new SR 189 eastbound-to-I-19 northbound flyover ramp (Ramp EN). In addition, the existing tubular sign structure-mounted guide signs along SR 189 eastbound and westbound near the I-19 TI will be removed as part of the SR 189 widening and will be replaced with a new sign structure. The existing border crossing information guide signs would be replaced with new signs and relocated to accommodate the roadway widening. New guide signs will be placed on all approaches of the proposed roundabout at SR 189 and Target Range Rd.

Various other ground-mounted guide and warning signs would be revised or relocated to accommodate the roadway widening and the introduction of the new Ramp EN.

Pavement marking will consist primarily of new striping for the proposed roadway widening and TI changes.

Some stripe obliteration and restriping would be needed along I-19 since the new ramp would merge with the I-19 northbound main line.

Ultimate Condition

Various other ground-mounted guide and warning signs would be revised or relocated to accommodate the roadway widening and the introduction of the new west-to-north ramp from SR 189 to I-19.

New guide signs will be installed along I-19 southbound to notify drivers of the new southbound-to-westbound flyover ramp (Ramp SW), with grade separation at Frank Reed Road.

A merge sign (W4-1R) will be added to I-19 northbound to warn drivers of the newly added Ramp EN traffic.

Pavement marking will consist primarily of new striping for the proposed roadway widening and TI changes.

Some stripe obliteration and restriping would be needed along I-19 southbound off ramp to accommodate the new ramp SW and also along Ramp C with the new alignment at the traffic interchange..

Lighting

Partial TI lighting currently exists at the Mariposa TI. The addition of Ramp EN from SR 189 to I-19 requires modification to the existing northbound on-ramp lighting and installation of additional light poles to light the existing northbound on-ramp and the new ramp to provide adequate lighting levels for the ramps.

In addition, 100-foot-tall mast poles shall be added at TI to provide adequate lighting levels to the new ramp structures.

In the ultimate condition, light poles shall be installed along the ramp structures starting west of Frank Reed Rd to provide adequate lighting levels on ramp structures, as they approach the TI high mast lighting.

There is currently no existing street lighting along the SR 189 corridor. The signalized intersections along SR 189 have intersection lighting. All the proposed new signals and existing signal modifications shall include intersection lighting as part of the signal design. The proposed roundabout at the SR 189 and Target Range Rd will include intersection lighting as part of the design.

Some of the existing light poles along Grand Ave that will be impacted will be relocated as part of the roadway widening at the Mariposa Rd and Grand Avenue intersection.

Freeway Management System

Currently, four ADOT traffic count stations are in the project segment where roadway improvements are proposed. This project proposes to replace the existing count stations as part of the roadway widening.

This project proposes installation of two DMS, along with CCTV cameras, one in each direction (eastbound and westbound) along SR 189. In accordance with the ADOT ITS Design Guide, the DMS will use the Arizona Department of Public Safety radio system to communicate between the Traffic Operations Center operator and the DMS in the field and will use cellular carriers for the CCTV images.

The future Intelligent Transportation System needs for the SR 189 corridor should be evaluated during final design to allow placement of appropriate FMS conduits, pull boxes, crossovers, and fiber along SR 189 and at the Mariposa TI to provide integration with the ADOT FMS system.

Signalization

Traffic signals proposed and modified as part of this project would be designed in accordance with the ADOT Traffic Signals and Lighting Standard Drawings (2015).

The existing signals at Frank Reed Road, Mariposa TI (on- and off-ramp intersections), Congress Drive, Mastick Way, and Grand Avenue will be modified to accommodate the roadway widening and intersection improvements in Interim condition.

New traffic signals will be installed at the Loma Mariposa Road and SR 189 intersection in the Ultimate condition. The existing signals at Frank Reed Road, Mariposa TI (on- and off-ramp intersections), will be modified to accommodate the roadway widening and intersection improvements in Interim condition.

SMART Infrastructure

Smart infrastructure technologies, collectively known as intelligent transportation systems (ITS), are being embedded in traffic lights, car parks, roads and bridges, making them increasingly able to communicate with each other and with the vehicles that use them. Together these innovations offer the prospect of a transport infrastructure system that suffers less congestion, is safer, and can be maintained predictively.

It is anticipated that the freight industry will be rapidly moving to smart vehicle technologies to improve transport efficiency. Consideration should be given to equipping traffic signals with infrastructure to vehicle (I2V) and vehicle to infrastructure (V2I) communications capability. This will include intersection mapping and Signal Phasing and Timing (SPAT) communication. All such improvement shall be coordinated with the proposed FMS improvements.

4.9 Construction Sequencing

This section discusses the potential construction sequencing plans for the Mariposa TI improvements, and the SR 189 widening to the east and southwest. A description of each construction phase is included in Table 4-3.

Construction will affect both the I-19 and SR 189 corridors. On I-19, work will be ongoing in the right shoulder for construction of the ramps. Short overnight closures of I-19 will be required to complete the bridge construction across I-19, including placing precast girders (or falsework); pouring concrete for the superstructure, deck, and barriers; and miscellaneous work. Detour plans for alternative routing of I-19 traffic will be required during these periods.

Impacts on traffic along SR 189 will be constant and will last for the duration of the project. However, it is essential that traffic be maintained through this area. A minimum of one lane in each direction is essential, but certain periods of the day may require that two lanes (either inbound, outbound, or both) be maintained.

Detailed construction sequencing plans will be developed during final design to implement these goals.

Table 4-3. Construction phasing

Construction phase	Work description
Phase 1a	Construct foundations, columns, and bents for Ramp EN and Ramp SW.
Phase 1b	Construct girders/decks or cast-in-place bridge decks. OR Construct superstructures for Ramp EN and Ramp SW. Construct tie-ins to the I-19 main line.
Phase 2a	Construct all outside widening along the northern side of SR 189.
Phase 2b	Construct all outside widening along the southern side of SR 189, including the tie-in of Ramp EN.
Phase 2c	Construct median improvements along SR 189, including the tie-in of Ramp SW to the median area.
Phase 3	Construct and complete all miscellaneous improvements.

4.10 Maintenance of Traffic

Traffic will be managed through detailed traffic control plans, procedures, and guidelines specified in Part VI of the *Manual of Uniform Traffic Control Devices*, 2009 Version, the *Arizona Supplement to the Manual of Uniform Traffic Control Devices,* and by the *ADOT Traffic Control Design Guidelines,* 2010 version. The final construction phasing and traffic control plans will be developed during final design.

Interstate 19 Structures

All the existing travel lanes on I-19 will remain open to traffic most of the time during construction. Temporary concrete barriers should be used for protection while constructing bridge piers, abutments, and sign structures adjacent to the travel lane. However, limited weekend and night closures of one or more travel lanes may be needed to facilitate construction of the bridge across I-19, including precast girder placement and deck pours.

Ramp Widening

Construction of the ramp merge and diverge areas will occur with the temporary closure of the I-19 outside shoulders. Temporary concrete barriers should be used for protection while construction occurs adjacent to the I-19 travel lanes.

State Route 189

During the reconstruction of SR 189 along the existing alignment, the roadway will remain open to traffic most of the time. Temporary concrete barriers should be used for protection, while access to existing businesses will be maintained at all times. Most of the traffic signals, or temporary signals, will still be operational. However, limited weekend and night closures of one or more travel lanes may be needed to facilitate construction of various features. The final construction phasing and traffic control plans will be prepared to cover various contingencies.

4.11 Utilities

The Recommended Build Alternative will affect existing utilities, resulting in the need to modify and/or relocate the utilities before or during construction. Utility relocations will result in no disruption, or brief disruption, of services. Utility relocations will be staged so as to minimize impacts to residences and businesses within the project area.

With construction of an elevated ramp over the Frank Reed Road intersection, SR 189, and I-19, the Recommended Build Alternative will have vertical conflicts with existing overhead power lines west of the Frank Reed Road intersection. Additional pole height will be required for the power lines to cross over the future entrance and exit ramps. Given the vertical profile of the future ramps, rerouting of the overhead power may be necessary just west of the Frank Reed Road intersection. New public utility easements may be required for the relocation of the power lines. The widening of SR 189 may require the relocation of the power poles along the northern and southern sides of SR 189 between Target Range and Frank Reed Roads. The poles will be adjacent to their current locations.

Other utilities that will be affected by this project include water and sewer lines along SR 189, AT&T telephone and fiber optic lines along SR 189, CenturyLink coaxial and fiber, El Paso Natural Gas pipelines, UniSource Energy Service electric and gas, City of Nogales sewer and water, and ADOT and Arizona Public Service underground power lines.

Utility relocation plans will be developed according to the Policy for Accommodating Utilities on Highway Rights-of-Way (ADOT 2009c) during final design. Utility companies will be provided with the preliminary design plans (Appendix A) to identify any utilities that need to be relocated and/or adjusted prior to construction.

4.12 Structures

Mariposa Canyon Bridge No. 1 Widening

Location

Mariposa Canyon Bridge No. 1 carries SR 189 northbound and southbound traffic cross over Mariposa Canyon Wash. It is located at milepost 1.58 just west of the Mariposa Ranch Road.

Proposed Conditions

No bridge widening is anticipated at Mariposa Canyon Bridge No. 1. Additional details will be provided in the Initial Bridge Selection Report.

Mariposa Canyon Bridge No. 2 Widening (Interim)

Location

Mariposa Canyon Bridge No. 2 carries SR 189 westbound and eastbound traffic across the Mariposa Canyon Wash. It is located at milepost 2.82, just west of the Mariposa TI.

Proposed Conditions (Interim)

The Interim widening of this bridge will occur on the north side of the existing structure to accommodate one additional westbound lane and median widening on SR 189. It is assumed the widened portion of the bridge will match the existing bridge length and follow the existing bridge abutment and pier line skew to minimize hydraulic impact. The total width of the widening will be approximately 30 feet – 2 5/8 inches at abutment 1 and 35 feet – 9 inches at abutment 2, measured perpendicular from the existing edge of deck. Two types of superstructure could be considered:

- A three-span, continuous, CIP concrete box superstructure to match the existing bridge superstructure. This superstructure type will require falsework within the Mariposa Canyon Wash 100-year floodway and floodplain during construction.
- A three-span structure consisting of precast prestressed concrete box beams set adjacent to each other to form the superstructure for the widened bridge structure.

It is anticipated that the widened structure will have pier columns supported on drilled shaft foundations. The abutments will match the existing abutment type, with a stub abutment at abutment 1 and a full-height wall abutment at abutment 2. The foundation of both abutments is anticipated to be steel H piles to match the existing foundation type. The pier foundations for the widened section will penetrate through the existing soil cement scour protection floor. The existing soil cement scour protection floor will be extended to the north beyond the edge of widen deck. New soil cement bank protection will be constructed at both abutments to match the existing bank protection configuration.

Proposed Conditions (Phased Ultimate)

The Phased Ultimate roadway widening at the bridge location will occur on north and south side of the existing structure to accommodate two additional lanes in the eastbound and westbound direction as well as median widening on SR 189. It is anticipated that SR 189 Ultimate construction will occurred after 2040. Per discussion with ADOT Bridge Group, a bridge replacement will be considered at this site in lieu of widening for the ultimate condition because the existing bridge was built in 1975 and is nearing its service life of 50 years.

Mariposa Canyon Bridge ultimate consists of two bridges, westbound and eastbound. The typical roadway section for the westbound bridge consists of three 12-foot thru-lanes and one left lane, for a clear roadway width that varies from 36’-0” to 45’-1 1/8”. The superstructure width will include a 1’-5” wide, 34” tall F-shape barrier at the right edge of deck on top of a raised median and a 6 foot wide raised sidewalk and 1’-0” wide, 54” tall combination pedestrian-traffic bridge railing at the left edge of deck. The total bridge width varies from 56’-2 3/8” to 52’-11”.

The typical roadway section for the eastbound bridge consists of a turn lane, a 14’-0” thru-lane, two 12’-0” thru-lanes with an inside shoulder of 2-feet for a clear roadway width that varies from 54’-7 1/8” to 54’-11 7/8”. The superstructure width will include a 1’-5” wide, 34” tall F-shape barrier at the left edge of deck and a 6 foot wide raised sidewalk and a 1’-0” wide, 54” tall combination pedestrian-traffic bridge railing at the right edge of deck. The total bridge width varies from 63’-2 1/8” to 63’-6 7/8”.

The high water elevation for mariposa Wash at the bridge is 3800.04 ft for the 50 year flood and 3800.47 feet for the 100 year flood.

Two superstructure alternatives for each bridge will be considered:

- A three-span precast prestressed spread box beam system
- A five-span cast-in-place rigid closed cell frame system

The spread box beam alternative is used for the DCR estimate and each structure consists of the following:

Eastbound Structure

The total length of bridge, back-to-back of abutments is 265’-5 3/8” with span lengths of 68’-8 3/8”, 117’-8 5/8”, and 68’-8 3/8”. The total width of the bridge varies from 66’-3 ½” to 64’-01/2”. The cross-section of the superstructure consists of 10 PCI Type BIV-48 box beams with varying spacing and a cast-in-place concrete deck slab. The bridge is supported by a cast-in-place concrete cap beam at the abutments and piers and supported on drilled shafts.

Westbound Structure

The total length of bridge, back-to-back of abutments is 246’-10 ¼”” with span lengths of 63’-11 1/2”, 109’-7 1/4”, and 63’- 8 7/8”. The total width of the bridge varies from 56’-2 3/8” to 52’-11”. The cross-section of the superstructure consists of 8 PCI Type BIV-48 box beams with varying spacing and a cast-in-place concrete deck slab. The bridge is supported by a cast-in-place concrete cap beam at the abutments and piers and supported on drilled shafts.

Ramp East-to-North (Interim)

Location

The proposed Ramp East-to-North (EN) is a flyover bridge that carries SR 189 eastbound traffic from the Frank Reed Road intersection onto northbound I-19. The structure crosses over the Mariposa Wash 100-year floodplain at two locations and various Mariposa TI features that include the I-19 southbound on-ramp, the I-19 main line, the SR 189 main line, and the I-19 northbound on-ramp.

Proposed Conditions

The Ramp EN typical roadway section consists of one 12-foot lane, a 6-foot inside shoulder, a 10-foot outside shoulder for a clear roadway width of 28 feet. The superstructure width will include a 1 foot and 7-inch-wide, 44-inch-tall F-shape barriers on each side for a total bridge width of 31 feet-2 inches.

The alignment of the ramp structure begins just east of Frank Reed Rd on a horizontal tangent spanning over the Mariposa Wash 100-yr and 500-yr floodplain and quickly transitions into a horizontal curve to cross I-19 southbound on-ramp, I-19 mainline, SR 189 mainline, and I-19 northbound on-ramp. Ramp EN ends just after crossing Mariposa Wash 100-yr flood plain near the north end of the project study limit. The entire bridge is located within a vertical crest curve. Piers will be located within the Mariposa Wash 100-yr floodway, between I-19 northbound and southbound mainline roadways, and adjacent to sidewalks behind SR 189.

The traditional solution for wash crossings such as the Mariposa Wash in Arizona has been precast, prestressed concrete I girders. This type of structure eliminates the risk of constructing shoring and falsework in the wash that could be washed away in an unexpected flood. Ramp EN requires a span of approximately 230 ft to cross over the SR 189 which is not feasible for a precast I girder. A CIP PT box girder superstructure could be used for this situation.

Depending on the traffic closuring restrictions for the TI area, three different superstructure systems will be considered:

- A system consisting of precast prestressed California Wide Flange (CAWF) I girders and CIP Post-Tension (PT) box girder
- A system consisting of precast prestressed CAWF I girders and CIP PT box girders with drop in span
- A system consisting of precast prestressed I girders and steel plate girder

For the cost estimate of this study, Ramp EN interim superstructure is assumed to be precast prestressed CAWF I girders over 100-yr flood plain and I-19 mainline locations with a 3 span CIP PT box girder frame crossing SR 189. This system results in a total bridge length of 2,411 feet with a total of 14 spans. The bridge length and number of spans could be revised with further refinement.

Abutments of the proposed flyover bridge will be full-height wall abutment supported on drilled shafts. Piers consisting of a single round column with a hammer head cap beam supported on drilled shaft will be used in the 100-year flood way area to minimize hydraulic impact to the wash. Single flared rectangular columns supported by a large diameter shaft will be used for the PT box frame.

Further evaluation of each feasible superstructure system based on structural requirements, aesthetics, economic feasibility, construction considerations, and long-term serviceability will be perform for the initial Bridge Selection Report.

Ramp EN –Ultimate (Phased Ultimate)

Location

The proposed Ramp EN ultimate alignment would carry SR 189 eastbound traffic over Frank Read Road(Industrial Park Drive)in order to provide vertical clearance over Industrial Park Drive The ultimate ramp extension would connect back to the interim alignment within the third span of the interim ramp bridge. This would require a partial reconstruction and extension of the Ramp EN structure. . The new abutment would be located in the median area of SR 189.

Proposed Conditions

The ramp extension would begin west of Frank Reed Road Intersection on a horizontal tangent and a crest vertical curve between the SR 189 EB and WB construction centerlines. It immediately crosses over SR 189 eastbound and Frank Reed Road(Industrial Park Drive) requiring a straddle bent pier over SR 189 eastbound and a single column pier placed in median of Frank Reed Road(Industrial Park Drive). The alignment then transitions to a horizontal curve and enters a sag vertical curve before tying into the interim roadway alignment on a horizontal tangent over the Mariposa Wash 100-year flood plain.

The typical roadway section of the Ramp EN Bridge extension will match that of the interim which consists of one 12-foot lane, a 6-foot inside shoulder, and a 10-foot outside shoulder for a clear roadway width of 28 feet. The superstructure width would include a 1 foot and 7-inch-wide, 44-inch-tall F-shape barrier on each side for a total bridge width of 31 feet-2 inches.

The horizontal and vertical alignment of the ultimate ramp extension matches the interim configuration at the Interim bridge Pier 3(ultimate Pier 9). To minimize throw away bridge, the ultimate bridge layout would retrofit and salvage structural elements from the interim configuration as much as possible. Interim abutment foundation, Pier no 1 through 3 can be incorporated into the ultimate structure. The I girders of Interim Span 1 thru 3 would be removed and salvaged. The bearing seats of Interim Pier 1(ultimate Pier 7) and pier cap and column of Pier 2(ultimate Pier 8) would be reconstructed to the required elevations needed for the ultimate profile and the existing girders reset on the new bearing seats. In addition, six new spans will be constructed to complete the ultimate ramp extension. This results in a proposed bridge extension length of approximately 1242 feet with 9 spans (3 retrofit and 6 new). The total Ramp EN bridge length, including the ultimate extension, is approximately 3247 feet with 21 spans. The bridge length and number of spans could be revised with further refinement.

Two types of superstructures could be considered for the six new spans of the ramp extension segment depending on the selected alternative for the Interim configuration:

- A system consisting of CIP Post-Tension (PT) box girders
- A system consisting of precast prestressed CAWF I girders

For the DCR estimate, the ultimate superstructure is assumed to be precast prestressed CAWF I girders for the entire Ultimate extension segment.

Similar to the Interim, substructure and foundation systems with some variation are proposed for the ultimate configuration to satisfy its specific constraints while maintaining consistency with the interim configuration.

Further evaluation of each feasible superstructure concept based on structural requirements, aesthetics, economic feasibility, construction considerations, and long-term serviceability will be perform for the Initial Bridge Selection Report.

Ramp South-to-West (Ultimate)

Location

The proposed Ramp South-to-West (SW) is a flyover that carries I-19 southbound traffic onto SR 189. The structure diverts from I-19 southbound off-ramp, cross Mariposa Wash 100-year floodplain, SR 189 eastbound, and Frank Reed Road. Ending in the median of SR 189 west of The Frank Reed Road Intersection.

Proposed Conditions

Ramp SW typical roadway section consists of one 12-foot lane, a 6-foot inside shoulder, and a 10-foot outside shoulder for a clear roadway width of 28 feet. The superstructure width would include a 1 foot and 7-inch-wide, 44-inch-tall F-shape barrier on each side for a total bridge width of 31feet-2 inches.

The alignment of the SW ramp structure begins in the median of SR 189 intersection, west of Frank Reed Road with a horizontal tangent and entering a vertical crest curve. It immediately crosses over Frank Reed Road with piers located near SR 189 median nose on each side of Frank Reed Road and stays within the SR 189 median for several spans. The ramp stays on the horizontal tangent while spanning over SR 189 westbound with a straddle bent. It then transition to a horizontal curve before crossing the Mariposa 100-yr flood plain. The alignment then merges with the I-19 southbound off-ramp. The bridge ends before the converge point of the off ramp

Depending on the traffic closure restrictions at The Frank Reed Road Intersection and SR 189, two different superstructure systems could be considered:

- A system consisting of precast prestressed CAWF I girders and a single span steel plate girder at SR 189 WB
- A system consisting of precast prestressed CAWF I girders with a straddle pier at SR 189 WB.

Due to a majority of the Ramp SW bridge being located within the Mariposa Wash, a superstructure system consisting of only precast prestressed CAWF I girders are assumed for the superstructure cost estimate. This bridge alternative consists of 13 spans and a total length of 1878 feet. The bridge length and number of spans could be revised with further refinement. It is assumed a roadway closure will not be allowed at the intersection of Frank Reed Rd and SR 189 as it is the major access to the local community and industrial park. This would require a 165-ft span structure to cross over the intersection. It is assumed a high strength concrete CAWF I girder would be used.

Abutments of the proposed flyover bridge would be full-height wall abutments supported on drilled shafts. To be consistent with the substructure system of Ramp EN, the piers will consist of a round column with hammer head cap beam supported on a drilled shaft. A straddle bent will be needed over SR 189 WB to satisfy structure and vertical clearance requirement.

Further evaluation of each feasible superstructure concept based on structural requirements, aesthetics, economic feasibility, construction considerations, and long-term serviceability will be perform for the initial Bridge Selection Report.

4.13 Pavement and Geotechnical

During final design, a geotechnical investigation will be performed to characterize the roadway subgrade to support pavement section design. A pavement design summary and materials design report will be prepared to document the recommended pavement design, including projected traffic volumes and pavement design parameters and criteria. The final design of pavements will be performed in accordance with current ADOT Pavement Design Section guidance and recommendations.

4.14 Landscaping and Aesthetics

Landscaping is a standard feature of ADOT's regional freeways. In consultation with the local agencies and neighboring communities, ADOT will develop a theme for aesthetic treatments applied to bridges and other freeway structures to help them blend into the surroundings. ADOT has expanded its palette of acceptable wall treatments to include thematic emblems or symbols and, in some cases, more than one color. ADOT Roadside Development staff will design the aesthetic treatments based on community input.

4.15 Manual for Assessing Safety Hardware (MASH) Compliant

All permanent concrete barrier and guardrail components included on ADOT construction projects advertised after December 31, 2017 must be MASH compliant. This project will most likely be bid in year 2018. Revised standard drawings, specifications and barrier summary sheets were not available at the time of this report. The final design of the preferred alternative for SR 189 shall incorporate the MASH compliant items.

4.16 Design Exceptions

No AASHTO nonconforming design elements are anticipated within the project limits for construction of the recommended alternative; therefore, no design exceptions will be required.

5.0 Estimate of Probable Costs

The estimate of probable project costs for constructing the Ultimate Condition is $133.8 million (2016 dollars). This estimate includes $5.3 million for design and $31.4 million for right-of-way.

Two additional estimates for the Recommended Build Alternative have been developed for the phased implementation of the Interim and Ultimate Conditions. The estimate of probable project costs for constructing the Interim Condition is $53.7 million (2016 dollars). This estimate includes $2.6 million for design and $4.5 million for right-of-way. The estimated of probable cost for constructing the phased Ultimate Condition is $93.0 million (2016 dollars). This estimate includes $3.7 million for design and $26.9 million for right-of-way. The Order of Magnitude project cost estimates are presented in Appendix D. Tables 5-1, 5-2, and 5-3 summarize the total cost by major element.

The total phased cost is $146.7 million.

Unit cost information from recent ADOT construction projects was used to develop the estimate of probable cost.

The following is a general summary of the cost estimates being provided:

- Ultimate Condition – Includes corridor improvements from POE to Grand Avenue, grade-separated flyover for Ramp EN, grade-separated flyover for Ramp SW, and southbound I-19 exit ramp improvements.
- Interim Condition – Includes corridor improvements from POE to Grand Avenue, at-grade flyover for Ramp EN, and southbound I-19 exit ramp improvements. Phase Ultimate Condition – Includes reconstruction of Ramp EN previously constructed in the Interim Condition to provide a grade-separated flyover at Frank Reed Road, grade-separated flyover for Ramp SW, and southbound I-19 exit ramp improvements.
- Phase Ultimate Condition – Includes reconstruction of Ramp EN previously constructed in the Interim Condition to provide a grade-separated flyover at Frank Reed Road, grade-separated flyover for Ramp SW, and southbound I-19 exit ramp improvements.

Table 5-1. Estimate of probable cost for Ultimate Condition

Item description	Cost ($)
Earthwork	$7,339,207
Base and surface treatment (paving)	$3,425,114
Drainage	$2,115,654
Structures	$25,739,480
Traffic (signing, striping, signals, lighting)	$6,138,352
Roadside development (landscape/aesthetics)	$3,170,000
Incidentals	$14,958,402
Subtotal A	**$62,886,000**
Unidentified items (20% of Subtotal A)	$12,577,000
Subtotal B (Subtotal A + unidentified items)	**$75,463,000**
Construction engineering (10% of Subtotal B)	$7,546,000
Construction contingencies (5% of Subtotal B)	$3,773,000
Total estimated construction cost	**$86,782,000**
Design (7% of Subtotal B)	$5,282,000
Right-of-way	$31,400,000
Subtotal other project costs	**$36,682,000**
Indirect cost allocation (*8.36%*) of total construction and other project cost)	**$10,322,000**
Total estimated project cost	**$133,786,000**

Table 5-2. Estimate of probable cost for Interim Condition

Item description	*Cost ($)*
Construction Total	$ 23,041,107.78
Project Wide Cost	$ 3,525,289.49
Subtotal A	**$ 26,566,397.27**
Unidentified items (20% of Subtotal A)	$ 5,313,279.45
Subtotal B (Subtotal A + unidentified items)	**$ 31,879,676.72**
Other Project Cost	
Construction engineering (10% of Subtotal B)	$ 3,187,967.67
Construction contingencies (5% of Subtotal B)	$ 1,593,983.84
Utility Relocations	$ 4,000,000.00
Landscaping	$ 1,000,000.00
Design (8% of Subtotal B)	$ 2,550,374.14
Right-of-way	$ 4,500,000.00
Subtotal other project costs	**$ 16,832,325.65**
Total Project Cost	**$ 48,712,002.36**
Indirect cost allocation (10.14% of total construction and other project cost)	**$ 4,939,397.04**
Total estimated project cost	**$ 53,651,399.40**

Table 5-3. Estimate of probable cost for Phased Ultimate Condition

Item description	Cost ($)
Construction Total	$ 33,670,072.36
Project Wide Cost	$ 4,478,119.62
Subtotal A	**$ 38,148,191.98**
Unidentified items (20% of Subtotal A)	$ 7,629,638.40
Subtotal B (Subtotal A + unidentified items)	**$ 45,777,830.38**
Other Project Cost	
Construction engineering (10% of Subtotal B)	$ 4,577,783.04
Construction contingencies (5% of Subtotal B)	$ 2,288,891.52
Utility Relocations	$ 1,000,000.00
Landscaping	$ 250,000.00
Design (8% of Subtotal B)	$ 3,662,226.43
Right-of-way	$ 26,900,000.00
Subtotal other project costs	**$ 38,678,900.99**
Total Project Cost	**$ 84,456,731.37**
Indirect cost allocation (10.14% of total construction and other project cost)	**$ 8,563,912.56**
Total estimated project cost	**$ 93,020,643.93**

Total Phased Project Cost: $146,672,043.33

6.0 Social, Economic, and Environmental Considerations

The EA, along with supporting technical reports, has been prepared for this project pending approval by ADOT and FHWA. Contained in the EA are mitigation measures to be incorporated into the project final design and construction documents. The mitigation measures listed in the EA are not subject to modification without prior written approval of FHWA.

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Appendix A. Recommended Build Alternative Plans

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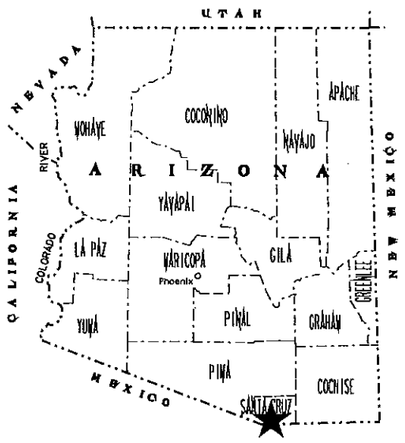
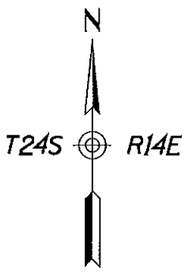
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION

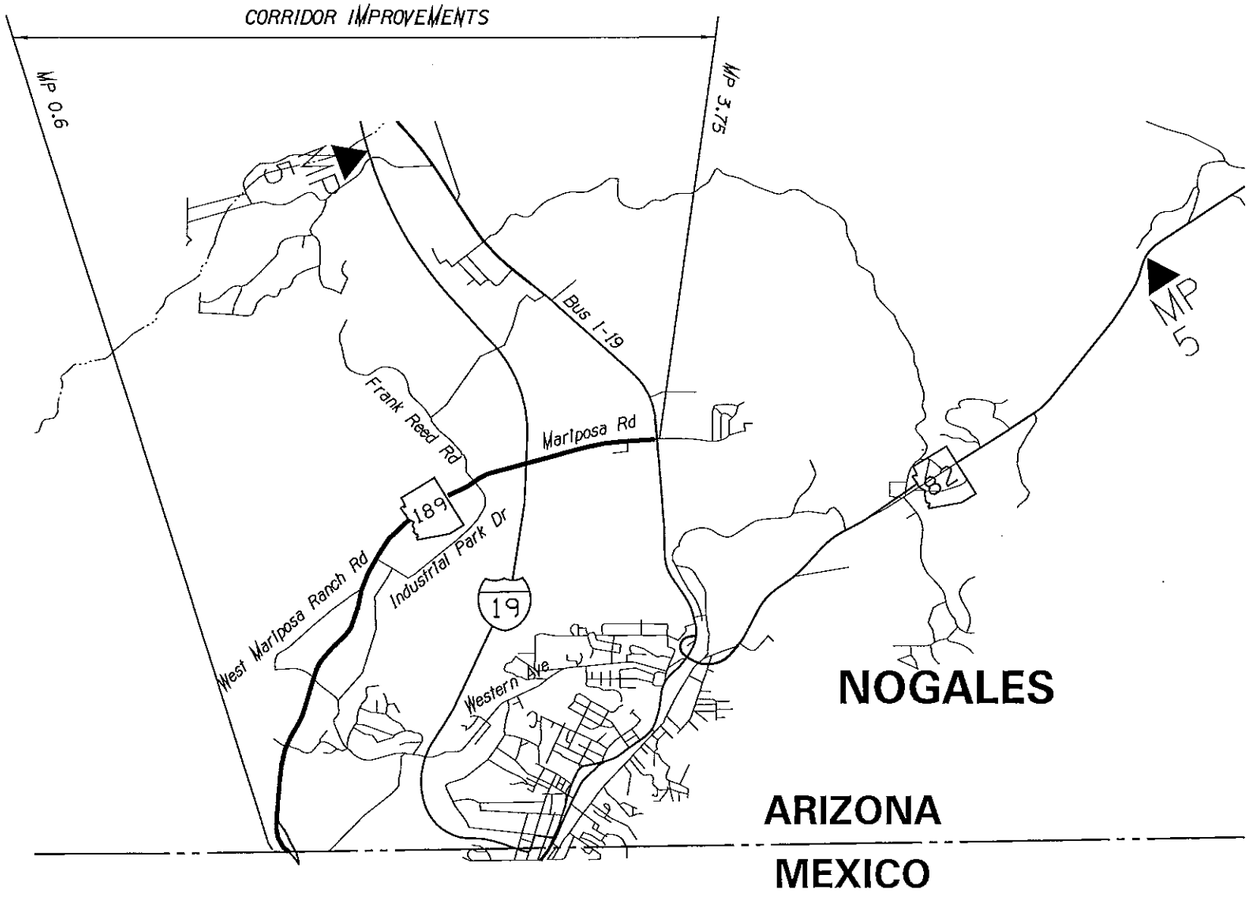
ADOT

PROJECT PLANS

STATE HIGHWAY
NOGALES PRIMARY CONNECTION
SR 189







INTERNATIONAL BORDER TO GRAND AVENUE

PROJECT NO. 189 SC 000 H8045 01L
FEDERAL AID NO. STP-189-A(201)T

Constructed by:

Construction Company

Completion Date

Red-Lines by:

Construction Administrator Name & Company

Completion Date

Record Drawings by:

Record Drawings Designer Name & Company

Completion Date

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
DALLAS HAMMIT, P.E., STATE ENGINEER

REC. DWGS. DATA	REC. DWG. DATE	OF

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ADOT STANDARD DRAWINGS
C STANDARDS

ISSUE OR REVISION DATE	STANDARD NO.	SUBJECT
		CONSTRUCTION
5/12	C-01.10 SH 1	SYMBOL LEGEND
5/12	C-01.10 SH 2	SYMBOL LEGEND
5/12	C-01.10 SH 3	SYMBOL LEGEND
5/12	C-01.10 SH 4	SYMBOL LEGEND
12/17	C-01.30 SH 1	GENERAL ABBREVIATIONS
5/12	C-01.30 SH 2	GENERAL ABBREVIATIONS
5/12	C-01.30 SH 3	GENERAL ABBREVIATIONS
5/12	C-02.10	SLOPES, RURAL DIVIDED HIGHWAYS
5/12	C-02.20	SLOPES, RURAL UNDIVIDED AND FRINGE-URBAN HIGHWAYS
5/12	C-02.30	SLOPES, MISCELLANEOUS ROADWAYS
5/12	C-03.10 SH 1	DITCHES, CHANNELS, DIKES AND BERMS, DITCHES AND CHANNELS
5/12	C-03.10 SH 2	DITCHES, CHANNELS, DIKES AND BERMS, DIKES
5/12	C-03.10 SH 3	DITCHES, CHANNELS, DIKES AND BERMS, DITCH DIKE
5/12	C-03.10 SH 4	DITCHES, CHANNELS, DIKES AND BERMS, PIPE BERMS
5/12	C-03.10 SH 5	DITCHES, CHANNELS, DIKES AND BERMS, HEADWALL BERMS
12/17	C-04.10 SH 1	SPILLWAY, EMBANKMENT SINGLE INLET
12/17	C-04.10 SH 2	SPILLWAY, EMBANKMENT DOUBLE INLET
12/17	C-04.20 SH 1	DOWNDRAIN, EMBANKMENT SINGLE INLET
12/17	C-04.20 SH 2	DOWNDRAIN, EMBANKMENT DOUBLE INLET
12/17	C-04.30	SPILLWAY LENGTH TABLE
12/17	C-04.40	DOWNDRAIN LENGTH TABLE
5/12	C-04.50	DOWNDRAIN ENERGY DISSIPATOR
5/12	C-05.10	CURB & GUTTER, CURB, GUTTER
5/12	C-05.12 SH 1	CURB & GUTTER TRANSITIONS
5/12	C-05.12 SH 2	CURB & GUTTER TRANSITIONS
5/12	C-05.12 SH 3	CURB AND GUTTER TRANSITIONS
5/12	C-05.20 SH 1	CONCRETE DRIVEWAYS & SIDEWALKS, DRIVEWAYS
5/12	C-05.20 SH 2	CONCRETE DRIVEWAYS & SIDEWALKS, SIDEWALKS
5/12	C-05.30 SH 1	SIDEWALK RAMP, TYPE A
5/12	C-05.30 SH 2	SIDEWALK RAMP, TYPE B
5/12	C-05.30 SH 3	SIDEWALK RAMP, TYPE C
5/12	C-05.30 SH 4	SIDEWALK RAMP, TYPE D
5/12	C-05.30 SH 5	SIDEWALK RAMP, TYPE E
5/12	C-05.30 SH 6	SIDEWALK RAMP, TYPE F
5/12	C-05.30 SH 7	SIDEWALK RAMP, DETECTABLE WARNING STRIP
5/12	C-05.40	MEDIAN PAVING AND NOSE TAPER
5/12	C-05.50	CONCRETE BUS BAY
5/12	C-06.10 SH 1	DRIVEWAY & TURNOUT LAYOUTS
5/12	C-06.10 SH 2	DRIVEWAY & TURNOUT LAYOUTS
5/12	C-07.01 SH 1	PCCP JOINTS
5/12	C-07.01 SH 2	PCCP JOINTS
5/12	C-07.02	LOAD TRANSFER DOWEL ASSEMBLY
5/12	C-07.03 SH 1	PCCP JOINT LOCATIONS, MAINLINE SKEWED JOINTS
5/12	C-07.03 SH 2	PCCP JOINT LOCATIONS, MAINLINE SKEWED JOINTS
5/12	C-07.03 SH 3	PCCP JOINT LOCATIONS, MAINLINE SKEWED JOINTS
5/12	C-07.03 SH 4	PCCP JOINT LOCATIONS, MAINLINE SKEWED JOINTS
5/12	C-07.03 SH 5	PCCP JOINT LOCATIONS, MAINLINE NON-SKEWED JOINTS
5/12	C-07.03 SH 6	PCCP JOINT LOCATIONS, MAINLINE NON-SKEWED JOINTS
5/12	C-07.03 SH 7	PCCP JOINT LOCATIONS, MAINLINE NON-SKEWED JOINTS
5/12	C-07.03 SH 8	PCCP JOINT LOCATIONS, MAINLINE NON-SKEWED JOINTS
5/12	C-07.04 SH 1	PCCP JOINT LOCATIONS, PARALLEL-TYPE ENTRANCE RAMP WITH AUXILIARY LANE
5/12	C-07.04 SH 2	PCCP JOINT LOCATIONS, PARALLEL-TYPE EXIT RAMP WITH AUXILIARY LANE
5/12	C-07.04 SH 3	PCCP JOINT LOCATIONS, TAPER-TYPE ENTRANCE RAMP
5/12	C-07.04 SH 4	PCCP JOINT LOCATIONS, TAPER-TYPE EXIT RAMP
5/12	C-07.04 SH 5	PCCP JOINT LOCATIONS, CROSSROAD AND RAMP TERMINI
5/12	C-07.06	TRENCH BACKFILL AND PAVEMENT REPLACEMENT
5/12	C-08.20	PAVED GORE AREA
12/17	C-10.00	GUARDRAIL MEASUREMENT LIMITS
12/17	C-10.01	GUARDRAIL INSTALLATION
12/17	C-10.03	W-BEAM GUARDRAIL, MGS BLOCKED-OUT TIMBER POST
12/17	C-10.04	W-BEAM GUARDRAIL, MGS BLOCKED-OUT STEEL POST
12/17	C-10.05 SH 1	W-BEAM GUARDRAIL (MODIFIED) WITH FREEWAY CURB AND GUTTER
12/17	C-10.05 SH 2	W-BEAM GUARDRAIL (MODIFIED) WITH FREEWAY CURB AND GUTTER
12/17	C-10.06	W-BEAM GUARDRAIL LONG-SPAN
12/17	C-10.07 SH 1	W-BEAM GUARDRAIL, BOX CULVERT GUARDRAIL POST
12/17	C-10.07 SH 2	W-BEAM GUARDRAIL, BOX CULVERT GUARDRAIL POST
12/17	C-10.08 SH 1	W-BEAM GUARDRAIL, END ANCHOR
12/17	C-10.08 SH 2	W-BEAM GUARDRAIL, END ANCHOR
12/17	C-10.09	GUARDRAIL POST ROCK INSTALLATION
12/17	C-10.20 SH 1	GUARDRAIL END TERMINAL PAD LAYOUT FOR SOFTSTOP
12/17	C-10.20 SH 2	GUARDRAIL END TERMINAL PAD LAYOUT FOR SOFTSTOP
12/17	C-10.21 SH 1	GUARDRAIL END TERMINAL PAD LAYOUT FOR MSKT
12/17	C-10.21 SH 2	GUARDRAIL END TERMINAL PAD LAYOUT FOR MSKT
2/18	C-10.22 SH 1	GUARDRAIL END TERMINAL PAD LAYOUT FOR MAX-TENSION
2/18	C-10.22 SH 2	GUARDRAIL END TERMINAL PAD LAYOUT FOR MAX-TENSION
12/17	C-10.30 SH 1	GUARDRAIL TRANSITION TO CONCRETE BARRIER, TIMBER POST
12/17	C-10.30 SH 2	GUARDRAIL TRANSITION TO CONCRETE BARRIER, TIMBER POST
12/17	C-10.31 SH 1	GUARDRAIL TRANSITION TO CONCRETE BARRIER, STEEL POST
12/17	C-10.31 SH 2	GUARDRAIL TRANSITION TO CONCRETE BARRIER, STEEL POST
12/17	C-10.38 SH 1	GUARDRAIL TAPER G4 TO MGS W-BEAM WITH STAGGERED POST
12/17	C-10.38 SH 2	GUARDRAIL TAPER G4 TO MGS W-BEAM WITH OFFSET RAIL
12/17	C-10.40	CONCRETE MEDIAN BARRIER, 32" TYPE 'F', CAST-IN-PLACE
12/17	C-10.41	CONCRETE MEDIAN BARRIER, 42" TYPE 'F', CAST-IN-PLACE
12/17	C-10.44 SH 1	CONCRETE MEDIAN BARRIER, 42" TYPE 'F' WITH VARIABLE HEIGHT SIDES, H=0" TO 26"
12/17	C-10.44 SH 2	CONCRETE MEDIAN BARRIER, 42" TYPE 'F' WITH VARIABLE HEIGHT SIDES, H=0" TO 26"
12/17	C-10.45 SH 1	CONCRETE MEDIAN BARRIER, 42" TYPE 'F' WITH VARIABLE HEIGHT SIDES, H=26" TO 60"
12/17	C-10.45 SH 2	CONCRETE MEDIAN BARRIER, 42" TYPE 'F' WITH VARIABLE HEIGHT SIDES, H=26" TO 60"
12/17	C-10.50 SH 1	CONCRETE HALF BARRIER, 32" TYPE 'F', CAST-IN-PLACE
12/17	C-10.50 SH 2	CONCRETE HALF BARRIER, 32" TYPE 'F', PRECAST
12/17	C-10.51	CONCRETE HALF BARRIER, 32" TYPE 'F' WITH SIDEWALK
12/17	C-10.52	CONCRETE HALF BARRIER, 32" TYPE 'F' WITH GUTTER
12/17	C-10.53	CONCRETE HALF BARRIER, 42" TYPE 'F' WITH GUTTER

ISSUE OR REVISION DATE	STANDARD NO.	SUBJECT
		CONSTRUCTION
12/17	C-10.54 SH 1	CONCRETE HALF BARRIER, 32" TYPE 'F' AT PIERS, CAST-IN-PLACE
12/17	C-10.54 SH 2	CONCRETE HALF BARRIER, 32" TYPE 'F' AT PIERS, PRECAST
12/17	C-10.54 SH 3	CONCRETE HALF BARRIER, 32" TYPE 'F' AT PIERS, LAYOUT
12/17	C-10.55 SH 1	CONCRETE HALF BARRIER, 42" TYPE 'F' AT PIERS, CAST-IN-PLACE
12/17	C-10.55 SH 2	CONCRETE HALF BARRIER, 42" TYPE 'F' AT PIERS, PRECAST
12/17	C-10.55 SH 3	CONCRETE HALF BARRIER, 42" TYPE 'F' AT PIERS, LAYOUT
12/17	C-10.70 SH 1	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 32" TYPE 'F' WITH CAISSONS
12/17	C-10.70 SH 2	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 32" TYPE 'F' WITH CAISSONS
12/17	C-10.70 SH 3	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 32" TYPE 'F' WITH CAISSONS
12/17	C-10.71 SH 1	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 32" TYPE 'F' WITH CURB & GUTTER
12/17	C-10.71 SH 2	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 32" TYPE 'F' WITH CURB & GUTTER
12/17	C-10.72 SH 1	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 42" TO 32" TYPE 'F' WITH CAISSONS
12/17	C-10.72 SH 2	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 42" TO 32" TYPE 'F' WITH CAISSONS
12/17	C-10.72 SH 3	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 42" TO 32" TYPE 'F' WITH CAISSONS
12/17	C-10.73 SH 1	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 42" TO 32" TYPE 'F' WITH GUTTER
12/17	C-10.73 SH 2	CONCRETE HALF-BARRIER TRANSITION TO VERTICAL, 42" TO 32" TYPE 'F' WITH GUTTER
12/17	C-10.74	CONCRETE HALF-BARRIER TRANSITION, 42" TO 32" TYPE 'F'
12/17	C-10.75 SH 1	CONCRETE HALF-BARRIER TRANSITION, TYPE 'F' TANGENT DEPARTURE TYPE 1
12/17	C-10.75 SH 2	CONCRETE HALF-BARRIER TRANSITION, TYPE 'F' TANGENT DEPARTURE TYPE 2
12/17	C-10.76	CONCRETE HALF-BARRIER TRANSITION, TYPE 'F' AT RADIUS, 32" TO 0"
12/17	C-10.77	CONCRETE BARRIER TRANSITION TO GUARDRAIL END TERMINAL LAYOUT WITH CURB
12/17	C-10.78	CONCRETE HALF-BARRIER TRANSITION, 32" TYPE 'F' LOW SPEED APPROACH
12/17	C-10.79	CONCRETE HALF-BARRIER TRANSITION, 42" TYPE 'F' TANGENT DEPARTURE
5/12	C-11.10 SH 1	ROADWAY CATTLE GUARD
5/12	C-11.10 SH 2	ROADWAY CATTLE GUARD
5/12	C-11.10 SH 3	ROADWAY CATTLE GUARD
5/12	C-11.10 SH 4	ROADWAY CATTLE GUARD
5/12	C-11.20	CATTLE GUARD, DRAINAGE
5/12	C-12.10 SH 1	FENCE, WOVEN WIRE
5/12	C-12.10 SH 2	FENCE, BARBED WIRE
5/12	C-12.10 SH 3	FENCE, TYPE 1 AND 2 GATES, FLOOD GATE
5/12	C-12.10 SH 4	FENCE, FLOOD GATE INSTALLATION
5/12	C-12.10 SH 5	FENCE, MISCELLANEOUS DETAILS
5/12	C-12.20 SH 1	FENCE, CHAIN LINK, TYPE 1
5/12	C-12.20 SH 2	FENCE, CHAIN LINK, TYPE 2
5/12	C-12.20 SH 3	FENCE, CHAIN LINK, GATES
5/12	C-12.30 SH 1	FENCE, CHAIN LINK CABLE BARRIER
5/12	C-12.30 SH 2	FENCE, CHAIN LINK CABLE BARRIER
5/12	C-12.30 SH 3	FENCE, CHAIN LINK CABLE BARRIER
5/12	C-13.10 SH 1	PIPE CULVERT INSTALLATION
5/12	C-13.10 SH 2	PIPE CULVERT INSTALLATION
5/12	C-13.15	TYPICAL PIPE INSTALLATION
5/12	C-13.20	PIPE, REINFORCED CONCRETE END SECTION
5/12	C-13.25	PIPE, CORRUGATED METAL END SECTION
5/12	C-13.30	PIPE AND PIPE ARCH, CORRUGATED METAL, CONCRETE INVERT PAVING
5/12	C-13.55	PIPE, CATTLE-VEHICLE PASS, MITERED END TREATMENT
5/12	C-13.60	SLOTTED DRAIN DETAILS
5/12	C-13.65	SLOTTED DRAIN INSTALLATION DETAILS
5/12	C-13.70	STORM DRAIN CONNECTION DETAILS
5/12	C-13.75	STORM DRAIN OUTLET BARRIER GATE
5/12	C-13.76	STORM DRAIN OUTLET AND STORM DRAIN PLUG
5/12	C-13.80	PIPE COLLAR DETAILS
5/12	C-15.10	CATCH BASIN, TYPE 1
5/12	C-15.20 SH 1	CATCH BASIN, TYPE 3
5/12	C-15.20 SH 2	CATCH BASIN, TYPE 3
5/12	C-15.20 SH 3	CATCH BASIN, ACCESS FRAME AND COVER DETAILS
5/12	C-15.30	CATCH BASIN, TYPE 4
5/12	C-15.40 SH 1	CATCH BASIN, TYPE 5
5/12	C-15.40 SH 2	CATCH BASIN, TYPE 5
5/12	C-15.50	CATCH BASIN, FRAME AND GRATE
5/12	C-15.70 SH 1	CATCH BASIN, MISCELLANEOUS DETAILS
5/12	C-15.70 SH 2	CATCH BASIN, MISCELLANEOUS DETAILS
5/12	C-15.75	CATCH BASIN, DROP INLET
5/12	C-15.80	CATCH BASIN, FLUSH
5/12	C-15.81	CATCH BASIN, SIDE SLOPE
5/12	C-15.90	CATCH BASIN, MEDIAN DIKE, PRECAST
5/12	C-15.91 SH 1	FREEWAY CATCH BASIN DETAILS
5/12	C-15.91 SH 2	FREEWAY CATCH BASIN DETAILS
5/12	C-15.92 SH 1	CATCH BASIN WITH TYPE 'F' CONCRETE HALF BARRIER
5/12	C-15.92 SH 2	CATCH BASIN WITH TYPE 'F' CONCRETE HALF BARRIER
5/12	C-16.40	IRRIGATION SLEEVES
5/12	C-17.10	RAIL BANK PROTECTION FOR DRAINAGEWAYS, TYPES 1, 2 & 3
5/12	C-17.15	RAIL BANK PROTECTION AT ABUTMENTS, TYPES 4, 5 & 6
5/12	C-17.20	RAIL BANK PROTECTION FOR DRAINAGEWAYS, TYPES 7, 8 & 9
5/12	C-18.10 SH 1	MANHOLE, RISER DETAILS
5/12	C-18.10 SH 2	MANHOLE, BASE DETAILS, NORMAL INSTALLATION
5/12	C-18.10 SH 3	MANHOLE, FRAME AND COVER DETAILS
5/12	C-19.10 SH 1	FORD, CONCRETE WALLS
5/12	C-19.10 SH 2	FORD, TYPES 1 AND 2
5/12	C-21.10	SURVEY MONUMENT FRAME AND COVER
5/12	C-21.20	SURVEY MARKER

REV.: 02/18

ADOT STANDARD DRAWINGS REVISION DATES and STANDARD NO.'s REVIEW		
	NAME	DATE
CONSTRUCTION Standards		
PROJECT NO. 189 SC 000 H8045 01L	1A OF 163	
RECORD DRAWING DATA	FEDERAL AID NO. 189-A(201)T	REC. DWG. DATE: ____ OF ____

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ADOT STANDARD DRAWINGS

TRAFFIC SIGNING & MARKING STANDARDS
(SHEET 1 OF 2)
EFFECTIVE MAY 2015

REVISION	STANDARD	SUBJECT: SIGNING & MARKING DETAILS
6/14	M-1	CURB MARKINGS FOR RAISED MEDIAN AND ISLANDS
6/14	M-2 SHT 1	INTERSECTION STRIPING
5/15	M-2 SHT 2	INTERSECTION STRIPING (TWO-LANE RURAL)
6/14	M-2 SHT 3	CENTERLINE & REVERSE CURVE DETAILS
6/14	M-3	STRIPING AND DELINEATION FOR FREEWAY TERMINALS
6/14	M-4	PASSING LANE STRIPING DETAILS
6/14	M-5	RAILROAD PAVEMENT MARKINGS
6/14	M-6	WORD MARKINGS
6/14	M-7	PAVEMENT LETTERS
6/14	M-8	PAVEMENT LETTERS
6/14		
	M-9	PAVEMENT NUMBERS
6/14	M-10 SHT 1	PAVEMENT MARKING SYMBOLS
6/14	M-10 SHT 2	PAVEMENT MARKING SYMBOLS
6/14	M-11	TURN LANE PAVEMENT MARKINGS
6/14	M-12	WRONG-WAY ARROWS
6/14	M-13	PREFERENTIAL LANE PAVEMENT MARKINGS
6/14	M-14	STRIPING AND DELINEATION FOR TRUCK ESCAPE RAMPS
6/14	M-15 SHT 1	PAVEMENT MARKING FOR FREEWAY ENTRANCE RAMP - TAPERED ACCELERATION LANE
6/14	M-15 SHT 2	PAVEMENT MARKING FOR FREEWAY ENTRANCE RAMP - PARALLEL ACCELERATION LANE
6/14	M-15 SHT 3	PAVEMENT MARKING FOR FREEWAY ENTRANCE RAMP - PARALLEL ACCELERATION LANE WITH HOV BYPASS
6/14	M-15 SHT 4	PAVEMENT MARKING FOR FREEWAY PARALLEL - ACCELERATION LANE
6/14	M-16 SHT 1	PAVEMENT MARKING FOR FREEWAY EXIT RAMPS - TAPERED DECELERATION LANE
6/14	M-16 SHT 2	PAVEMENT MARKING FOR FREEWAY EXIT RAMP - PARALLEL DECELERATION LANE
5/15	M-17	FREEWAY LANE DROP PAVEMENT MARKINGS
6/14	M-18	RECESSED PAVEMENT MARKER DETAILS
6/14	M-19 SHT 1	RAISED PAVEMENT MARKER PLAN LEGEND
6/14	M-19 SHT 2	NON-REFLECTIVE RAISED PAVEMENT MARKER DETAILS
6/14	M-19 SHT 3	RETROREFLECTIVE RAISED PAVEMENT MARKER DETAILS
6/14	M-19 SHT 4	RETROREFLECTIVE RAISED PAVEMENT MARKER DETAILS
5/15	M-19 SHT 5	PAVEMENT MARKING DETAILS FOR UNDIVIDED HIGHWAYS
6/14	M-19 SHT 6	RETROREFLECTIVE RAISED PAVEMENT MARKERS (RPM) FOR UNDIVIDED HIGHWAYS
6/14	M-19 SHT 7	FREEWAY AND DIVIDED HIGHWAY EDGE LINE AND LANE STRIPING
5/15	M-19 SHT 8	LANE DROP MARKING AND RAMP OR INTERSECTION GUIDE STRIPING
6/14	M-19 SHT 9	PAVEMENT MARKING CROSS-SECTION DETAILS FOR HIGHWAYS AND FREEWAYS

REVISION	STANDARD	SUBJECT: SIGNING & MARKING DETAILS
6/14	M-20 SHT 1	CHIP SEAL MARKER USAGE FOR TEMPORARY MARKERS
6/14	M-20 SHT 2	CHIP SEAL MARKER USAGE FOR TEMPORARY MARKERS
6/14	M-21	TRANSVERSE RUMBLE STRIP DETAILS
6/14	M-22 SHT 1	LONGITUDINAL RUMBLE STRIP GROOVE, PATTERN - AND LOCATION DETAILS
6/14	M-22 SHT 2	LONGITUDINAL RUMBLE STRIP EXCEPTION DETAILS
6/14	M-22 SHT 3	CENTERLINE RUMBLE STRIP GROOVE, PATTERN - AND LOCATION DETAILS
6/14	M-23	OBJECT MARKER DETAILS
6/14	M-24	OBJECT MARKER PLACEMENT DETAILS
6/14	M-26 SHT 1	DELINEATOR PLACEMENT AND SPACING
6/14	M-26 SHT 2	DELINEATOR PLACEMENT AND SPACING
6/14	M-26 SHT 3	FLEXIBLE DELINEATOR ASSEMBLIES
6/14	M-26 SHT 4	SQUARE STEEL POST DELINEATOR
6/14	M-26 SHT 5	DELINEATOR FOUNDATION DETAILS
6/14	M-27	DELINEATION DETAILS FOR MEDIAN CROSSOVERS
6/14	M-29	OFF-MAINLINE REFERENCE MARKER LOCATION DETAIL
6/14	M-30	OFF-MAINLINE REFERENCE MARKER DETAILS
6/14	M-32	BRIDGE AND BARRIER MARKER DETAILS
6/14	M-33	BRIDGE & BARRIER MARKER PLACEMENT AND INSTALLATION DETAILS
6/14	M-34	GUARDRAIL END TERMINAL DELINEATION DETAILS
6/14	M-35	OBJECT MARKER FOR SAND BARREL CRASH CUSHION

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
1	REVISED ALL DRAWINGS AND RE-ISSUED. CREATED SHEET 2.	L. LOPEZ	6/14
2	REVISED M-2 SHT2, M-17, M-19 SHTS 5&8. REVISED S-7 SHT3 ON PG2. UPDATED BORDER TITLE BLOCK.	L. LOPEZ	5/15

ADOT STANDARD DRAWINGS
REVISION DATES and STANDARD NO.'s REVIEW

	NAME	DATE
SIGNING & MARKING STANDARDS		

PROJECT NO. 189 SC 000 H8045 01L | IB-1 OF 163

RECORD DRAWING DATA | FEDERAL AID NO. 189-A(201)T | REC. DWG. DATE | OF

ADOT STANDARD DRAWINGS

TRAFFIC SIGNING & MARKING STANDARDS
(SHEET 2 OF 2)
EFFECTIVE MAY 2015

REVISION	STANDARD	SUBJECT: SIGNING & MARKING DETAILS
6/14	S-1 SHT 1	GENERAL SIGNING NOTES
6/14	S-2 SHT 1	S & W BREAKAWAY POST SELECTION CHART
6/14	S-2 SHT 2	S & W BREAKAWAY POST INSTALLATION DETAILS
6/14	S-3 SHT 1	FLAT SHEET SIGNS SQUARE TUBE POST GENERAL NOTES
6/14	S-3 SHT 2	SINGLE POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 12, 18 AND 24 INCH WIDTHS
6/14	S-3 SHT 3	SINGLE POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 30, 36, 42 AND 54 INCH WIDTHS
6/14	S-3 SHT 4	TWO POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 36, 42 AND 48 INCH WIDTHS
6/14	S-3 SHT 5	TWO POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 54, 60 AND 72 INCH WIDTHS
6/14	S-3 SHT 6	TWO POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 84 - 144 INCH WIDTHS
6/14	S-3 SHT 7	THREE POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 48, 60 AND 72 INCH WIDTHS
6/14	S-3 SHT 8	THREE POST FLAT SHEET RECTANGULAR SIGN ASSEMBLY - 84 - 144 INCH WIDTHS
6/14	S-3 SHT 9	WARNING SIGN ASSEMBLY - SINGLE POST
6/14	S-3 SHT 10	WARNING SIGN ASSEMBLY - TWO POST
6/14	S-3 SHT 11	WARNING SIGN ASSEMBLY - THREE POST
6/14	S-3 SHT 12	MULTIPLE ROUTE MARKER ASSEMBLIES
6/14	S-3 SHT 13	SPECIAL SIGN ASSEMBLIES
6/14	S-3 SHT 14	STRINGER DETAILS FOR SQUARE TUBE POSTS
6/14	S-3 SHT 15	SQUARE TUBE SIGN POST FOUNDATION
6/14	S-3 SHT 16	SQUARE TUBE POST SLIP BASE DETAILS
6/14	S-4	W SHAPE BREAKAWAY POST FUSE PLATE AND HINGE DETAILS
6/14	S-5	W SHAPE BREAKAWAY POST DETAILS
6/14	S-6	S4x7.7 BREAKAWAY POST DETAILS
6/14	S-7 SHT 1	ALUMINUM EXTRUSION SIGN PANEL DETAILS
6/14	S-7 SHT 2	ALUMINUM EXTRUSION AUXILIARY SIGN INSTALLATION DETAILS
5/15	S-7 SHT 3	ALUMINUM EXTRUSION EXIT PANEL INSTALLATION DETAIL
6/14	S-8 SHT 1	FLAT SHEET ALUMINUM PANEL ON BREAKAWAY POSTS INSTALLATION DETAIL
6/14	S-8 SHT 2	ALUMINUM EXTRUSION SIGN TO PERFORATED POSTS INSTALLATION DETAIL
6/14	S-9 SHT 1	SIGN INSTALLATION ON POLE
6/14	S-9 SHT 2	SIGN INSTALLATION ON SIGNAL POLE
6/14	S-9 SHT 3	SIGN INSTALLATION ON POLE BAND-TYPE CLAMP
6/14	S-10	MILEPOST AND REFERENCE LOCATION SIGNS
6/14	S-11 SHT 1	TAPERED TUBE SIGN STRUCTURE CANTILEVER
6/14	S-11 SHT 2	TAPERED TUBE SIGN STRUCTURE CANTILEVER POST AND MAST ARM DETAILS
6/14	S-11 SHT 3	TAPERED TUBE SIGN STRUCTURE SINGLE BEAM
6/14	S-11 SHT 4	TAPERED TUBE SIGN STRUCTURE SINGLE BEAM POST AND BEAM DETAILS

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REVISION	STANDARD	SUBJECT: SIGNING & MARKING DETAILS
6/14	S-12 SHT 1	TYPE A, B, AND DOWN ARROWS
6/14	S-12 SHT 2	TYPE C AND D ARROWS
6/14	S-12 SHT 3	C2 ARROW DETAIL
6/14	S-13	SIGN IDENTIFICATION DETAILS
6/14	S-14 SHT 1	ROTATING OPEN/CLOSED SIGN
6/14	S-14 SHT 2	ROTATING OPEN/CLOSED SIGN DETAILS
6/14	S-14 SHT 3	ROTATING OPEN/CLOSED SIGN MOUNTING DETAILS
6/14	S-15 SHT 1	FOLDING RECTANGULAR SIGN ASSEMBLY
6/14	S-15 SHT 2	FOLDING RECTANGULAR SIGN OPERATION
6/14	S-15 SHT 3	FOLDING DIAMOND SIGN ASSEMBLY
6/14	S-16 SHT 1	TEMPORARY WOOD POSTS
6/14	S-16 SHT 2	TEMPORARY WOOD POSTS SELECTION CHART
6/14	S-17	END OF ROAD BARRICADE
6/14	C-1	SAND BARREL CRASH CUSHION
6/14	C-2	SAND BARREL CRASH CUSHION TYPICAL INSTALLATION
6/14	C-3 SHT 1	PRECAST CONCRETE BARRIER STRUCTURAL DETAILS
6/14	C-3 SHT 2	PRECAST CONCRETE BARRIER PIN AND LOOP ASSEMBLY
6/14	C-4 SHT 1	MEDIAN CROSSOVER
6/14	C-4 SHT 2	TYPICAL END TREATMENTS FOR DETOURS USING TEMPORARY CONCRETE BARRIER (TCB)
6/14	C-5 SHT 1	APPROACH PLATE AND TRANSITION SECTION FOR TEMPORARY CONCRETE BARRIER
6/14	C-5 SHT 2	APPROACH PLATE AND TRANSITION SECTION FOR TEMPORARY CONCRETE BARRIER

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
1	REVISED ALL DRAWINGS AND RE-ISSUED. CREATED SHEET 2.	L. LOPEZ	6/14
2	REVISED S-7 SHT3. REVISED M-2 SHT2, M-17, M-19 SHTS 5&8 ON PG1. UPDATED BORDER TITLE BLOCK.	L. LOPEZ	5/15

ADOT STANDARD DRAWINGS
REVISION DATES and STANDARD NO.'s REVIEW

	NAME	DATE
SIGNING & MARKING STANDARDS		

PROJECT NO. 189 SC 000 H8045 01L — IB-2 OF 163

RECORD DRAWING DATA — FEDERAL AID NO. 189-A(201)T — REC. DWG. DATE — OF

ADOT STANDARD DRAWINGS

TRAFFIC SIGNAL AND LIGHTING STANDARDS
(SHEET 1 OF 2)
EFFECTIVE MAY 2015

REVISION DATE	STANDARD NUMBER		SUBJECT: TRAFFIC SIGNALS AND LIGHTING DETAILS
	T.S. 0		**ABBREVIATIONS, SYMBOLS AND DEFINITIONS**
05/15	0-1		STANDARD ABBREVIATIONS
01/12	0-2	SHT 1	PLAN SYMBOLS
01/12	0-2	SHT 2	PLAN SYMBOLS
01/12	0-2	SHT 3	PLAN SYMBOLS
03/10	0-3	SHT 1	STANDARD DEFINITIONS
03/10	0-3	SHT 2	STANDARD DEFINITIONS
03/10	0-4		REFERENCE DOCUMENTS AND GENERAL REQUIREMENTS
	T.S. 1		**PULL BOXES**
09/11	1-1	SHT 1	LIGHT DUTY - LIGHT WEIGHT NO. 5 AND NO. 7 PULL BOX
09/11	1-1	SHT 2	LIGHT DUTY - LIGHT WEIGHT NO. 5 AND NO. 7 SLOPE WALL BODY PULL BOX DETAILS
03/15	1-2		HEAVY DUTY NO. 5 AND NO. 7 STRAIGHT BODY WALL PULL BOX DETAILS
09/11	1-3		REPLACEMENT LID SIZING FOR EXISTING NO. 5 AND NO. 7 PULL BOXES
09/11	1-4	SHT 1	TYPICAL PULL BOX INSTALLATION AND WIRING DETAILS
09/11	1-4	SHT 2	TYPICAL PULL BOX INSTALLATION AND WIRING DETAILS
09/11	1-4	SHT 3	TYPICAL PULL BOX INSTALLATION DETAILS
09/11	1-5	SHT 1	ELECTRICAL CONDUIT COVER AND TRENCH REQUIREMENTS
09/11	1-5	SHT 2	CONDUIT EXPANSION COUPLINGS
09/11	1-6		CONDUCTOR REQUIREMENTS
03/10	1-7		TRAFFIC SIGNAL IMSA CABLE COLOR CODES
09/11	1-8	SHT 1	FRONT OF BARRIER JUNCTION BOX
09/11	1-8	SHT 2	BACK OF BARRIER JUNCTION BOX
09/11	1-9		TOP OF BARRIER JUNCTION BOX DETAILS
09/11	1-10		TOP OF BARRIER JUNCTION BOX DETAILS
10/13	1-11	SHT 1	HEAVY DUTY LIGHTING NO. 4 AND NO. 6 PULL BOX
10/13	1-11	SHT 2	HEAVY DUTY LIGHTING NO. 4 AND NO. 6 PULL BOX
03/15	1-11	SHT 3	HEAVY DUTY LIGHTING NO. 4 AND NO. 6 PULL BOX LID
03/15	1-12	SHT 1	PRECAST HEAVY DUTY LIGHTING NO. 4B AND NO. 6B PULL BOX
03/15	1-12	SHT 2	PRECAST HEAVY DUTY LIGHTING NO. 4B AND NO. 6B PULL BOX
	T.S. 2		**FOUNDATIONS**
03/10	2-1		FOUNDATION FOR TYPE II LOAD CENTER CABINET
03/10	2-2		FOUNDATION FOR TYPE IV LOAD CENTER CABINET
03/10	2-3		FOUNDATION FOR TYPE III CONTROL CABINET
03/10	2-4		FOUNDATION FOR TYPE IV AND V CONTROL CABINETS
03/10	2-5		FOUNDATION FOR TYPE 340 CONTROL CABINET
03/10	2-6		METER PEDESTAL CABINET FOUNDATION AND BASE
03/15	2-7		TRAFFIC SIGNAL UPS CABINET FOUNDATION DETAIL
	T.S. 3		**CABINETS**
12/12	3-0		NOTES FOR TYPE II AND IV LOAD CENTER CABINETS
03/10	3-1		TYPE II LOAD CENTER CABINET
03/10	3-2		TYPE IV LOAD CENTER CABINET
03/10	3-3		TYPE II OR IV LOAD CENTER CABINET WIRING DETAILS 240/480 3W W/DISCONNECT
03/10	3-4	SHT 1	PHOTO ELECTRIC CELL MOUNTING DETAILS
03/10	3-4	SHT 2	PHOTO ELECTRIC CELL MOUNTING DETAILS
03/10	3-5	SHT 1	TYPE I AND II METER PEDESTAL CABINET
12/12	3-5	SHT 2	METER PEDESTAL CABINET
03/10	3-6		TYPE III CONTROL CABINET
03/10	3-7		POLE MOUNTED TYPE III CONTROL CABINET
03/10	3-8	SHT 1	POLE MOUNT DETAILS FOR TYPE III CONTROL CABINET
03/10	3-8	SHT 2	POLE MOUNT DETAILS FOR TYPE III CONTROL CABINET
03/10	3-9	SHT 1	TYPE IV AND V CONTROL CABINET NOTES
03/10	3-9	SHT 2	TYPE IV CONTROL CABINET
03/10	3-9	SHT 3	TYPE V CONTROL CABINET
03/10	3-10		CABINET EXTENSION OR ELEVATOR BASE
03/10	3-11		CONTROL CABINET MOUNTED SERVICE ENCLOSURE
03/10	3-12	SHT 1	120/240 OR 240/480 VOLT, SINGLE PHASE UTILITY PULL SECTION AND SERVICE DISCONNECT DETAILS
03/10	3-12	SHT 2	120/240 OR 240/480 VOLT, SINGLE PHASE UTILITY PULL SECTION AND SERVICE DISCONNECT DETAILS
03/10	3-13	SHT 1	TRAFFIC SIGNALS AND LIGHTING MODEL 345 CABINET DETAILS
03/10	3-13	SHT 2	TRAFFIC SIGNALS AND LIGHTING MODEL 345 CABINET DETAILS
03/10	3-13	SHT 3	TRAFFIC SIGNALS AND LIGHTING MODEL 345 CABINET CAGE DETAILS

REVISION DATE	STANDARD NUMBER		SUBJECT: TRAFFIC SIGNALS AND LIGHTING DETAILS
	T.S. 4		**POLES AND POSTS**
10/13	4-1		TYPE "A" POLE
10/13	4-2		TYPE "E" POLE
10/13	4-3		TYPE "F" POLE
10/13	4-4		TYPE "G" POLE
10/13	4-5		ALUMINUM TYPE "G" POLE
10/13	4-6		ALUMINUM TYPE "H" POLE
10/13	4-7		ALUMINUM TYPE "I" POLE
10/13	4-8		TYPE "J" POLE
10/13	4-9		TYPE "K" POLE
10/13	4-10		TYPE "O" POLE
10/13	4-11		TYPE "R" POLE
10/13	4-12		TYPE "S" POLE
10/13	4-13		ALUMINUM TYPE "S" POLE
10/13	4-14	SHT 1	TYPE "T" POLE
10/13	4-14	SHT 2	TYPE "S" AND "T" STEEL TWIN LUMINAIRE MOUNTING BRACKET AND EXTENSIONS
10/13	4-15		ALUMINUM TYPE "T" POLE
10/13	4-16		TYPE "U" POLE ELLIPTICAL BASE DETAILS
10/13	4-17	SHT 1	TYPE "U" POLE SQUARE BASE
10/13	4-17	SHT 2	TYPE "U" POLE ROUND POLE / SQUARE BASE
03/10	4-17	SHT 3	TYPE "U" POLE ROUND POLE / SQUARE BASE
10/13	4-17	SHT 4	TYPE "U" POLE ROUND POLE / SQUARE BASE
10/13	4-17	SHT 5	TYPE "U" POLE ROUND POLE / SQUARE BASE
10/13	4-17	SHT 6	TYPE "U" POLE ROUND POLE / SQUARE BASE
10/13	4-18		TYPE "V" POLE AND 60' OR 65' MAST ARM
10/13	4-19		TYPE "W" POLE AND 60' OR 65' MAST ARM
03/10	4-20		POLE HAND HOLE DETAIL
03/10	4-21		EQUIPMENT MOUNTING HEIGHT DETAILS
03/15	4-22		PEDESTRIAN PUSH BUTTON POST "TYPE PB POLE"
10/13	4-23		POLE FOUNDATION ANCHOR BOLTS
03/10	4-26		STEEL MAST ARM DETAILS LUMINAIRE AND SIGNAL ARMS TO 20'
03/10	4-27		ALUMINUM TRUSS ARM DETAILS TYPE G, H, AND I POLES
03/10	4-28		SIGNAL MAST ARM CONNECTION DETAIL TYPE J AND Q POLES
03/10	4-29		SIGNAL MAST ARM CONNECTION DETAIL TYPE K AND R POLES
03/10	4-30		MAST ARM CONNECTION DETAIL TYPE V AND W POLES
03/10	4-31		SIGNAL MAST ARM TENON DETAIL
12/12	4-32		TYPICAL HIGHWAY LIGHTING OFFSETS IN CUT AND FILL SECTIONS
	T.S. 5		**POLE BASES - SPECIAL**
03/15	5-0		TYPE 2 AND 3 CAST ALUMINUM BREAK-AWAY BASES
12/12	5-1		TYPE 2 CAST ALUMINUM BREAK-AWAY BASE
12/12	5-2		TYPE 3 CAST ALUMINUM BREAK-AWAY BASE
12/12	5-3		INSTALLATION DETAILS FOR POLE FOUNDATIONS WITH TYPE 2 AND 3 BREAK-AWAY BASES
	T.S. 6		**HIGHWAY TRAFFIC DATA DETECTORS**
03/10	6-1		TYPE C VEHICLE DETECTOR LOOPS FOR TRAFFIC COUNTERS
03/10	6-2	SHT 1	TYPE SA AND SB SPEED/VEHICLE CLASSIFICATION SYSTEMS
03/10	6-2	SHT 2	TYPE SA SPEED/VEHICLE CLASSIFICATION SYSTEMS
03/10	6-2	SHT 3	TYPE SB SPEED/VEHICLE CLASSIFICATION SYSTEMS
12/12	6-3		PIEZOELECTRIC WEIGHT SENSOR AND LOOP LANE LAYOUT
12/12	6-4	SHT 1	DETECTOR LOOPS AND PIEZOELECTRIC SENSOR DETAILS
12/12	6-4	SHT 2	DETECTOR LOOPS AND PIEZOELECTRIC SENSOR DETAILS
03/15	6-4	SHT 3	DETAIL A PIEZOELECTRIC SENSOR DETAILS
12/12	6-4	SHT 4	DETAIL B DETECTOR LOOP DETAILS
12/12	6-4	SHT 5	DETECTOR LOOPS AND PIEZOELECTRIC SENSOR DETAILS
03/10	6-5		MICROLOOPS FOR SPEED/VEHICLE CLASSIFICATION
03/10	6-6		QUARTZ PIEZOELECTRIC WEIGHT SENSOR AND LOOP LANE LAYOUT
03/10	6-7		TRAFFIC DATA COLLECTION CABINET INSTALLATION DETAILS
03/10	6-8		TYPE MPD CABINET POLE, BASE AND FOUNDATION INSTALLATION DETAILS

NO.1	DESCRIPTION OF REVISION	MADE BY	DATE
NO.2	REVISED TS 0-1, 1-11, 2-7, 4-22, 5-0, 6-4.	L. LOPEZ	03/15
NO.3	UPDATED BORDER TITLE BLOCK.	L. LOPEZ	05/15

ADOT STANDARD DRAWINGS REVISION DATES and STANDARD NO.'s REVIEW		
	NAME	DATE
TRAFFIC SIGNAL & LIGHTING STANDARDS		
PROJECT NO. 189 SC 000 H8045 01L	IC-1 OF 163	
RECORD DRAWING DATA — FEDERAL AID NO. 189-A(201)T	REC. DWG. DATE	OF

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ADOT STANDARD DRAWINGS

TRAFFIC SIGNAL AND LIGHTING STANDARDS
(SHEET 2 OF 2)
EFFECTIVE MAY 2015

REVISION DATE	STANDARD NUMBER		SUBJECT: TRAFFIC SIGNALS AND LIGHTING DETAILS
	T.S. 7		**TRAFFIC SIGNAL DETECTORS**
03/10	7-1	SHT 1	LOOP DETECTOR LOCATION SAWCUT PATTERNS AND INSTALLATION DETAILS
03/10	7-1	SHT 2	SAW CUT AND CORING DETAILS
03/15	7-1	SHT 3	SAW CUT AND CORING DETAILS
03/10	7-1	SHT 4	TYPICAL DETECTOR LOOP LEAD-IN ROAD TO PULL BOX DETAIL
03/10	7-1	SHT 5	LOOP DETECTOR LOCATION AND INSTALLATION DETAILS
03/10	7-2		PRE-FORMED LOOP DETECTORS FOR RAMP METERING AND COUNTING
03/10	7-3		PRE-FORMED LOOP DETECTORS IN BRIDGE DECK
03/10	7-4		PRE-FORMED LOOP DETECTORS IN PCCP
03/10	7-5		TYPICAL PRE-FORMED LOOP DETECTOR STUB-OUT DETAIL
	T.S. 8		**SIGNAL ASSEMBLIES**
01/12	8-0		TRAFFIC SIGNAL VEHICLE FACE ASSEMBLY REQUIREMENTS AND DETAILS
01/12	8-1		VEHICLE TRAFFIC SIGNAL FACE ASSEMBLY
01/12	8-2		VEHICLE TRAFFIC SIGNAL FACE ASSEMBLY
01/12	8-3		VEHICLE TRAFFIC SIGNAL FACE ASSEMBLY
10/13	8-4	SHT 1	12-INCH VEHICLE TRAFFIC SIGNAL HOUSING/SECTION
01/12	8-4	SHT 2	12-INCH VEHICLE TRAFFIC SIGNAL HOUSING/SECTION NOTES
01/12	8-4	SHT 3	VEHICLE TRAFFIC SIGNAL HOUSING/SECTION DETAILS
03/10	8-4	SHT 4	VISORS FOR 8-INCH AND 12-INCH VEHICLE TRAFFIC SIGNAL FACE ASSEMBLIES
01/12	8-5		FLASHING BEACON SIGNAL FACE ASSEMBLY
01/12	8-6		LED LAMP FOR PROGRAMMED VISIBILITY SIGNAL
01/12	8-7	SHT 1	PEDESTRIAN SIGNAL ASSEMBLY REQUIREMENTS AND DETAILS
01/12	8-7	SHT 2	PEDESTRIAN SIGNAL ASSEMBLY HOUSING
01/12	8-7	SHT 3	PEDESTRIAN SIGNAL ASSEMBLY VISOR
	T.S. 9		**MOUNTING ASSEMBLIES - SIGNAL**
03/10	9-0	SHT 1	MOUNTING ASSEMBLY GENERAL REQUIREMENTS
03/10	9-0	SHT 2	MOUNTING ASSEMBLY GENERAL REQUIREMENTS
03/10	9-1		TYPE I AND II MOUNTING ASSEMBLIES
03/10	9-2		TYPE III AND IV MOUNTING ASSEMBLIES
10/13	9-3		TYPE V MOUNTING ASSEMBLY
03/10	9-4		TYPE VI MOUNTING ASSEMBLY
03/10	9-5		TYPE VII MOUNTING ASSEMBLY
03/10	9-6		TYPE VIII MOUNTING ASSEMBLY
03/10	9-7		TYPE IX MOUNTING ASSEMBLY
03/10	9-8		TYPE X MOUNTING ASSEMBLY
03/10	9-9		TYPE XI MOUNTING ASSEMBLY
	T.S. 10		**MOUNTING CASTINGS - SIGNAL**
03/10	10-1		MISCELLANEOUS SIGNAL MOUNTING PARTS
03/10	10-2		MAST ARM SIGNAL MOUNTING PLUMBIZER
03/10	10-3		SIGNAL MOUNTING POLE PLATE DETAILS
03/10	10-4		TERMINAL COMPARTMENT, SIDE MOUNTED AND POLE TOP MOUNTED
	T.S. 11		**PEDESTRIAN DETAILS**
03/15	11-1		TYPE I PEDESTRIAN PUSH BUTTON HOUSING ASSEMBLY
03/15	11-2		CAN STYLE PEDESTRIAN PUSH BUTTON
	T.S. 12		**FLASHERS**
03/10	12-1	SHT 1	ADVANCE WARNING FLASHER POLE DETAIL
03/10	12-1	SHT 2	ADVANCE WARNING FLASHER POLE SIGN MOUNTING DETAILS
03/10	12-1	SHT 3	ADVANCE WARNING FLASHER POLE DETAIL
	T.S. 13		**ILLUMINATION - SIGNS**
03/10	13-1		SIGN LIGHTING DETAIL FOR TUBULAR SIGN STRUCTURES
03/10	13-2		FUSE PANEL DETAILS FOR SIGN LIGHTING
03/15	13-3		PLACEMENT OF LIGHTING FIXTURES FOR OVERHEAD SIGNS
	T.S. 14		**ILLUMINATION - SPECIAL**
03/10	14-1	SHT 1	HIGH PRESSURE SODIUM (HPS) LAMPS
03/10	14-1	SHT 2	HIGH PRESSURE SODIUM (HPS) LAMPS
03/10	14-1	SHT 3	HIGH PRESSURE SODIUM (HPS) LAMPS
03/10	14-2		PEDESTRIAN BRIDGE LIGHTING DETAILS

REVISION DATE	STANDARD NUMBER		SUBJECT: TRAFFIC SIGNALS AND LIGHTING DETAILS
	T.S. 15		**SPAN WIRE SIGNALS AND LIGHTING**
01/12	15-0	SHT 1	GENERAL NOTES
01/12	15-0	SHT 2	GENERAL NOTES
01/12	15-0	SHT 3	GENERAL NOTES
01/12	15-1	SHT 1	STEEL POLE TYPICAL DETAILS
01/12	15-1	SHT 2	STEEL POLE FOUNDATION DETAILS
01/12	15-1	SHT 3	STEEL POLE ATTACHMENT DETAILS
01/12	15-1	SHT 4	WOOD POLE TYPICAL DETAILS
01/12	15-1	SHT 5	WOOD POLE TYPICAL DETAILS
01/12	15-1	SHT 6	TYPICAL DETAILS
01/12	15-2		HANGER AND BALANCE ADJUSTER TYPICAL DETAILS
01/12	15-3	SHT 1	SIGNAL ASSEMBLY DETAILS
01/12	15-3	SHT 2	CONDUCTOR ENTRANCE HEADS TYPE A, B AND C
01/12	15-3	SHT 3	ALUMINUM PIPE EXTENSION AND TYPICAL DETAILS
01/12	15-4	SHT 1	ADJUSTABLE SIGN HANGER TYPICAL DETAILS
01/12	15-4	SHT 2	ADJUSTABLE SIGN HANGER TYPICAL DETAILS
01/12	15-4	SHT 3	ADJUSTABLE SIGN HANGER TYPICAL DETAILS
01/12	15-5		ADJUSTABLE HANGER TOP AND EXTENSION DETAILS
01/12	15-6		SIGNAL TETHER CLAMP TYPICAL DETAILS
01/12	15-7		POLE BAND TYPICAL DETAILS
01/12	15-8		WEATHERHEAD TYPICAL DETAILS

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
NO.1	REVISED TS 0-1 ON SHT1, UPDATED BORDER TITLE BLOCK.	L. LOPEZ	5/15
NO.2	REVISED STDS 7-1, 11-1, 11-2, 13-3, ADDED NEW STD 1-12.	L. LOPEZ	3/15

ADOT STANDARD DRAWINGS
REVISION DATES AND STANDARD NO.'s REVIEW

	NAME	DATE
TRAFFIC SIGNAL AND LIGHTING STANDARDS		

PROJECT NO. 189 SC 000 H8045 01L — IC-2 OF 163

RECORD DRAWING DATA | FEDERAL AID NO. 189-A(201)T | REC. DWG. DATE | OF

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	2	163	
		189 SC 000			

MIDPOINT OF PROJECT

Central Zone
State Plane Coordinates

X=1002,308
Y=133,708

DESIGN DATA

2040 AADT = 24,100 (SR 189)
Min Design Speed:
BOP to Sta 115+00 = 50 MPH
Sta 115+00 to EOP = 40 MPH

LENGTH OF PROJECT

SR 189 Sta 45+65.00 to 168+23.28	=	*12,258.28'*
EQUATION:		
SR 189 Sta 168+23.28 Bk to SR 189 50+00.00 Ahd		
SR 189 Sta 50+00.00 to Sta 90+77.00	=	*4,077.00'*
Grand Ave/119 Business		
Sta 36+00.00 to 52+33.00	=	*1633.00'*
Gross & Net Length	=	*17,968.28 = 3.40 Miles*

SR 189 Mile Post 0.00 to 3.75

GENERAL NOTES

The roadway plans have been designed utilizing the 2012 Construction Standard Drawings (C-Series) and current revisions Refer to the 1A sheet for a listing of current revision dates.

The project roadway shall be striped by the contractor in accordance with the current edition of the Signing and Marking Standard Drawings (M&S-Series) and the pavement marking plans.

For R/W information not shown, see Right-of-Way project No. STP-032-1(6).

Where only the horizontal location of an existing utility is shown, the location is approximate. Where both the horizontal and vertical location of an existing utility is shown, the location has been verified by field survey methods. The contractor shall comply with all current Blue Stake laws and Section 107.15 of the Specifications.

The average project elevation is 3,800'.

Slope rounding shall be applied per Std C-02 series unless otherwise noted.

R/W markers will be furnished and placed by ADOT R/W Plans Section forces.

New Right of Way and easements are required.

Existing landscaping and irrigation will be disturbed by construction activities. Prior to removing a tree, stake cut limits to verify if tree removal is required. Protect trees in place if cut slope limits do not encroach into the tree canopy. Replace any removed tree in kind. Existing shrubs and cacti are to be replaced with in kind plants. Irrigation is to be restored to all vegetation.

Pavement lift thickness is nominal.

INDEX OF SHEETS

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

DESIGN DATA

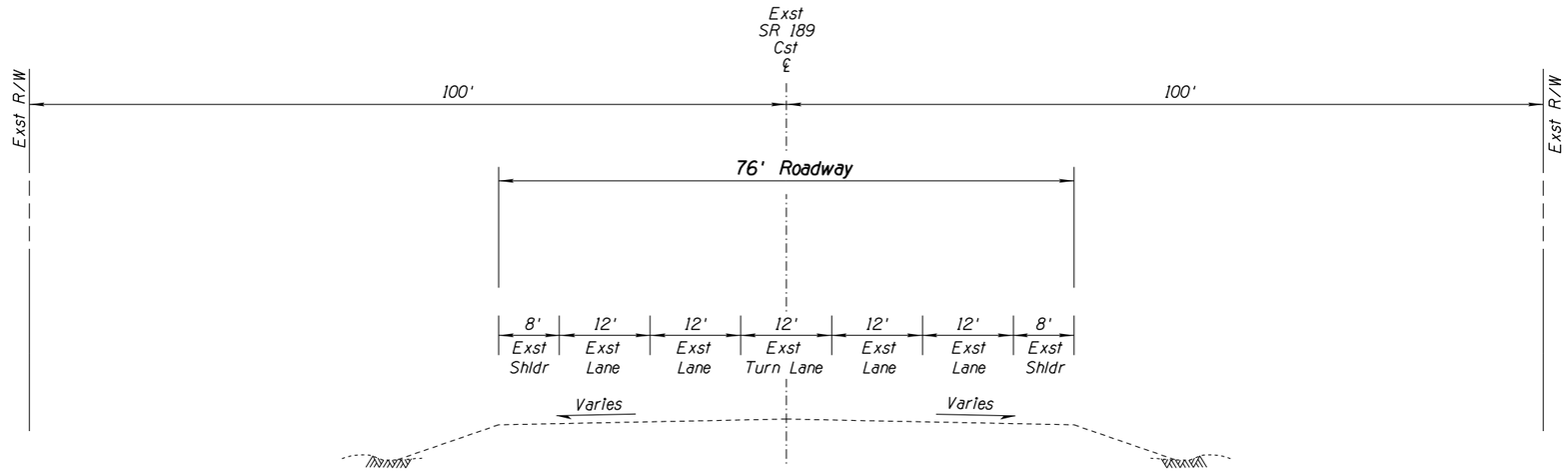
ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

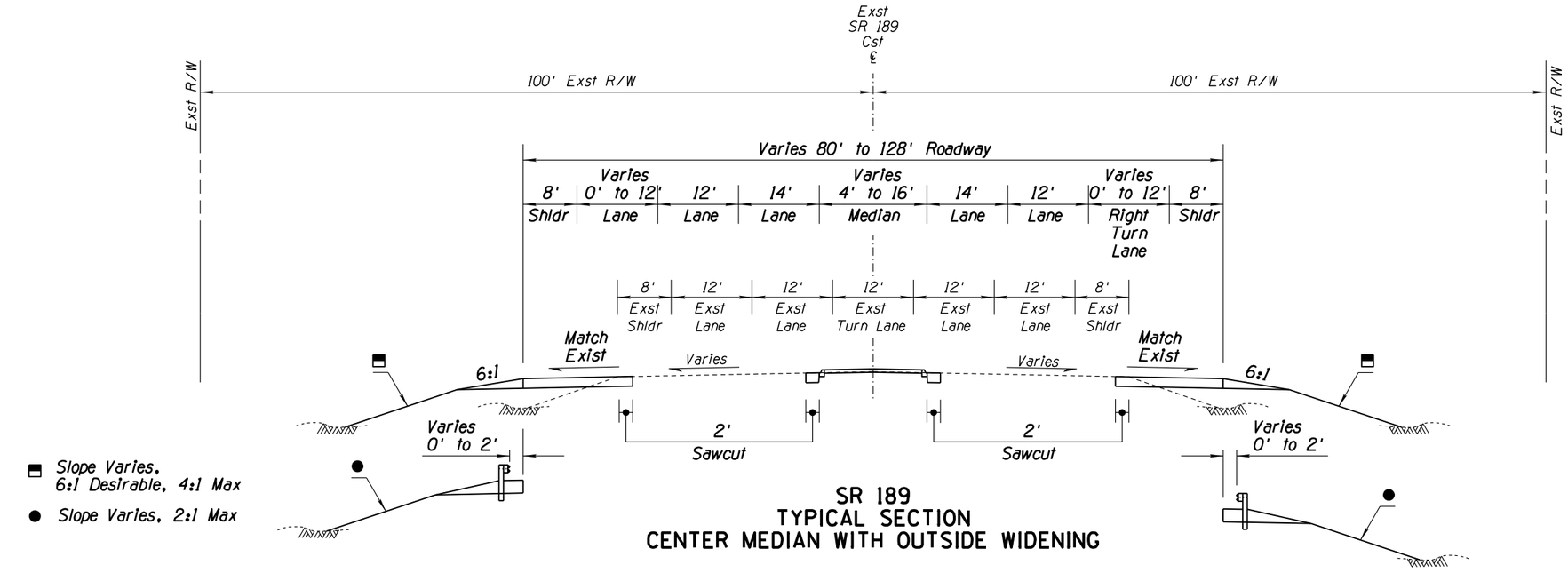
DWG NO. G-01.01

____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	3	163	
		189 SC 000			



SR 189
EXISTING TYPICAL SECTION



SR 189
TYPICAL SECTION
CENTER MEDIAN WITH OUTSIDE WIDENING

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

TYPICAL SECTIONS

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. G-02.01
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

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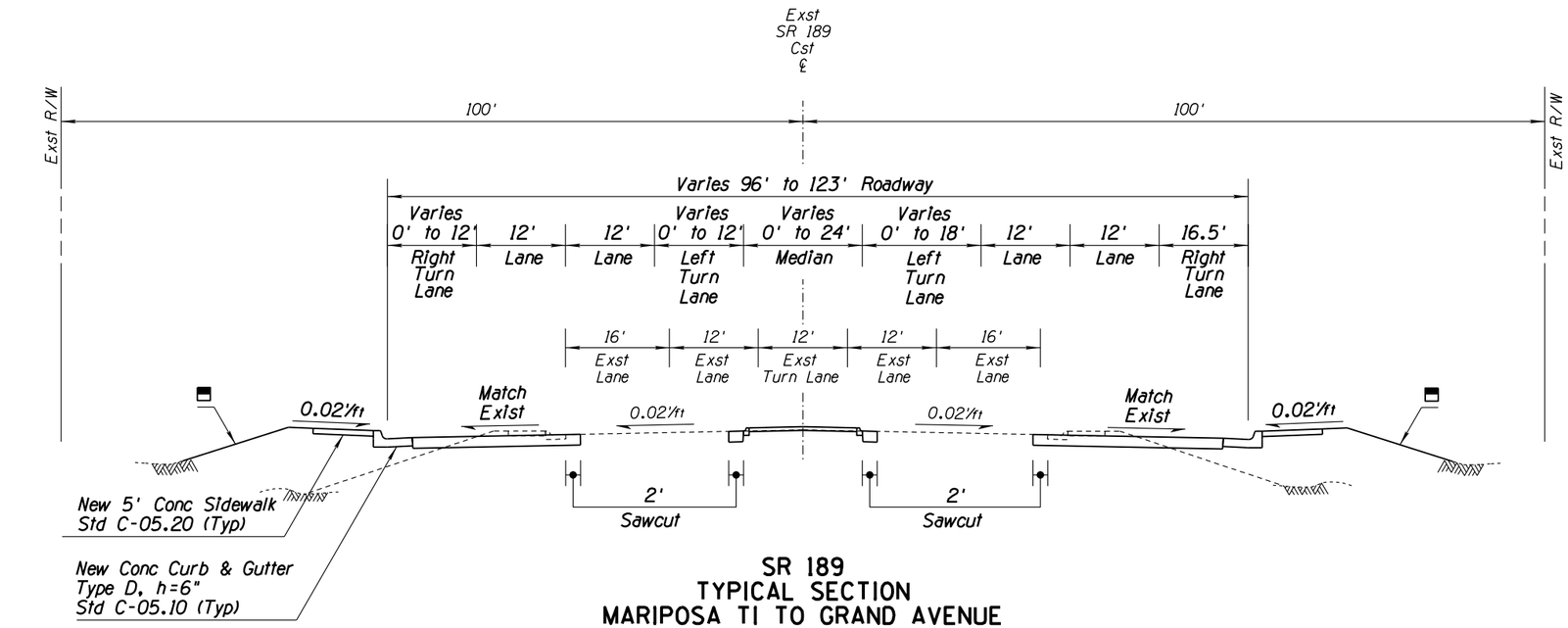
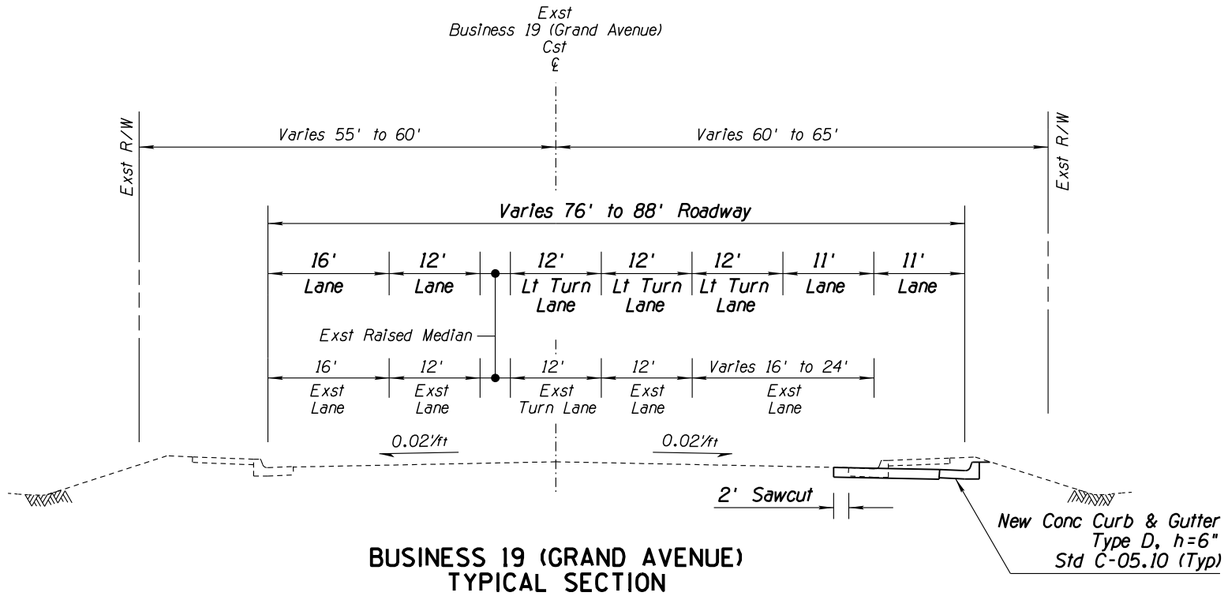
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	4	163	
		189 SC 000			



Slope Varies,
6:1 Desirable, 4:1 Max

SR 189
TYPICAL SECTION
MARIPOSA TI TO GRAND AVENUE
CENTER MEDIAN WITH OUTSIDE WIDENING



BUSINESS 19 (GRAND AVENUE)
TYPICAL SECTION

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

TYPICAL SECTIONS

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-02.02

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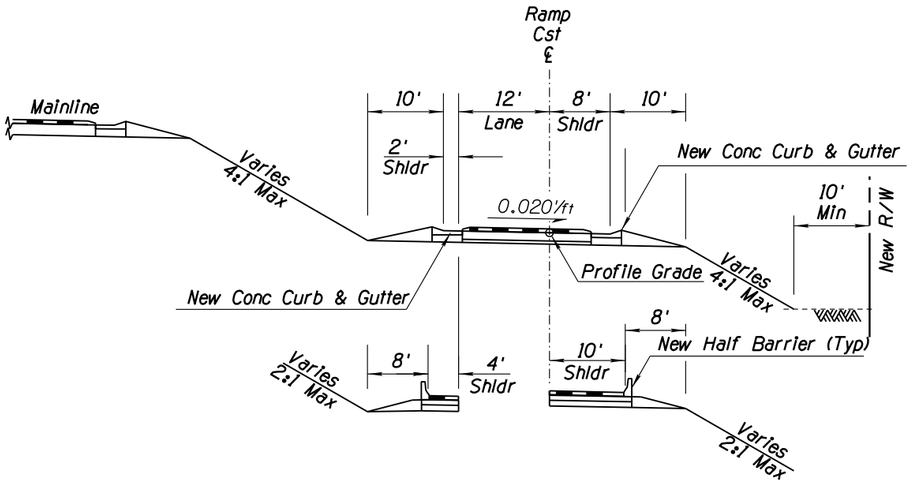
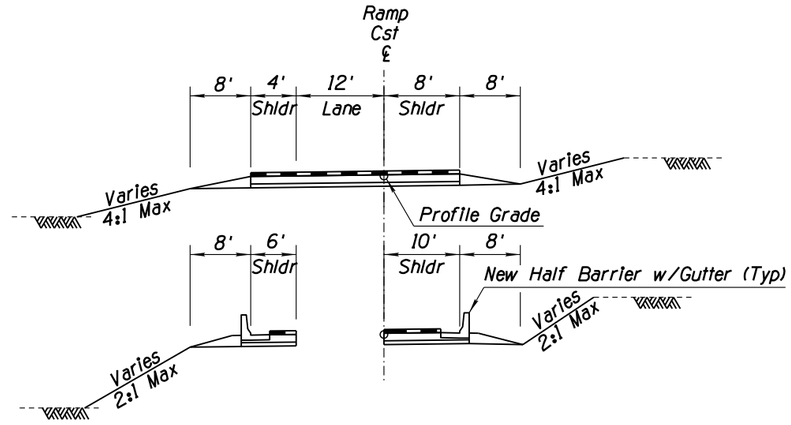
FILE NAME:c:\pwworking\phx\d0476786\h8045typ02.dgn PLOT DATE:Jul. 24, 2018 TIME:10:31:38 AM PLOT SCALE:1:20 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	5	163	
		189 SC 000			



TYPICAL SECTION - EXIT RAMP
Shown in the Direction of Travel



TYPICAL SECTION - ONE LANE DIRECTIONAL RAMP
Shown in the Direction of Travel

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

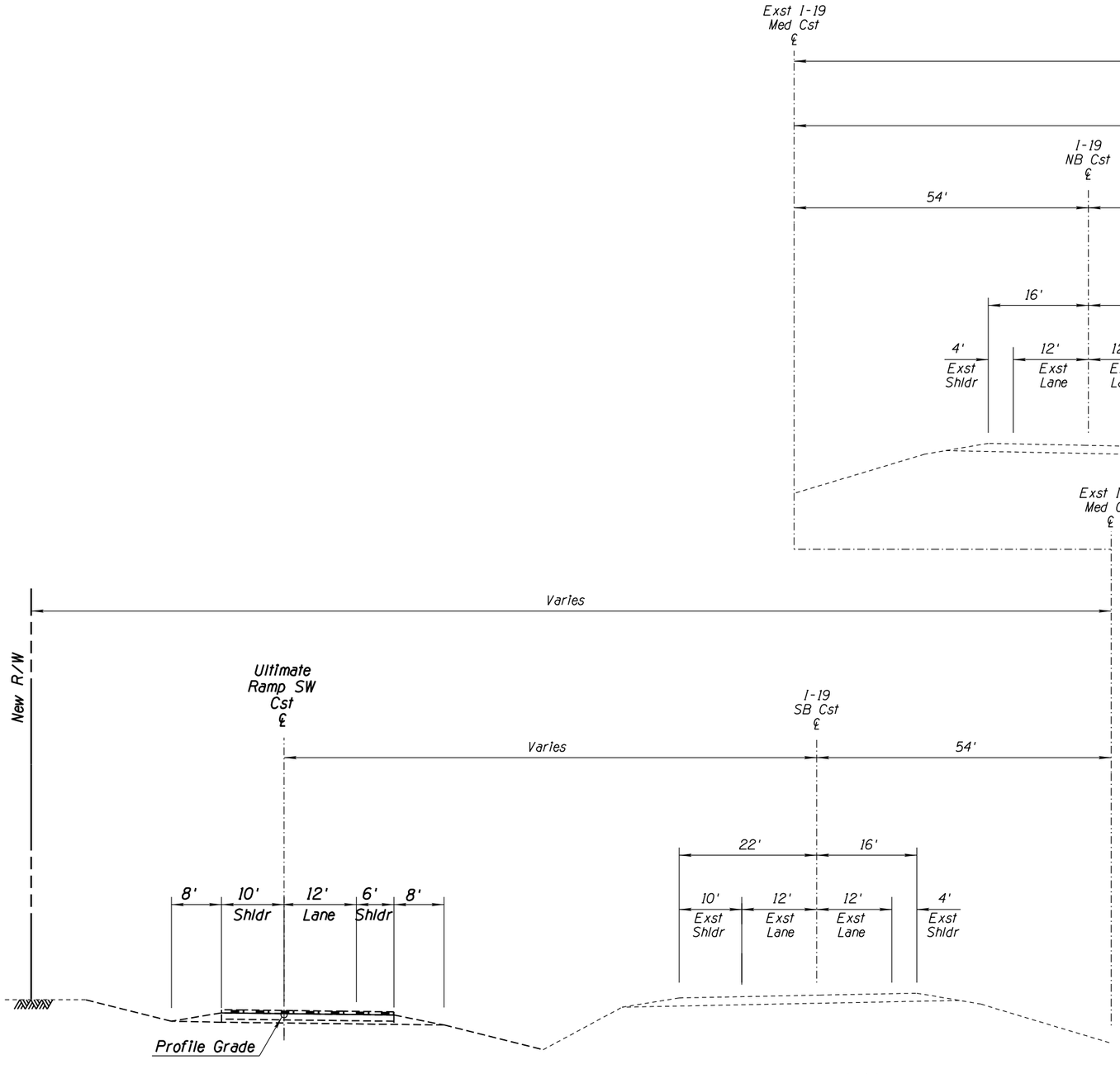
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

TYPICAL SECTIONS

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. G-02.03
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	6	163	
		189 SC 000			



I-19
FLYOVER RAMP
TYPICAL SECTION

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

TYPICAL SECTIONS

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

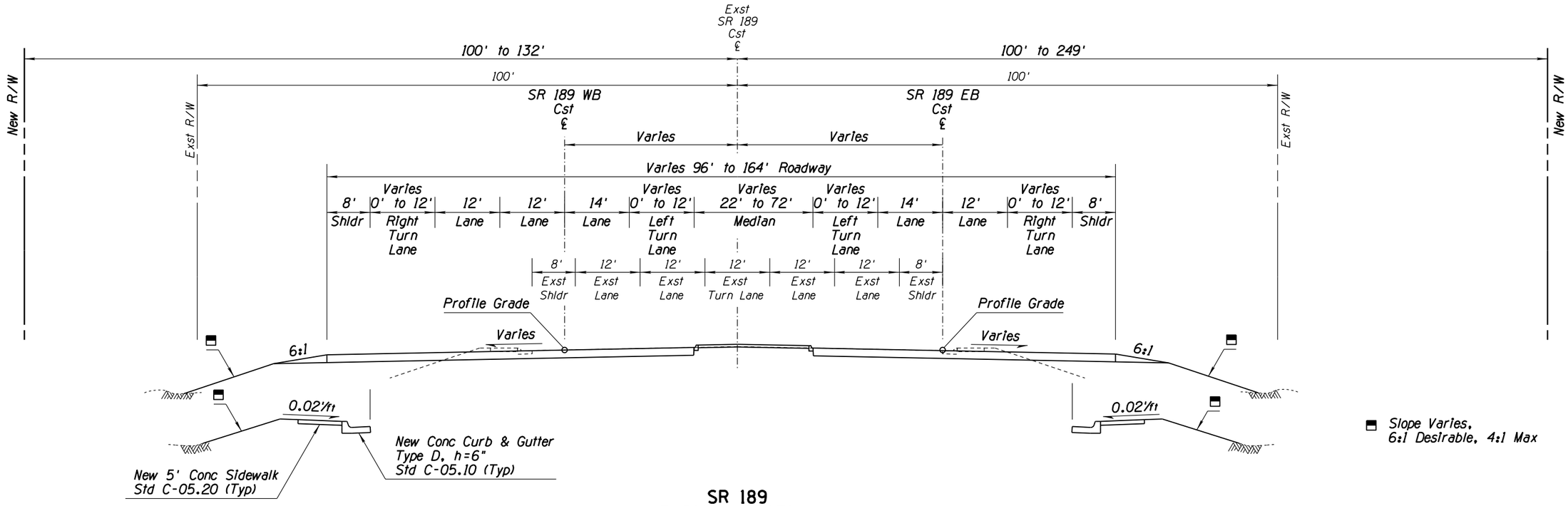
ROUTE	LOCATION	DWG NO. G-02.04
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME:c:\pwworking\phx\d0476786\h8045typ04.dgn PLOT DATE:Jul. 24, 2018 TIME:10:31:49 AM PLOT SCALE:1:20 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	7	163	
		189 SC 000			



SR 189
TYPICAL SECTION
LOMA MARIPOSA ROAD TO MARIPOSA TI
FULL RECONSTRUCTION

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
TYPICAL SECTIONS

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

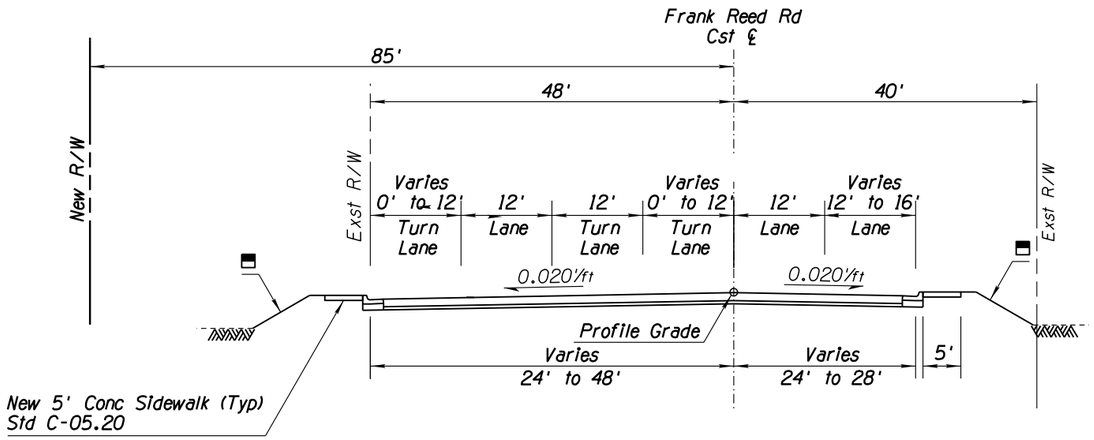
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-02.05

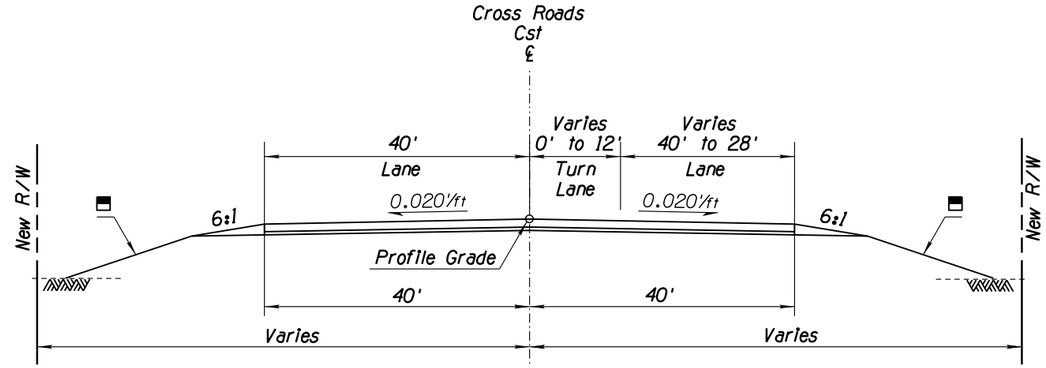
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	8	163	
		189 SC 000			



TYPICAL SECTION - FRANK REED ROAD



TYPICAL SECTION - CROSS ROADS

Slope Varies,
6:1 Desirable, 4:1 Max

Slope Varies,
6:1 Desirable, 4:1 Max

Contact Arizona 811 at least two full working days before you begin excavation
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
TYPICAL SECTIONS

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

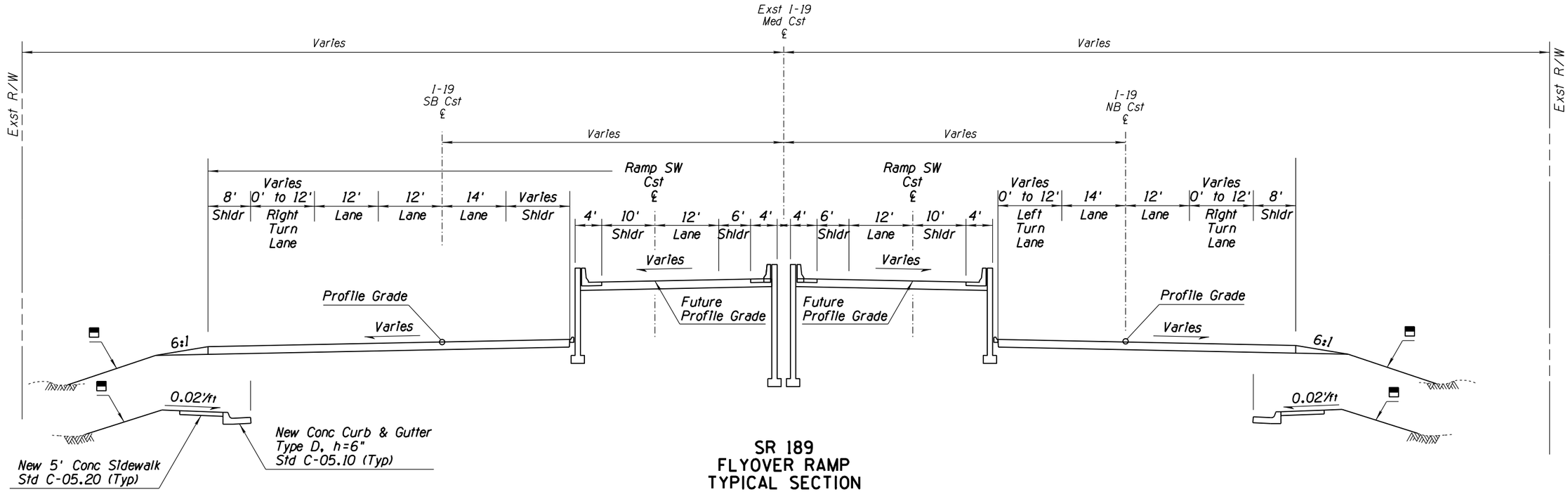
DWG NO. G-02.06

____ OF ____

FILE NAME:c:\pwworking\phx\d0476786\h8045typ06.dgn PLOT DATE:Jul. 24, 2018 TIME:10:31:59 AM PLOT SCALE:1:20 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	9	163	
		189 SC 000			



SR 189
FLYOVER RAMP
TYPICAL SECTION

▬ Slope Varies,
6:1 Desirable, 4:1 Max

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
TYPICAL SECTIONS

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-02.07

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045typ07.dgn PLOT DATE:Jul. 24, 2018 TIME:10:32:05 AM PLOT SCALE=1:20 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

FILE NAME:c:\pwworking\phx\d0476786\h8045ps01.dgn PLOT DATE:Jul. 24, 2018 TIME:10:32 PLOT BY:AHOFFMAN

REV. DATE: 07/27/2012

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	10	163	

189 SC 000

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

NOTE:
FOR PIPE CULVERT PLACEMENT SEE STANDARD DRAWINGS C-13.10 AND C-13.15

NOTE:
PIPE OPTIONS SELECTED ARE THOSE REQUIRED TO MEET MINIMUM SERVICE LIFE.
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CSP - CORRUGATED STEEL PIPE
CAP - CORRUGATED ALUMINUM PIPE
RCP - REINFORCED CONCRETE PIPE
NRCP - NON-REINFORCED CONCRETE PIPE
NRCIPCP - NON-REINFORCED CAST-IN-PLACE CONCRETE PIPE
CHDPEPP - CORRUGATED HIGH-DENSITY POLYETHYLENE PLASTIC PIPE

DESCRIPTION							CSP						CAP				RCP		NRCP	NRCIPCP	CHDPEPP		END TREATMENT														QUANTITIES				
			In.	In.	Ft.	Degree		In.	Coating					In.						In.			End Section (Each)		Catch Basin, Manhole, Headwall & Junction Structure			Ea		Ft.				Grate	Ft.	Inlet Depression C-15.70 In.	Inlet Depression C-15.70 Ft.	Cubic Yard				REMARKS
Station	Plan Reference Number	Controlling Fill Height Range	Size, Corrugated	Size, Smooth	Length (0)	Skew (0)	Corrugation	Wall Thickness (0.000)	Zinc	Bituminous Coated Zinc	Aluminum	Bituminous Coated Aluminum	Corrugation	Wall Thickness (0.000)	Uncoated	Bituminous Coated	Class - Non-Trench	Class - Trench	Class	Minimum Wall Thickness (0)	AASHTO M-294 Type C	AASHTO M-294 Type S	C-13.20 & C-13.25	Detail	Size, (In) Manhole	Standard or Detail	S-Single / D-Double	Location	H (0.0)	L Wing (0.0)	L 18" Slotted Drain (0)	L 24" Slotted Drain (0)	Type	Elevation (0.00)	Depth	L (0.0)	Pipe Excavation (0)	Pipe Backfill (0) C-13.15	Drainage Excavation (0)	Berm/Dike Embankment (0)	
Sta 50+01.40	1	1	24		80								A	0.06									2			C-15.20											39	16			Outfall to Outfall
Sta 56+89.62	2	2	24		40								A	0.06									1			C-15.20											30	8			CB1 to Outfall
Sta 59+91.11	3	2	24		40								A	0.06									1			C-15.20											30	8			CB2 to Outfall
Sta 65+93.45	4	2	24		40								A	0.06									1			C-15.20											30	8			CB3 to Outfall
Sta 80+61.32	5	2	24		40								A	0.06									1														30	8			CB8 to Outfall
Sta 85+68.37	6	1	24		80								A	0.06									2														39	16			Outfall to Outfall
Sta 87+16.75	7	1	24		80								A	0.06									2			C-15.20											39	16			Outfall to Outfall
Sta 91+57.50	8	2	24		40								A	0.06									1			C-15.20											30	8			CB9 to Outfall
Sta 94+16.18	9	2	24		40								A	0.06									1			C-15.20											30	8			CB10 to Outfall
Sta 97+15.73	10	2	24		40								A	0.06									1			C-15.20											30	8			CB11 to Outfall
Sta 99+92.83	11	2	24		40								A	0.06									1			C-15.20											30	8			CB12 to Outfall
Sta 104+02.46	12	2	24		40								A	0.06									1			C-15.20											30	8			CB13 to Outfall
Sta 106+06.09	13	2	24		40								A	0.06									1			C-15.20											30	8			CB14 to Outfall
Sta 107+58.85	14	2	24		40								A	0.06									1														30	8			CB15 to Outfall
Sta 113+32.64	15	1	24		80								A	0.06									2			C-15.80											39	16			Outfall to Outfall
Sta 117+26.90	16	1	24		78								A	0.06									1														38	16			Outfall to Outfall
Sta 118+95.08	17	1	24		70								A	0.06									2			C-15.20											34	14			Outfall to Outfall
Sta 134+05.91	18	2	24		40								A	0.06									1			C-15.92											30	8			CB17 to Outfall
Sta 136+42.16	19	2	24		80								A	0.06												C-15.20											60	16			CB18 to CB19
Sta 137+31.40	20	2	24		40								A	0.06									1			C-15.20											30	8			CB19 to Outfall
Sta 137+73.66	21	2	24		40								A	0.06									1			C-15.20											30	8			CB20 to Outfall
Sta 140+13.53	22	2	24		40								A	0.06									1														30	8			CB21 to Outfall
Sta 140+79.42	23	1	24		70								A	0.06									2			C-15.20											34	14			Outfall to Outfall
Sta 143+24.90	24	2	24		40								A	0.06									1			C-15.20											30	8			CB24 to Outfall
Sta 145+46.64	25	2	24		40								A	0.06									1			C-15.80											30	8			CB23 to Outfall
Sta 145+53.48	26	2	24		165								A	0.06												C-15.80											124	33			CB24 to CB25
Sta 147+07.18	27	2	24		229								A	0.06									1														172	46			CB25 to Outfall
Sheet Total																							31														1128	339			

FILL HEIGHT RANGE TABLE (Ft.)													
RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL	>	1	3	5	8	11	15	20	25	30	40	55	70
HEIGHT (Ft.)	≤	3	5	8	11	15	20	25	30	40	55	70	90

● SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.

PIPE CORRUGATION			
A	$2\frac{2}{3} \times \frac{1}{2}$	D	6x2
B	3x1	E	3x1 or $9 \times 2\frac{1}{2}$
C	$9 \times 2\frac{1}{2}$		

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ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

NEW PIPE SUMMARY SHEET

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

DWG NO. G-03.01

TRACS NO. H8045 01L

189-SC-000

____ OF ____

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

NOTE:
FOR PIPE CULVERT PLACEMENT SEE STANDARD DRAWINGS C-13.10 AND C-13.15

NOTE:
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	11	163	
		189 SC 000			

	DESCRIPTION						CSP									CAP			RCP		NRCP	NRCIPCP	CHDPEPP	END TREATMENT																			QUANTITIES			
				In.	In.	Ft.	Degree	In.	Coating								In.			In.		In.			Each		Catch Basin, Manhole, Headwall & Junction Structure																	Cubic Yard			
																								End Section	Ea					Ft.					Grate		Ft.							
Station	Plan Reference Number	Controlling Fill Height Range	Size, Corrugated	Size, Smooth	Length (0)	Skew (0)	Corrugation	Wall Thickness (0.000)	Zinc	Bituminous Coated Zinc	Aluminum	Bituminous Coated Aluminum	Bituminous Coated	Corrugation	Wall Thickness (0.000)	Uncoated	Bituminous Coated	Class - Non-Trench	Class - Trench	Class	Minimum Wall Thickness (0)	AASHTO M-294 Type C	AASHTO M-294 Type S	C-13.20 & C-13.25	Detail	Size, (In) Manhole	Standard or Detail	S-Single / D-Double	Location	H (0.0)	L Wing (0.0)	L 18" Slotted Drain (0)	L 24" Slotted Drain (0)	Type	Elevation (0.00)	In.	Ft.	Depth	L (0.0)	Inlet Depression C-15.70	Pipe Excavation (0)	Pipe Backfill (0) C-13.15	Drainage Excavation (0)	Berm/Dike Embankment (0)	REMARKS
Sta 148+51.22	28	2	24		64								A	0.06										1			C-15.20														48	13			CB26 to Outfall
Sta 148+72.20	29	1	24		57								A	0.06										2																	28	11			Outfall to Outfall
Sta 150+53.58	30	2	24		37								A	0.06										1			C-15.20														28	7			CB27 to Outfall
Sta 21+23.88	31	1	24		18								A	0.06										2																	9	4			Outfall to Outfall
Sta 19+05.07	32	2	24		150								A	0.06													C-15.80														113	30			CB29 to MH1
Sta 19+23.09	33	2	24		33								A	0.06													C-15.80														25	7			MH1 to CB31
Sta 153+20.54	34	2	24		33								A	0.06													C-15.20														25	7			CB31 to MH2
Sta 153+53.94	35	2	24		65								A	0.06													C-15.20														49	13			CB32 to MH2
Sta 153+53.94	36	2	24		167								A	0.06													C-15.80														125	34			MH2 to CB33
Sta 155+10.31	37	2	24		262								A	0.06													C-15.80														197	53			CB33 to MH3
Sta 157+55.22	38	2	24		138								A	0.06										1			C-18.10														104	28			MH3 to Outfall
Sta 156+85.86	39	2	24		39								A	0.06										1			C-15.20														29	8			CB35 to Outfall
Sta 162+59.05	40	2	24		128								A	0.06										1			C-15.20														96	26			CB38 to CB39
Sta 163+88.77	41	2	24		118								A	0.06										1			C-15.20														89	24			CB39 to CB41
Sta 162+69.43	42	2	24		79								A	0.06													C-15.20														59	16			CB40 to CB41
Sta 164+24.17	43	2	24		17								A	0.06										1			C-15.20														13	3			CB41 to Outfall
Sta A 56+48.91	44	2	24		113								A	0.06													C-15.20														85	23			CB42 to CB43
Sta A 56+48.48	45	2	24		4								A	0.06													C-15.20														3	1			CB43 to MH4
Sta A 56+50.04	46	2	24		26								A	0.06													C-18.10														20	5			MH4 to Channel
Sta A 57+04.59	47	2	24		155								A	0.06																											116	31			CB50 to Existing MH
Sta A 59+23.92	48	2	24		100								A	0.06													C-15.20														75	20			CB44 to CB45
Sta A 59+24.10	49	2	24		20								A	0.06										1			C-15.20														15	4			CB45 to Outfall
Sta A 59+89.09	50	1	24		62								A	0.06										2																	30	12			Outfall to Outfall
Sta A 61+70.89	51	2	24		100								A	0.06													C-15.20														75	20			CB48 to CB47
Sta A 61+70.33	52	2	24		24								A	0.06													C-15.20														18	5			CB47 to CB50
Sta A 64+99.85	53	2	24		31								A	0.06										1			C-15.20														23	6			CB48 to MH5
Sta A 64+99.80	54	2	24		224								A	0.06													C-18.10														168	45			MH5 to MH6
Sheet Total																								15																	1665	456			

FILL HEIGHT RANGE TABLE (Ft.)

RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL	>	1	3	5	8	11	15	20	25	30	40	55	70
HEIGHT (Ft.)	≤	3	5	8	11	15	20	25	30	40	55	70	90

◒ SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.

◪ PIPE CORRUGATION			
A	2⅔x½	D	6x2
B	3x1	E	3x1 or 9x2½
C	9x2½		

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	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

NEW PIPE SUMMARY SHEET

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. G-03.02
___ OF ___

PLOT DATE:Jul. 24, 2018 TIME:10:32
PLOT BY:AHOFFMAN
FILE NAME:c:\pwworking\phx\d0476786\h8045ps02.dgn
DATE
LOCATION
REVISIONS
FINISHED PLANS
SURVEY NO.
REVISION DATE 07/27/2012

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

NOTE:
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CSP - CORRUGATED STEEL PIPE
CAP - CORRUGATED ALUMINUM PIPE
RCP - REINFORCED CONCRETE PIPE
NRCP - NON-REINFORCED CONCRETE PIPE
NRCIPCP - NON-REINFORCED CAST-IN-PLACE CONCRETE PIPE
CHDPEPP - CORRUGATED HIGH-DENSITY POLYETHYLENE PLASTIC PIPE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	12	163	
		189 SC 000			

	DESCRIPTION						CSP									CAP			RCP		NRCP	NRCIPCP	CHDPEPP	END TREATMENT																					QUANTITIES			
				In.	In.	Ft.	Degree	In.	Coating							In.					In.		Each	Catch Basin, Manhole, Headwall & Junction Structure																					Cubic Yard			
																							End Section	Ea				Ft.			Grate		Ft.												
Station	Plan Reference Number	Controlling Fill Height Range	Size, Corrugated	Size, Smooth	Length (0)	Skew (0)	Corrugation	Wall Thickness (0.000)	Zinc	Bituminous Coated Zinc	Aluminum	Bituminous Coated Aluminum	Corrugation	Wall Thickness (0.000)	Uncoated	Bituminous Coated	Class - Non-Trench	Class - Trench	Minimum Wall Thickness (0)	AASHTO M-294 Type C	AASHTO M-294 Type S	C-13.20 & C-13.25	Detail	Size, (In) Manhole	Standard or Detail	S-Single / D-Double	Location	H (0.0)	L Wing (0.0)	L 18° Slotted Drain (0)	L 24° Slotted Drain (0)	Type	Elevation (0.00)	In.	Ft.	Depth	L (0.0)	Inlet Depression C-15.70	Pipe Excavation (0)	Pipe Backfill (0) C-13.15	Drainage Excavation (0)	Berm/Dike Embankment (0)	REMARKS
Sta A 67+24.30	55	2	24		20								A	0.06										C-15.20														15	4			CB49 to MH6
Sta A 67+23.57	56	2	24		280								A	0.06										C-18.10														210	56			MH6 to MH7
Sta A 70+17.03	57	2	24		22								A	0.06										C-15.20														17	4			CB50 to MH7
Sta A 70+15.66	58	2	24		273								A	0.06										C-18.10														205	55			MH7 to MH8
Sta A 75+46.19	59	2	24		30								A	0.06										C-15.20														23	6			CB52 to MH9
Sta A 75+45.51	60	2	24		253								A	0.06										C-18.10														190	51			MH9 to MH10
Sta A 77+96.95	61	2	24		21								A	0.06										C-15.20														16	4			CB53 to MH10
Sta A 77+97.10	62	2	24		278								A	0.06										C-18.10														209	56			MH10 to MH11
Sta A 80+66.91	63	2	24		21								A	0.06										C-15.20														16	4			CB53 to MH11
Sta A 84+24.10	64	2	24		18								A	0.06										C-15.20														14	4			Existing Pipe to CB54
Sta A 84+21.62	65	2	24		5								A	0.06										C-15.80														4	1			CB55 to CB54
Sta A 87+23.43	66	2	24		12								A	0.06										C-15.20														9	2			Existing Pipe to CB56
Sta A 87+22.98	67	2	24		7								A	0.06										DET 16														5	1			CB56 to Det 16
Sta A 87+22.94	68	1	24		80								A	0.06										DET 16														39	16			Det 16 to New Channel
Sheet Total																																						972	264			

FILL HEIGHT RANGE TABLE (Ft.)

RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL	>	1	3	5	8	11	15	20	25	30	40	55	70
HEIGHT (Ft.)	≤	3	5	8	11	15	20	25	30	40	55	70	90

◒ SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.

PIPE CORRUGATION			
A	2⅔x½	D	6x2
B	3x1	E	3x1 or 9x2½
C	9x2½		

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

NEW PIPE SUMMARY SHEET

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-03.03
___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ps03.dgn PLOT DATE=Jul. 24, 2018 TIME=10:32
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-
PLOT BY=AHOFFMAN
REM DATE 07/27/2012

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	13	163	
		189 SC 000			

CAP - CORRUGATED ALUMINUM PIPE

DESCRIPTION											CAP						END TREATMENT											QUANTITIES					
				In.	Ft.	Degree	Each	Ft.			Ft.			In.			Each			Catch Basin, Manhole, Headwall & Junction Structure									Cubic Yard					
								Remove Existing Pipe			Extend						End Section C-13.25						Ft.		Grate Ft.								
Station	Plan Reference Number	Controlling Fill Height Range (Ft.)	Size	Length In Place (0.0)	Skew (0)	Remove & Salvage End Section	Remove Headwall	Left (0.0)	Right (0.0)	Left (0)	Right (0)	Corrugation	Wall Thickness (0.000)	Uncoated	Bituminous Coated	Reset Salvaged End Section	New	Detail	Size, (In.) Manhole	Standard or Detail	S-Single / D-Double	Location	H (0.0)	L Wing (0.0)	L 18° Slotted Drain (0)	L 24° Slotted Drain (0)	Type	Elevation (0.00)	Depth In.	Depth Ft.	L (0.0)	Inlet Depression C-15.70	Pipe Excavation (0)	Pipe Backfill (0) C-13.15	Drainage Excavation (0)	Berm Embankment (0)	Dike Embankment (0)	REMARKS
67+29.13	1	3	24	195	35 Lt						34	A	0.06							SD 6.30	S	RT										37	4				
21+11.36	2	4	24	232						67		A	0.06																			225	14				
18+28.75	3	4	24	165	20 Rt					18	10	A	0.06				X															60	4				
73+63.85	4	2	30	192	30 Rt						2	A	0.06				X			SD 6.30	S	RT										8	2				
77+12.12	5	1	24	183	5 Lt							A	0.06																			1	0				
81+82.98	6	1	30	222	30 Lt					5		A	0.06				X			SD 6.30	S	RT										3	1				
109+75.52	7	2	36	170	25 Lt					2	12	A	0.06				X			SD 6.30	S	LT										2	1				
128+44.06	8	3	54	156						24		A	0.06							SD 6.30	D	RT/LT										86	21				
131+86.98	9	2	36	174	5 Rt					9	3	A	0.06							SD 6.30	S	LT										9	3				
133+22.11	10	3	30	158	5 Rt					11		A	0.06							SD 6.30	D	RT/LT										24	3				
135+49.98	11	2	24	148	5 Rt					7		A	0.06																			5	1				
A 56+99.85	12	1	24	81						23		A	0.06				X															11	5				
A 88+10.63	13	2	18	116						18		A	0.06				X			DET 13												12	3				
A 88+96.57	14	2	24	116						18		A	0.06							DET 14												14	4				
Sheet Total																																497	66				

FILL HEIGHT RANGE TABLE (Ft.)												
RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL HEIGHT (Ft.)	>	1	3	5	8	11	15	20	25	30	40	55	70
	≤	3	5	8	11	15	20	25	30	40	55	70	90
◒ SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.													

◪ PIPE CORRUGATION			
A	2⅔×½	D	6×2
B	3×1	E	3×1 or 9×2½
C	9×2½		

NOTE:
FOR PIPE CULVERT PLACEMENT SEE STANDARD DRAWINGS C-13.10 AND C-13.15

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

NEW CORRUGATED ALUMINUM PIPE EXTENSIONS SUMMARY SHEET

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-03.04

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ps04.dgn PLOT DATE=Jul 24, 2018 TIME=10:32
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-
PLOT BY=AHOFFMAN
REV DATE 07/27/2012

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	14	163	

189 SC 000

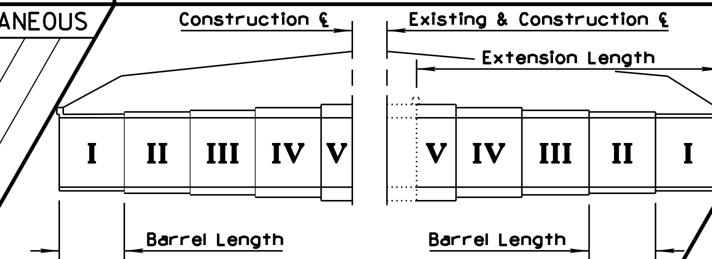
DESCRIPTION

Plan Reference Number ◯ & (BE)	Structure Number	New	Extend	Number of Barrels	Barrel Span (0.0)	Barrel Height (0.0)	Culvert Length (0.0)	Skew (Degree) (0)	SD 6.01 Miscellaneous Details	SD 6.01 Extension Details	◪ Standard or Detail
1			x	2	10	4	37	30	x	x	Det D24
Station:											
Existing:											
2			x	1	10	5	63	0	x	x	Det D25
Station:											
Existing:											
164											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											
Station:											
Existing:											

END TREATMENT

▼ Location	WINGS: Inlet Wings	WINGS: Outlet Wings	WINGS: ◪ Standard or Detail	APRONS: Apron	APRONS: ◪ Standard or Detail	MISCELLANEOUS: Scour/Bank Protection	MISCELLANEOUS: ◪ Standard or Detail	MISCELLANEOUS: Energy Dissipators	MISCELLANEOUS: Detail
Left	x		SD 6.08						
Right		x	SD 6.08			x	Det x		
Left		x	SD 6.08	x	Det x				
Right	x		SD 6.08						
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									
Left									
Right									

LENGTH OF BARREL & BARREL EXTENSIONS / APPROXIMATE QUANTITIES



	Linear Feet (0.0) ▲ Left of ℄: I	Left II	Left III	Left IV	Left V	▲ Right of ℄: V	Right IV	Right III	Right II	Right I	◑ Reinforcing Steel (0) Lbs.	◑ Place Dowels Ea.	◑ Class S Concrete f'c=3,000 PSI (Cubic Yards)	◑ Remove Str Concrete (0)	◑ Structural Excavation (0)	◑ Structure Backfill (0)	Berm Embankment (0)	Dike Embankment (0)	Drainage Excavation (0)	REMARKS
	32										11019		76	13						Det D13
										5	1734		27	13						Headwall Skew 30°
Box Culvert Total																				
	18	23									8942		54	31						Det D14
										22	3819		31	13						Connect to Exst
Box Culvert Total																				Concrete Channel
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Box Culvert Total																				
Sheet Total:											25514		188	70						

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.00) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

◑ TOTALS SHOWN FOR THE BOX CULVERT INCLUDE THE QUANTITIES FOR HEADWALLS, WINGS, APRONS, CURBS, CUT-OFF WALLS AND LAPS AT CONSTRUCTION JOINTS.

NOTE:
FOR STRUCTURAL EXCAVATION, STRUCTURE BACKFILL PLACEMENT AND MEASUREMENT, SEE STRUCTURE DETAIL DRAWING SD 6.01 (4 OF 5)

◪ BRIDGE GROUP STRUCTURE DETAIL DRAWINGS SD 6.01 TO SD 6.11

▲ Construction ℄ Looking Ahead

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

REINFORCED CONC BOX CULVERT AND BOX CULVERT EXTENSION SUMMARY SHEET

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. G-03.05
TRACS NO. H8045 01L
189-SC-000
____ OF ____

FILE NAME: c:\pwworking\phx\d0476786\h8045ps05.dgn
PLOT DATE: Jul, 24, 2018 TIME: 10:32:28 AM
PLOT BY: AHOFFMAN
REV. DATE: 08/08/2013

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

NOTE:
FOR PIPE CULVERT PLACEMENT SEE STANDARD DRAWINGS C-13.10 AND C-13.15

NOTE:
PIPE OPTIONS SELECTED ARE THOSE REQUIRED TO MEET MINIMUM SERVICE LIFE.
ALLOWABLE PIPE OPTIONS ARE INDICATED WITH THE LETTER 'X' IN THE SPACE. BLANK SPACES ARE NOT ALLOWABLE ALTERNATES.

CSP - CORRUGATED STEEL PIPE
CAP - CORRUGATED ALUMINUM PIPE
RCP - REINFORCED CONCRETE PIPE
NRCP - NON-REINFORCED CONCRETE PIPE
NRCIPCP - NON-REINFORCED CAST-IN-PLACE CONCRETE PIPE
CHDPEPP - CORRUGATED HIGH-DENSITY POLYETHYLENE PLASTIC PIPE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	15	163	
		189 SC 000			

Station	Plan Reference Number	Controlling Fill Height Range	Size, Corrugated (In.)	Size, Smooth (In.)	Length (0) (Ft.)	Skew (0) (Degree)	CSP: Corrugation	CSP: Wall Thickness (0.000)	CSP: Coating: Zinc	CSP: Coating: Bituminous Coated Zinc	CSP: Coating: Aluminum	CSP: Coating: Bituminous Coated Aluminum	CAP: Corrugation	CAP: Wall Thickness (0.000)	CAP: Coating: Uncoated	CAP: Coating: Bituminous Coated	RCP: Class - Non-Trench	RCP: Class - Trench	NRCP: Class	NRCIPCP: Minimum Wall Thickness (0) (In.)	CHDPEPP: AASHTO M-294 Type C	CHDPEPP: AASHTO M-294 Type S	CHDPEPP: C-13.20 & C-13.25	End Section: Detail (Each)	End Section: Size, (In) Manhole (Each)	End Section: Standard or Detail (Each)	Catch Basin, Manhole, Headwall & Junction Structure: S-Single / D-Double (Ea)	Catch Basin, Manhole, Headwall & Junction Structure: Location (Ea)	Catch Basin, Manhole, Headwall & Junction Structure: H (0.0) (Ft.)	Catch Basin, Manhole, Headwall & Junction Structure: L Wing (0.0) (Ft.)	Catch Basin, Manhole, Headwall & Junction Structure: L 18" Slotted Drain (0) (Ft.)	Catch Basin, Manhole, Headwall & Junction Structure: L 24" Slotted Drain (0) (Ft.)	Catch Basin, Manhole, Headwall & Junction Structure: Type (Grate)	Catch Basin, Manhole, Headwall & Junction Structure: Elevation (0.00) (Grate) (Ft.)	Catch Basin, Manhole, Headwall & Junction Structure: Depth (In.) (Grate)	Catch Basin, Manhole, Headwall & Junction Structure: L (0.0) (Grate) (Ft.)	Inlet Depression C-15.70 (Ft.)	Pipe Excavation (0) (Cubic Yard)	Pipe Backfill (0) C-13.15 (Cubic Yard)	Drainage Excavation (0) (Cubic Yard)	Berm/Dike Embankment (0) (Cubic Yard)	REMARKS
129+15.24	200	2	24		60								A	0.06										2														45	12			Outfall to Outfall
136+40.45	201	2	24		83								A	0.06												C-15.92												62	17			CB201 to CB202
137+31.03	202	2	24		40								A	0.06										1		C-15.92												30	8			CB202 to Outfall
137+73.69	203	2	24		87								A	0.06										1		C-15.92												65	17			CB203 to Outfall
138+77.02	204	2	30		349								A	0.06												C-15.92												262	70			CB204 to MH201
142+46.58	205	2	36		318								A	0.06												C-15.20												239	64			MH201 to CB205
145+45.42	206	2	24		63								A	0.06												C-15.92												47	13			CB206 to CB205
145+52.81	207	2	36		168								A	0.06												C-15.80												126	34			CB205 to CB207
147+07.51	208	2	36		234								A	0.06										1		C-18.10												176	47			CB207 to Outfall
141+46.00	209	2	24		63								A	0.06										1		C-18.10												47	13			CB208 to CB210
141+46.14	210	2	24		65								A	0.06										1		C-15.80												49	13			CB210 to MH202
141+46.13	211	2	24		327								A	0.06										1		C-15.92												245	66			MH202 to MH203
144+76.86	212	2	36		333								A	0.06										1		C-15.80												250	67			CB23 to Outfall
148+46.82	213	2	24		14								A	0.06										1		C-15.80												11	3			CB218 to Outfall
145+21.46	214	2	24		40								A	0.06												C-15.80												30	8			CB210 to CB211
144+45.32	215	2	24		30								A	0.06												C-15.80												23	6			CB212 to CB211
144+62.28	216	2	24		33								A	0.06												C-15.92												25	7			CB211 to CB216
145+22.45	217	2	24		30								A	0.06												C-15.92												23	6			CB213 to CB214
144+33.30	218	2	24		44								A	0.06												C-15.92												33	9			CB218 to CB216
144+80.46	219	2	24		39								A	0.06												C-15.20												29	8			CB216 to CB217
145+74.13	220	2	24		92								A	0.06												C-18.10												69	18			CB220 to CB217
144+78.82	221	2	24		14								A	0.06												C-18.10												11	3			CB217 to MH203
150+83.94	222	2	24		4								A	0.06										1		C-18.10												3	1			CB219 to Outfall
152+16.07	223	2	24		60								A	0.06												C-18.10												45	12			CB223 to CB224
152+72.44	224	2	24		24								A	0.06										1		C-15.92												18	5			CB224 to Outfall
155+06.98	225	2	24		10								A	0.06										1		C-15.20												8	2			CB221 to Outfall
156+82.67	226	2	24		10								A	0.06										1		C-15.92												8	2			CB222 to Outfall
Sheet Total																								14													1979	531			

FILL HEIGHT RANGE TABLE (Ft.)													
RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL HEIGHT (Ft.)	>	1	3	5	8	11	15	20	25	30	40	55	70
	≤	3	5	8	11	15	20	25	30	40	55	70	90

◒ SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.

PIPE CORRUGATION			
A	2⅔x½	D	6x2
B	3x1	E	3x1 or 9x2½
C	9x2½		

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
NEW PIPE SUMMARY SHEET

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-04.01
___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ps01ult.dgn PLOT DATE=Jul. 24, 2018 TIME=10:32
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE
PLOT BY=AHOFFMAN
REV DATE 07/27/2012

NOTE:
THE ZEROS IN PARENTHESES (0, 0.0 & 0.000) INDICATE THE DIMENSIONAL PRECISION FOR THAT COLUMN

NOTE:
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CSP - CORRUGATED STEEL PIPE
CAP - CORRUGATED ALUMINUM PIPE
RCP - REINFORCED CONCRETE PIPE
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CHDPEPP - CORRUGATED HIGH-DENSITY POLYETHYLENE PLASTIC PIPE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	16	163	
		189 SC 000			

Station	Plan Reference Number	Controlling Fill Height Range	DESCRIPTION: Size, Corrugated (In.)	Size, Smooth (In.)	Length (0) (Ft.)	Skew (0) (Degree)	CSP: Corrugation	CSP: Wall Thickness (0.000) (In.)	CSP: Coating: Zinc	CSP: Coating: Bituminous Coated Zinc	CSP: Coating: Aluminum	CSP: Coating: Bituminous Coated Aluminum	CAP: Corrugation	CAP: Wall Thickness (0.000) (In.)	CAP: Coating: Uncoated	CAP: Coating: Bituminous Coated	RCP: Class - Non-Trench	RCP: Class - Trench	RCP: Class	Minimum Wall Thickness (0) (In.)	NRCP: AASHTO M-294 Type C	NRCIPCP: AASHTO M-294 Type S	CHDPEPP: C-13.20 & C-13.25	END TREATMENT: Each: End Section: Detail	End Section: Size, (In) Manhole	End Section: Standard or Detail	Catch Basin, Manhole, Headwall & Junction Structure: Ea: S-Single / D-Double	Ea: Location	Ea: H (0.0)	Ea: L Wing (0.0)	Ea: L 18° Slotted Drain (0)	Ea: L 24° Slotted Drain (0)	Ea: Type	Ea: Elevation (0.00)	Ft.: Grate: Ft.: Depth (In.)	Ft.: Grate: Ft.: L (0.0) (Ft.)	Inlet Depression C-15.70	QUANTITIES: Cubic Yard: Pipe Excavation (0)	Pipe Backfill (0) C-13.15	Drainage Excavation (0)	Berm/Dike Embankment (0)	REMARKS
151+16.38	227	2	36		164								A	0.06										1			C-15.20												123	33			Outfall to MH204
152+80.76	228	1	36		76								A	0.06													C-18.10												57	15			MH204 to CB220
153+52.81	229	2	36		180								A	0.06													C-15.20												135	36			CB220 to MH205
155+18.24	230	1	36		260								A	0.06																									195	52			MH205 to MH206
157+55.75	231	2	42		162								A	0.06										1			C-18.10												122	33			MH206 to Outfall
163+19.17	232	2	24		112								A	0.06													C-15.20												84	22			CB228 to CB229
164+25.65	233	2	24		10								A	0.06										1			C-15.20												8	2			CB229 to Outfall
162+39.38	234	2	24		67								A	0.06													C-15.20												50	13			CB225 to CB226
163+04.68	235	2	24		76								A	0.06													C-15.20												57	15			CB226 to CB227
Sheet Total																								3														831	221			

FILL HEIGHT RANGE TABLE (Ft.)

RANGE NO.		1	2	3	4	5	6	7	8	9	10	11	12
FILL	>	1	3	5	8	11	15	20	25	30	40	55	70
HEIGHT (Ft.)	≤	3	5	8	11	15	20	25	30	40	55	70	90

◒ SHOULD FIELD CONDITIONS VARY FROM THE RANGE INDICATED, CONTACT DESIGN FOR RE-EVALUATION OF PIPE DESIGN REQUIREMENTS.

PIPE CORRUGATION			
A	2⅔×½	D	6×2
B	3×1	E	3×1 or 9×2½
C	9×2½		

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
NEW PIPE SUMMARY SHEET

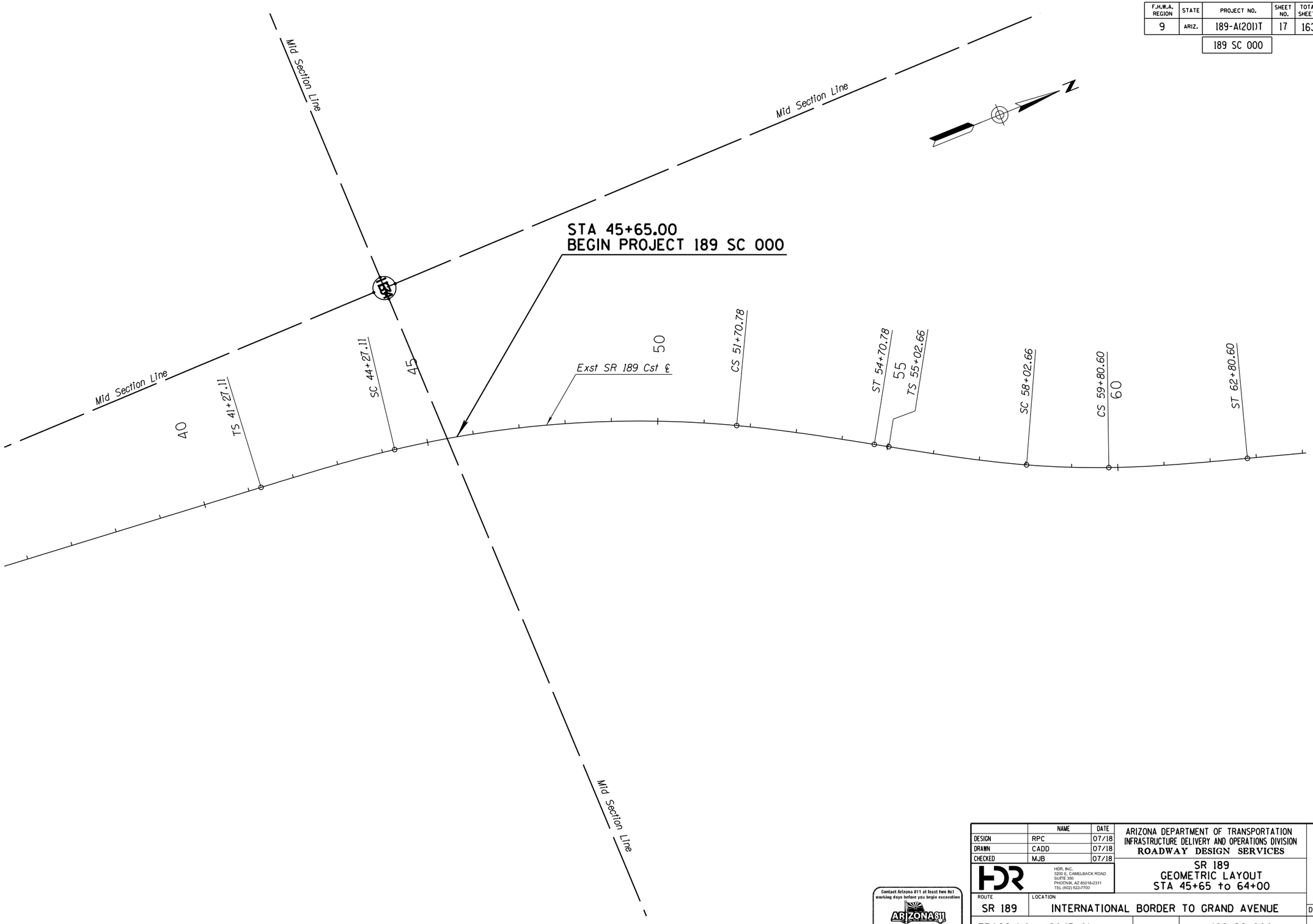
ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-04.02
___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ps02ui1.dgn PLOT DATE=Jul. 24, 2018 TIME=10:32
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-
PLOT BY=AHOFFMAN
REV DATE 07/27/2012

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	17	163	
		189 SC 000			



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ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 45+65 to 64+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

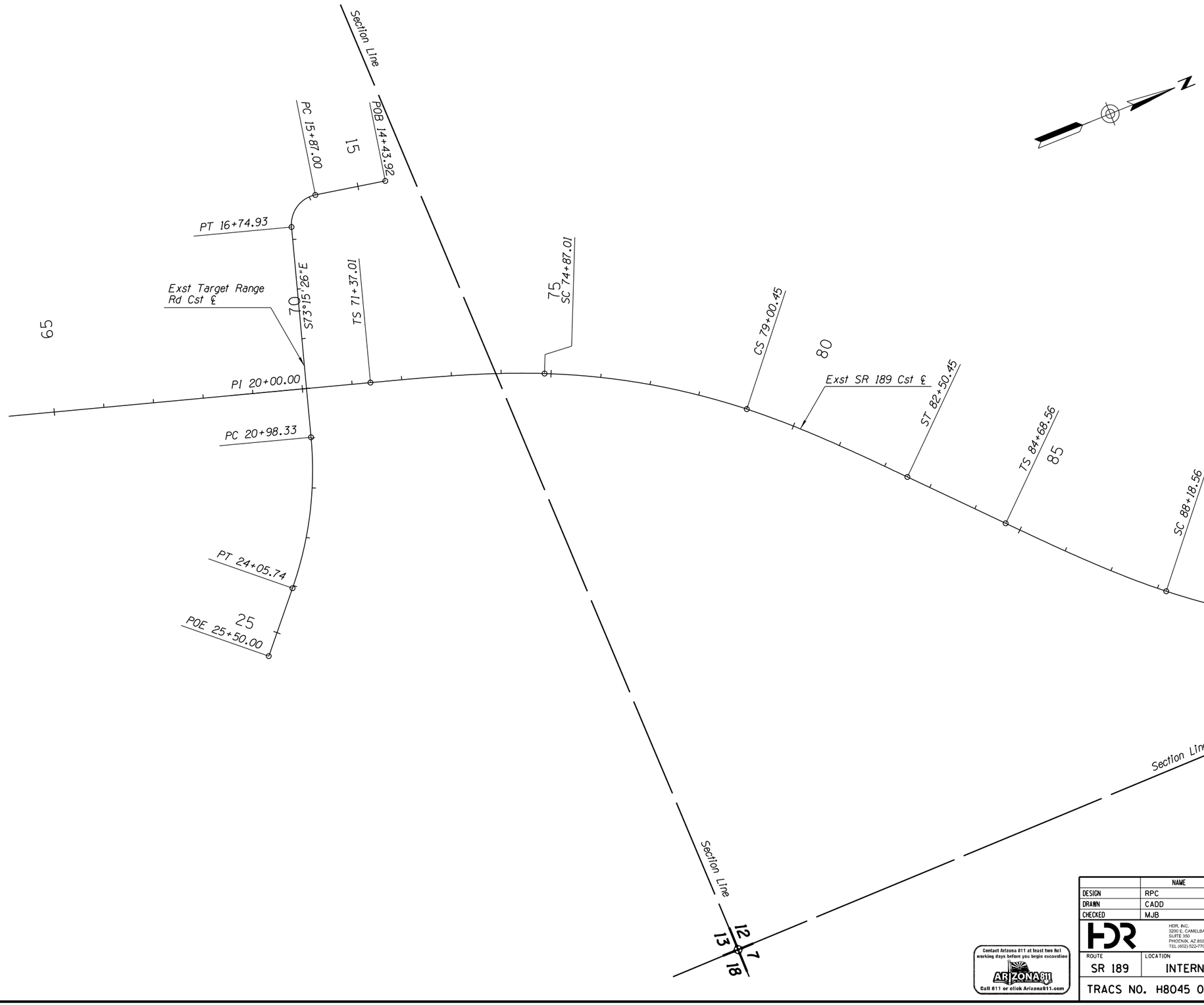
DWG NO. G-05.01

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ge01.dgn PLOT DATE=Jul, 24, 2018 TIME=10:32:53 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	18	163	
		189 SC 000			



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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 64+00 to 94+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

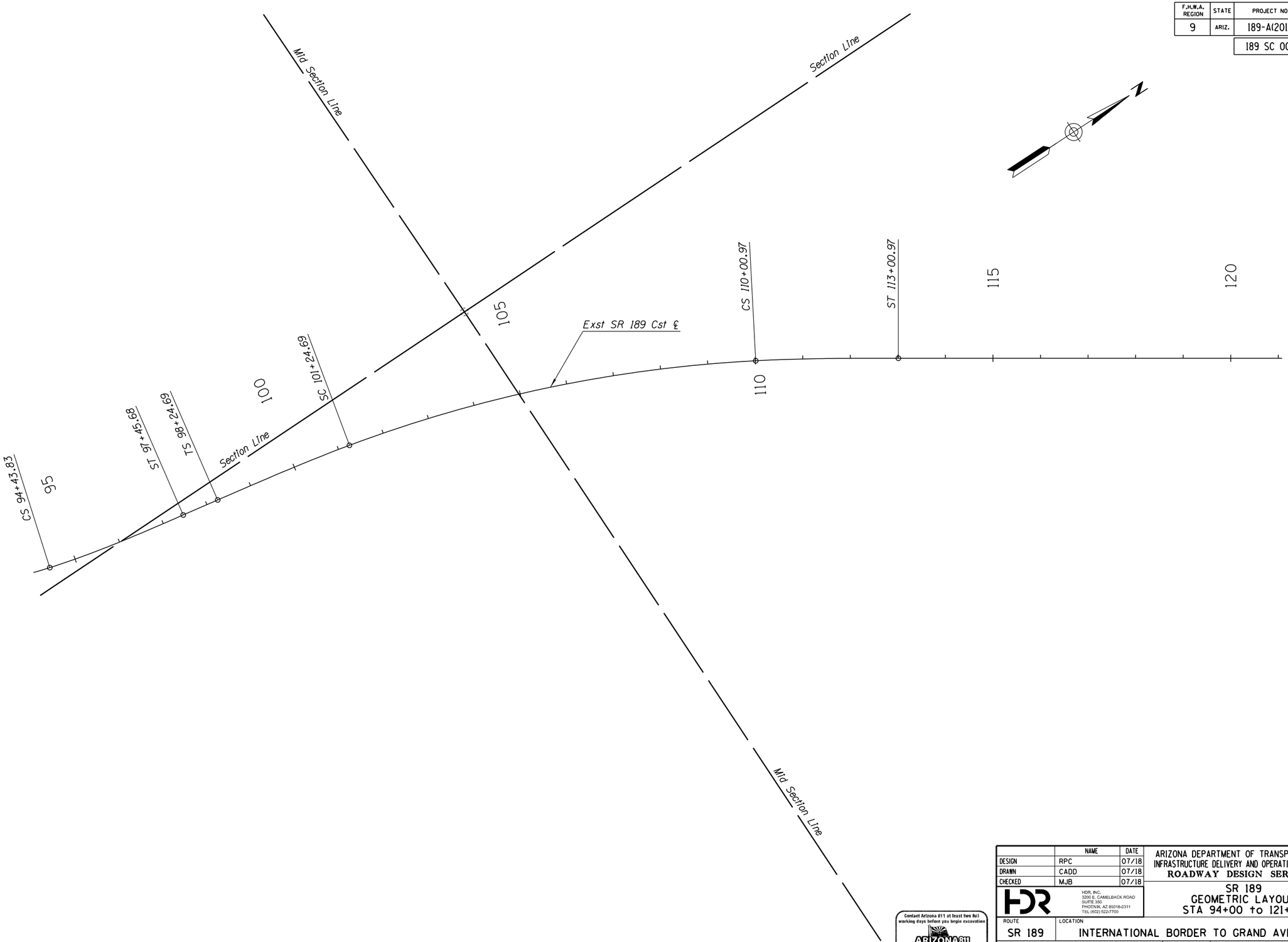
DWG NO. G-05.02

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045ge02.dgn PLOT DATE=Jul, 24, 2018 TIME=10:33:05 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	19	163	
		189 SC 000			



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ARIZONA811
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 94+00 to 121+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

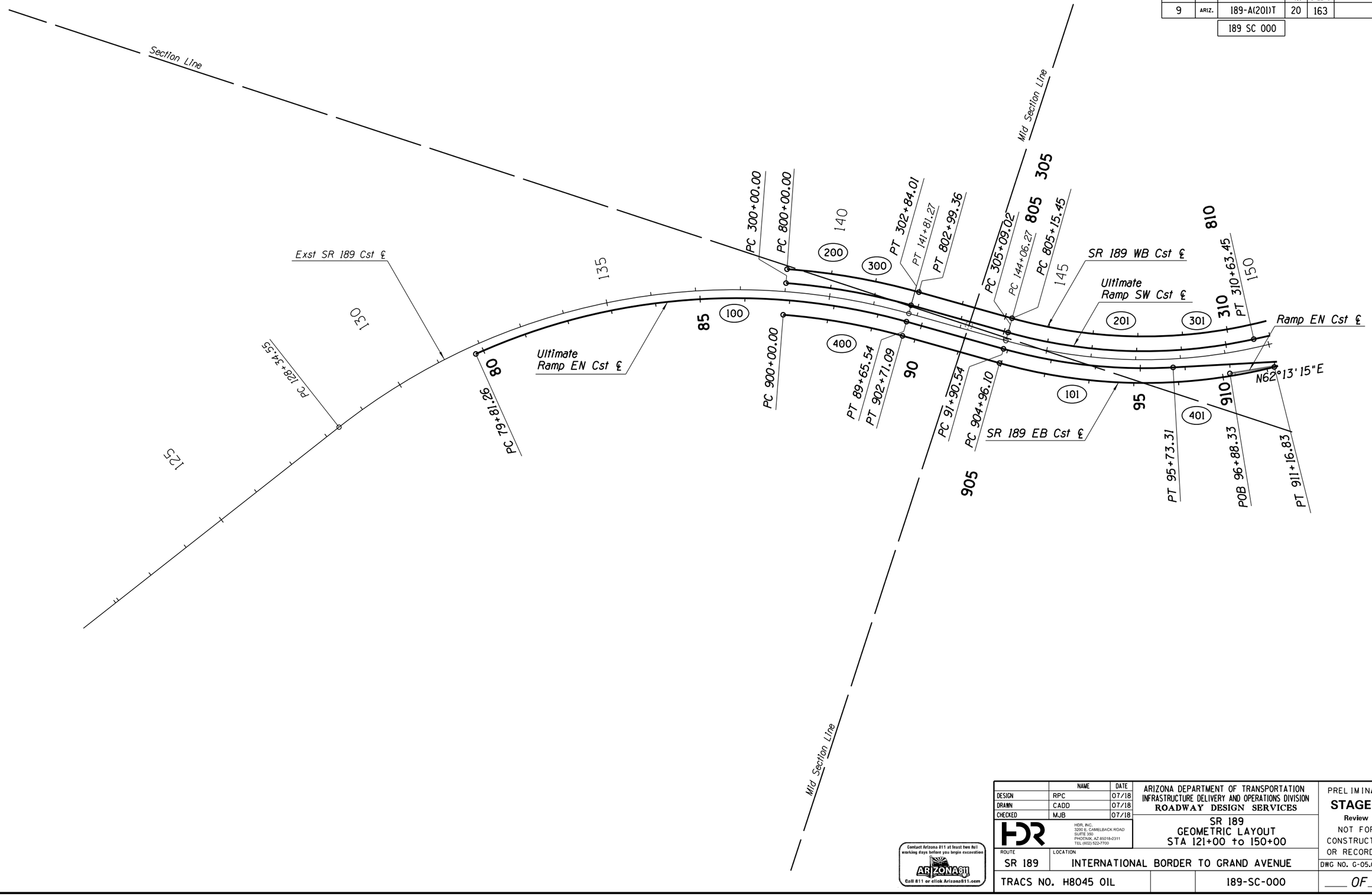
DWG NO. G-05.03

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045ge03.dgn PLOT DATE=Jul 24, 2018 TIME=10:33:14 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	20	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 121+00 to 150+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-05.04

____ OF ____

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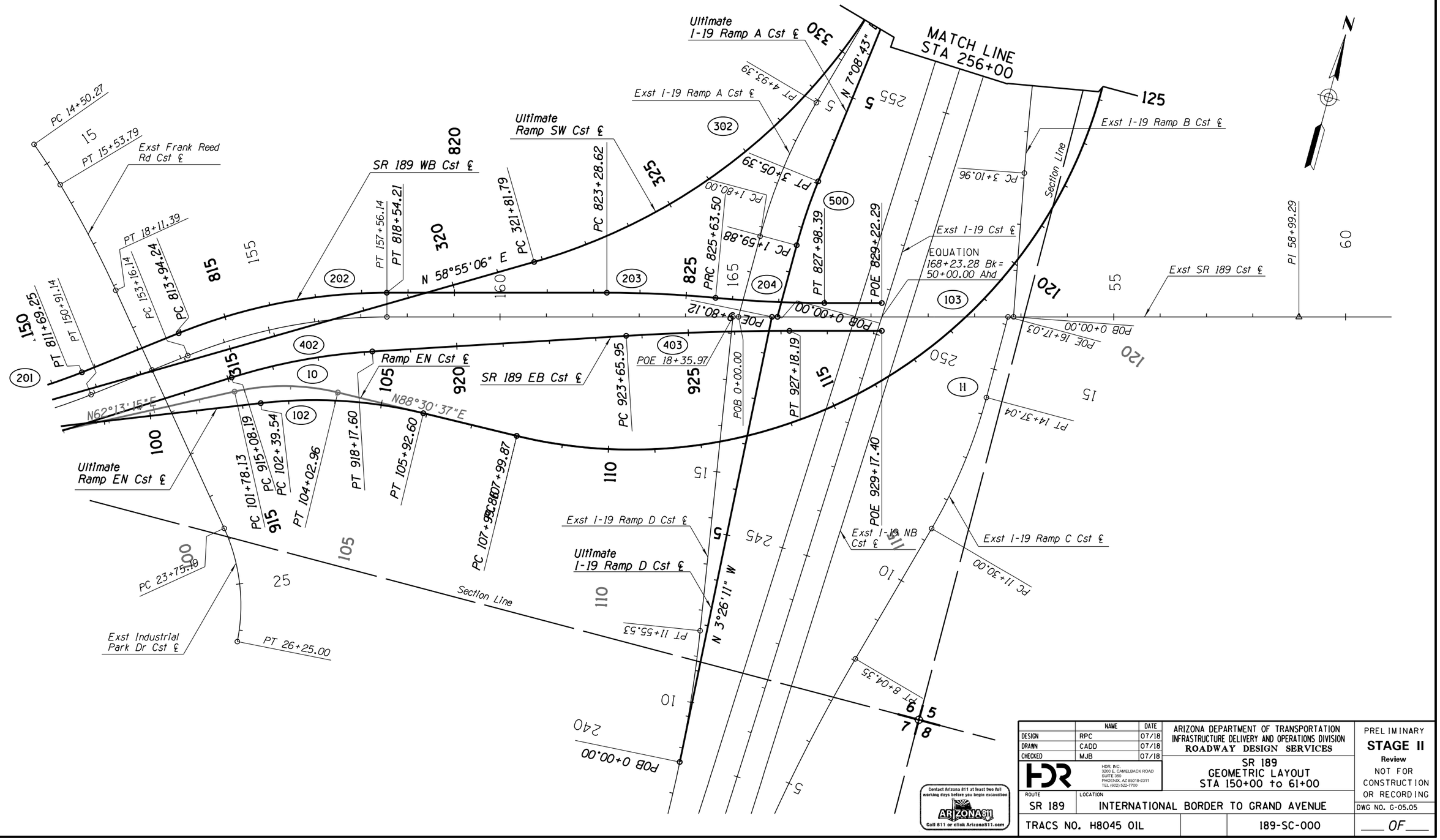
FILE NAME: c:\pwworking\phx\d0476786\h8045geo04.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:33:22 AM PLOT SCALE: 1:200 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	21	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 150+00 to 61+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-05.05

____ OF ____

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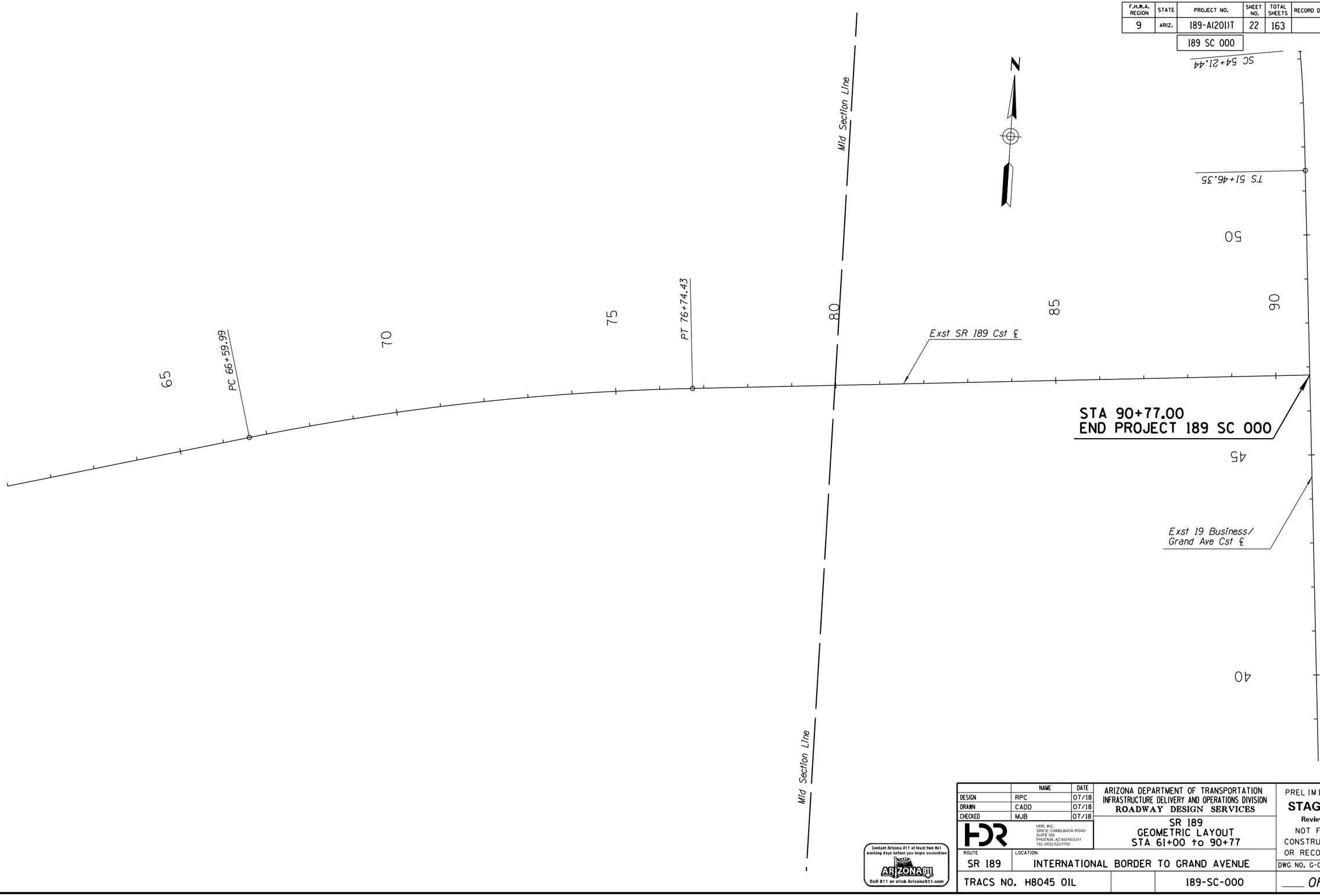
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	22	163	

189 SC 000



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ARIZONA811
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189
GEOMETRIC LAYOUT
STA 61+00 to 90+77

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-05.06

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045ge06.dgn PLOT DATE=Jul, 24, 2018 TIME=10:33:42 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	23	163	
		189 SC 000			

FILE NAME:c:\pwworking\phx\d0476786\h8045geo07.dgn PLOT DATE:Jul. 24, 2018 TIME:10:33:51 AM PLOT SCALE:1:200 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

N

Mid Section Line

Section Line

MATCH LINE
STA 256+00

PCC 331+08.71
PC 7+91.67
PCC 332+50.26
POE 10+90.19
PT 343+90.71
PT 20+07.05
PT 8+69.99
POE 11+03.62
PC 128+95.51
PT 126+25.11
PC 142+55.43
PT 139+80.35
POE 145+73.88

Ultimate
I-19 Ramp A Cst ℄

Ultimate
Ramp SW Cst ℄

Exst I-19 Ramp A
Cst ℄

Exst I-19 Cst ℄

Exst I-19 SB Cst ℄

Exst I-19 NB Cst ℄

Exst I-19 Ramp B
Cst ℄

Ramp EN Cst ℄

Ultimate
Ramp EN Cst ℄

N12°56'19"W

N11°05'21"W

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19
GEOMETRIC LAYOUT
STA 256+00 to 285+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-05.07

____ OF ____

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Centerline Geometric Data Sheet

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	24	163	
		189 SC 000			

PLAN REF NO.	DESCRIPTION	Point Type	STATION	COORDINATES		Spiral Total					Spiral Main or Circular Curve							Spiral Curve			
				Northing	Easting	Total Delta	T	L	R+o	Ext	Δ	D	R	L	T	Ext	Super	Δ	L	o	t
	164																				
	Ramp EN Cst ℄	*POB*	*96+88.33*	*133481.64*	*1002058.47*																
164	*Ramp EN Cst ℄*	*PC*	*101+78.13*	*133709.92*	*1002491.82*																
10	*Ramp EN Cst ℄*	*PI*	*102+92.56*	*133763.25*	*1002593.06*						*Δ=26°17'22"Rt*	*11°41'35"*	*490.00'*	*224.83'*	*114.43'*	*13.18'*					
	Ramp EN Cst ℄	*PT*	*104+02.96*	*133766.23*	*1002707.45*																
	Ramp EN Cst ℄	*PC*	*107+99.86*	*133776.55*	*1003104.22*																
11	*Ramp EN Cst ℄*	*PI*	*121+62.72*	*133811.98*	*1004466.62*						*Δ=104°46'33"Lt*	*5°27'24"*	*1050.00'*	*1920.12'*	*1362.86'*	*670.43'*					
	Ramp EN Cst ℄	*PT*	*127+19.98*	*135120.29*	*1004084.89*																
	Ramp EN Cst ℄	*POE*	*139+07.26*	*136260.04*	*1003752.34*																
	Ultimate Ramp EN Cst ℄	*PC*	*79+81.26*	*132986.97*	*1000448.16*																
100	*Ultimate Ramp EN Cst ℄*	*PI*	*84+94.30*	*133335.51*	*1000824.64*						*Δ=39°54'02"Rt*	*4°03'14"*	*1413.39'*	*984.28'*	*513.04'*	*90.23'*					
	Ultimate Ramp EN Cst ℄	*PT*	*89+65.54*	*133361.40*	*1001337.03*																
	Ultimate Ramp EN Cst ℄	*PC*	*91+90.54*	*133372.76*	*1001561.75*																
101	*Ultimate Ramp EN Cst ℄*	*PI*	*93+83.67*	*133382.50*	*1001754.62*						*Δ=18°49'33"Lt*	*4°55'06"*	*1164.92'*	*382.76'*	*193.12'*	*15.90'*					
	Ultimate Ramp EN Cst ℄	*PT*	*95+73.31*	*133453.97*	*1001934.04*																
	Ultimate Ramp EN Cst ℄	*PC*	*102+39.54*	*133700.51*	*1002552.98*																
102	*Ultimate Ramp EN Cst ℄*	*PI*	*104+17.93*	*133766.52*	*1002718.70*						*Δ=20°13'44"Rt*	*5°43'46"*	*1000.00'*	*353.06'*	*178.39'*	*15.79'*					
	Ultimate Ramp EN Cst ℄	*PT*	*105+92.60*	*13371.16*	*1002897.03*																
	Ultimate Ramp EN Cst ℄	*PC*	*107+99.87*	*133776.55*	*1003104.22*																
103	*Ultimate Ramp EN Cst ℄*	*PI*	*121+62.73*	*133811.98*	*1004466.62*						*Δ=104°46'33"Lt*	*5°27'24"*	*1050.00'*	*1920.12'*	*1362.86'*	*670.43'*					
	Ultimate Ramp EN Cst ℄	*PT*	*127+19.99*	*135120.29*	*1004084.89*																
	SR 189 WB Cst ℄	*PC*	*800+00.00*	*133387.62*	*1001046.93*																
200	*SR 189 WB Cst ℄*	*PI*	*801+50.19*	*133425.18*	*1001192.35*						*Δ=11°35'21"Rt*	*3°52'17"*	*1480.00'*	*299.36'*	*150.19'*	*7.60'*					
	SR 189 WB Cst ℄	*PT*	*802+99.36*	*133432.76*	*1001342.35*																
	SR 189 WB Cst ℄	*PC*	*805+15.45*	*133443.67*	*1001558.16*																
201	*SR 189 WB Cst ℄*	*PI*	*808+52.44*	*133460.67*	*1001894.72*						*Δ=34°14'37"Rt*	*5°14'16"*	*1093.92'*	*653.80'*	*336.99'*	*50.73'*					
	SR 189 WB Cst ℄	*PT*	*811+69.25*	*133664.12*	*1002163.37*																
	SR 189 WB Cst ℄	*PC*	*813+94.24*	*133799.95*	*1002342.74*																
202	*SR 189 WB Cst ℄*	*PI*	*816+27.09*	*133940.53*	*1002528.37*						*Δ=22°00'00"Rt*	*4°46'59"*	*1197.92'*	*459.97'*	*232.85'*	*22.42'*					
	SR 189 WB Cst ℄	*PT*	*818+54.21*	*134001.33*	*1002753.15*																
	SR 189 WB Cst ℄	*PC*	*823+28.62*	*134125.20*	*1003211.10*																
203	*SR 189 WB Cst ℄*	*PI*	*824+46.15*	*134155.89*	*1003324.55*						*Δ=5°22'59"Rt*	*2°17'31"*	*2500.00'*	*234.88'*	*117.53'*	*2.76'*					
	SR 189 WB Cst ℄	*PRC*	*825+63.50*	*134175.80*	*1003440.38*																
204	*SR 189 WB Cst ℄*	*PI*	*826+81.03*	*134195.71*	*1003556.21*						*Δ=5°22'59"Rt*	*2°17'31"*	*2500.00'*	*234.88'*	*117.53'*	*2.76'*					
	SR 189 WB Cst ℄	*PT*	*827+98.39*	*134226.40*	*1003669.66*																
	SR 189 WB Cst ℄	*POE*	*829+22.29*	*134258.75*	*1003789.26*																
	Ultimate Ramp SW Cst ℄	*PC*	*300+00.00*	*133357.45*	*1001054.67*																
300	*Ultimate Ramp SW Cst ℄*	*PI*	*301+42.46*	*133392.16*	*1001192.83*						*Δ=11°12'42"Rt*	*3°56'52"*	*1451.39'*	*284.01'*	*142.46'*	*6.97'*					
	Ultimate Ramp SW Cst ℄	*PT*	*302+84.01*	*133399.35*	*1001335.11*																
	Ultimate Ramp SW Cst ℄	*PC*	*305+09.02*	*133410.71*	*1001559.83*																
301	*Ultimate Ramp SW Cst ℄*	*PI*	*307+91.96*	*133424.99*	*1001842.42*						*Δ=28°11'20"Lt*	*5°05'03"*	*1126.92'*	*554.43'*	*282.95'*	*34.98'*					
	Ultimate Ramp SW Cst ℄	*PT*	*310+63.45*	*133571.06*	*1002084.74*																
	Ultimate Ramp SW Cst ℄	*PC*	*321+81.79*	*134148.42*	*1003042.52*																
302	*Ultimate Ramp SW Cst ℄*	*PI*	*326+66.88*	*134398.85*	*1003457.97*						*Δ=41°43'10"Lt*	*4°30'03"*	*1273.00'*	*926.92'*	*485.09'*	*89.29'*					
	Ultimate Ramp SW Cst ℄	*PCC*	*331+08.71*	*134862.24*	*1003601.40*																
303	*Ultimate Ramp SW Cst ℄*	*PI*	*331+79.51*	*134929.88*	*1003622.33*						*Δ=3°32'20"Lt*	*2°30'00"*	*2291.83'*	*141.55'*	*70.80'*	*1.09'*					

All Coordinates Are Ground Coordinates And All Bearings Are Grid Bearings G.A.F. = 1.000308795
All bearings and angles have been rounded to the nearest second.
Use the control points provided and their respective state plane coordinates to re-establish the centerline of each roadway.

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

GEOMETRIC DATA SHEET

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-06.01

____ OF ____

PLOT BY:AHOFFMAN PLOT SCALE:1:200 PLOT DATE:Jul. 24, 2018 TIME:10:33:57 AM
FILE NAME:c:\pwworking\phx\d0476786\h8045geodt01.dgn
DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

Centerline Geometric Data Sheet

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	25	163	
		189 SC 000			

PLAN REF NO.	DESCRIPTION	Point Type	STATION	COORDINATES		Spiral Total					Spiral Main or Circular Curve							Spiral Curve			
				Northing	Easting	Total Delta	T	L	R+o	Ext	Δ	D	R	L	T	Ext	Super	Δ	L	o	t
164	Ultimate Ramp SW Cst ℄	PCC	332+50.26	134998.67	1003639.05																
304	Ultimate Ramp SW Cst ℄	PI	338+32.55	135564.49	1003776.57						Δ=28°30'40"Lt	2°30'00"	2291.83'	1140.45'	582.29'	72.81'					
164	Ultimate Ramp SW Cst ℄	PT	343+90.71	136127.32	1003627.32																
		164																			
	SR 189 EB Cst ℄	PC	900+00.00	133288.35	1001071.03																
400	SR 189 EB Cst ℄	PI	901+35.98	133321.58	1001202.88						Δ=11°15'08"Rt	4°09'03"	1380.39'	271.09'	135.98'	6.68'					
	SR 189 EB Cst ℄	PT	902+71.09	133328.44	1001338.69																
	SR 189 EB Cst ℄	PC	904+96.10	133339.80	1001563.41																
401	SR 189 EB Cst ℄	PI	908+13.60	133355.82	1001880.51						Δ=29°41'22"Lt	4°46'59"	1197.92'	620.74'	317.51'	41.36'					
	SR 189 EB Cst ℄	PT	911+16.83	133526.80	1002148.05																
	SR 189 EB Cst ℄	PC	915+08.19	133737.55	1002477.81																
402	SR 189 EB Cst ℄	PI	916+63.66	133821.27	1002608.82						Δ=13°55'24"Rt	4°30'00"	1273.24'	309.41'	155.47'	9.46'					
	SR 189 EB Cst ℄	PT	918+17.60	133871.01	1002756.11																
	SR 189 EB Cst ℄	PC	923+65.95	134046.45	1003275.64																
403	SR 189 EB Cst ℄	PI	925+42.12	134102.81	1003442.56						Δ=3°31'22"Rt	1°00'00"	5729.00'	352.24'	176.18'	2.71'					
	SR 189 EB Cst ℄	PT	927+18.19	134148.82	1003612.62																
164	SR 189 EB Cst ℄	POE	929+17.40	134200.83	1003804.93																
	Ultimate I-19 Ramp A Cst ℄	PC	1+59.88	134330.99	1003579.58																
500	Ultimate I-19 Ramp A Cst ℄	PI	2+32.73	134403.84	1003579.40						Δ=7°16'53"Rt	5°00'14"	1145.00'	145.51'	72.85'	2.32'					
	Ultimate I-19 Ramp A Cst ℄	PT	3+05.39	134476.13	1003588.46																
	Ultimate I-19 Ramp A Cst ℄	POE	10+90.19	135254.84	1003686.08																
	Ultimate I-19 Ramp D Cst ℄	POB	0+00.00	133189.63	1003627.12																
	Ultimate I-19 Ramp D Cst ℄	POE	9+80.12	134167.97	1003568.37																

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ARIZONA811
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN SERVICES
GEOMETRIC DATA SHEET

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. G-06.02

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045geodt02.dgn PLOT DATE=Jul. 24, 2018 TIME=10:34:02 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN
DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	26	163	
		189 SC 000			

113-49-030
Delta Properties LLP

113-49-026B
Arizona Department
of Transportation

113-49-026C
MJV Corporation
AutoMotriz 50%

113-49-031
Arsenal Investments LLC

113-49-027
7659 Property LLC

113-49-002B
Kyriakis Apostolos D
& Maria Isabel 1/3

Mid Section Line

113-49-022
S & M LLC

Exst SR 189 Cst ℄

STA 45+65.00
BEGIN PROJECT 189 SC 000

Exst R/W

Exst Slope Easement

113-49-012
Kyriakis
Apostolos D

TS 41+27.11

SC 44+27.11

35

40

45

100'

100'

Exst R/W

Exst Slope Easement

Mid Section Line

113-49-025B
Arizona Department
of Transportation

113-49-025A
Arsenal Investments LLC

113-49-013B
Delta Properties LLP

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION PLAN SHEET
Sta 45+65 to 48+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

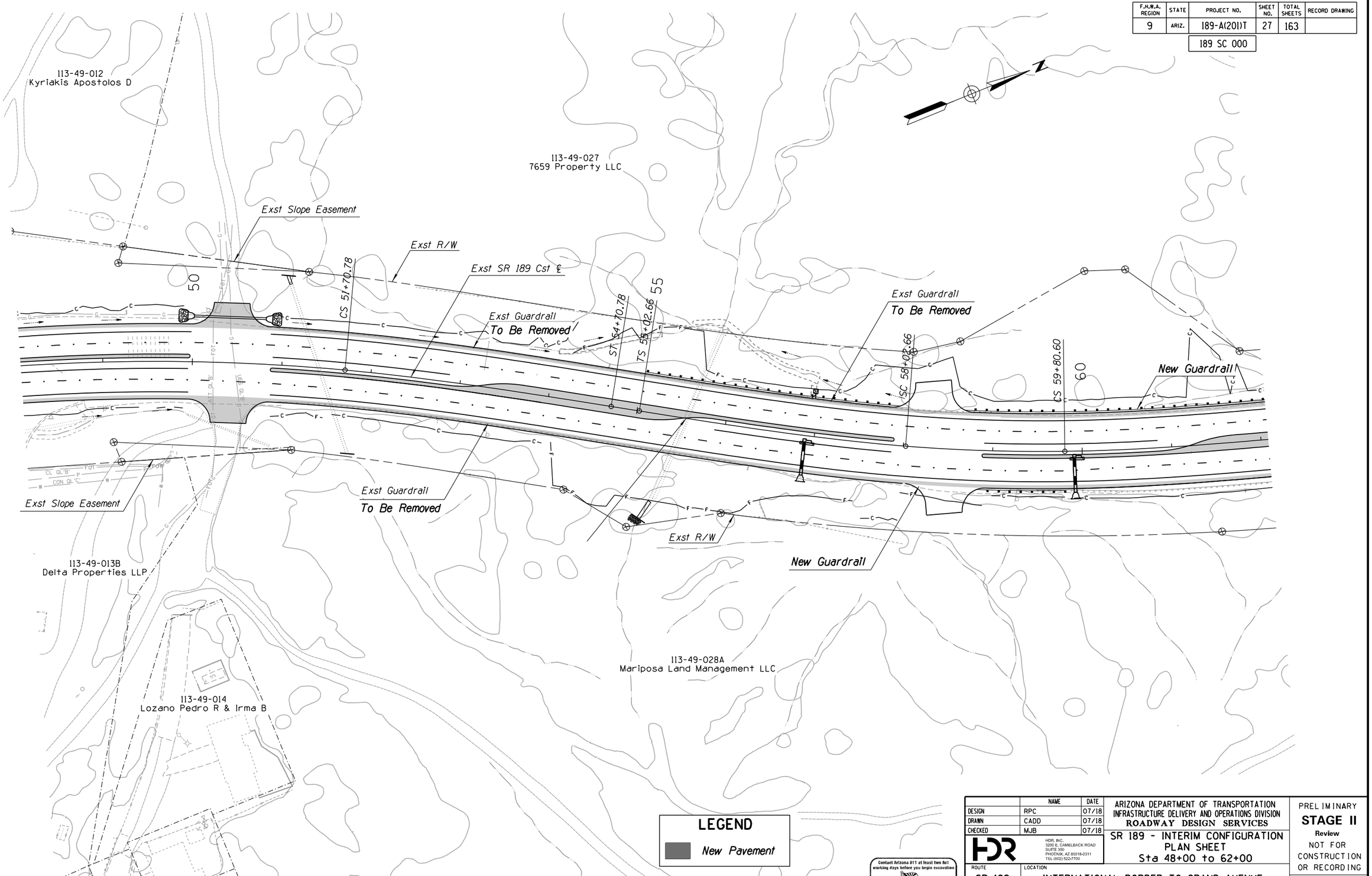
DWG NO. C-01.01

___ OF ___

FILE NAME:c:\pwworking\phx\d0476786\h8045pln01.dgn PLOT DATE:Jul. 24, 2018 TIME:10:34:12 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	27	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION PLAN SHEET
Sta 48+00 to 62+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.02

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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FILE NAME=c:\pwworking\phx\d0476786\h8045pln02.dgn PLOT DATE=Jul, 24, 2018 TIME=10:34:19 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	28	163	
		189 SC 000			

113-49-027
7659 Property LLC

113-46-004
Swift Transportation Inc

113-49-028A
Mariposa Land Management LLC

102-04-079
Alta Real Estate LLC

Section Line

Exst Target Range Rd Cst ℄

Exst SR 189 Cst ℄

PT 16+74.93

PC 15+87.00

POB 14+43.92

S10°42'33"W

S73°15'26"E

TS 71+37.01

SC 74+87.01

PI 20+00.00

PC 20+98.33

PT 24+05.74

POE 25+50.00

S48°39'50"E

ST 62+80.60

New Guardrail

Exst Guardrail
To Be Removed

Exst R/W

New R/W

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 62+00 to 75+50

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.03

____ OF ____

FILE NAME:c:\pwworking\phx\d0476786\h8045pln03.dgn PLOT DATE:Jul. 24, 2018 TIME:10:34:28 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	29	163	
		189 SC 000			

113-46-004
Swift Transportation Inc

113-46-030B
Harvey Laurence E Jr

113-46-031
Harvey Laurence E Jr

113-46-030C
Harvey Family
Limited
Partnership

113-46-030D
Harvey Laurence E Jr

113-46-027B
Vidal Martha R

102-04-079
Alta Real Estate LLC

Exst R/W

CS 79+00.45

80

ST 82+50.00

TS 84+68.66

85

SC 88+18.56

New Guardrail

Exst Guardrail
To Be Removed

Exst Guardrail
To Be Removed

New Guardrail

Exst R/W

Exst SR 189 Cst ℄

102-04-072A
Gyris Group LLC

102-04-079
Alta Real Estate LLC

102-04-073
Harvey Laurence E

102-04-071
Lopez Francisca G

Section Line

Section Line

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 75+50 to 89+50

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR
CONSTRUCTION
OR RECORDING

DWG NO. C-01.04

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045pln04.dgn PLOT DATE=Jul. 24, 2018 TIME=10:34:37 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	30	163	
		189 SC 000			

113-46-053
Burbas &
Harvery Leasing
& Rental LLC

113-46-052A
Harvey Lawrence & Regina

113-46-052B
MT Industries Corp

113-46-027A
Quick Fix Trailer & Truck Repair LLC

113-46-012D
Mariposa Land Management LLC

Mariposa Ranch Rd

113-46-022
C & D Rent-All Inc

113-46-012B
Covarrubias
Jesus
& Michelle

113-46-011F
Mariposa Land
Management LLC

Mariposa Canyon
Bridge No. 1

Exst R/W

Mariposa Wash

Exst SR 189 Cst ℄

New Guardrail

Exst Guardrail
To Be Removed

CS 94+43.83

ST 97+45.68

TS 98+24.69

SC 101+24.69

Section Line

102-04-072B
Cordova Ramon Alejandro C
& Lino Barbara Munoz

102-04-032
City of
Nogales

102-04-031
City of
Nogales

Exst Drainage
Easement

Mariposa Canyon Wash

102-04-028
City of
Nogales

102-04-006B
Joffroy Rudolfo Q

102-04-071
Lopez Francisca G

102-04-070
Three Frontiers Express Inc

ROAD UNDER CONSTRUCTION

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
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TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 89+50 to 103+50

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR
CONSTRUCTION
OR RECORDING

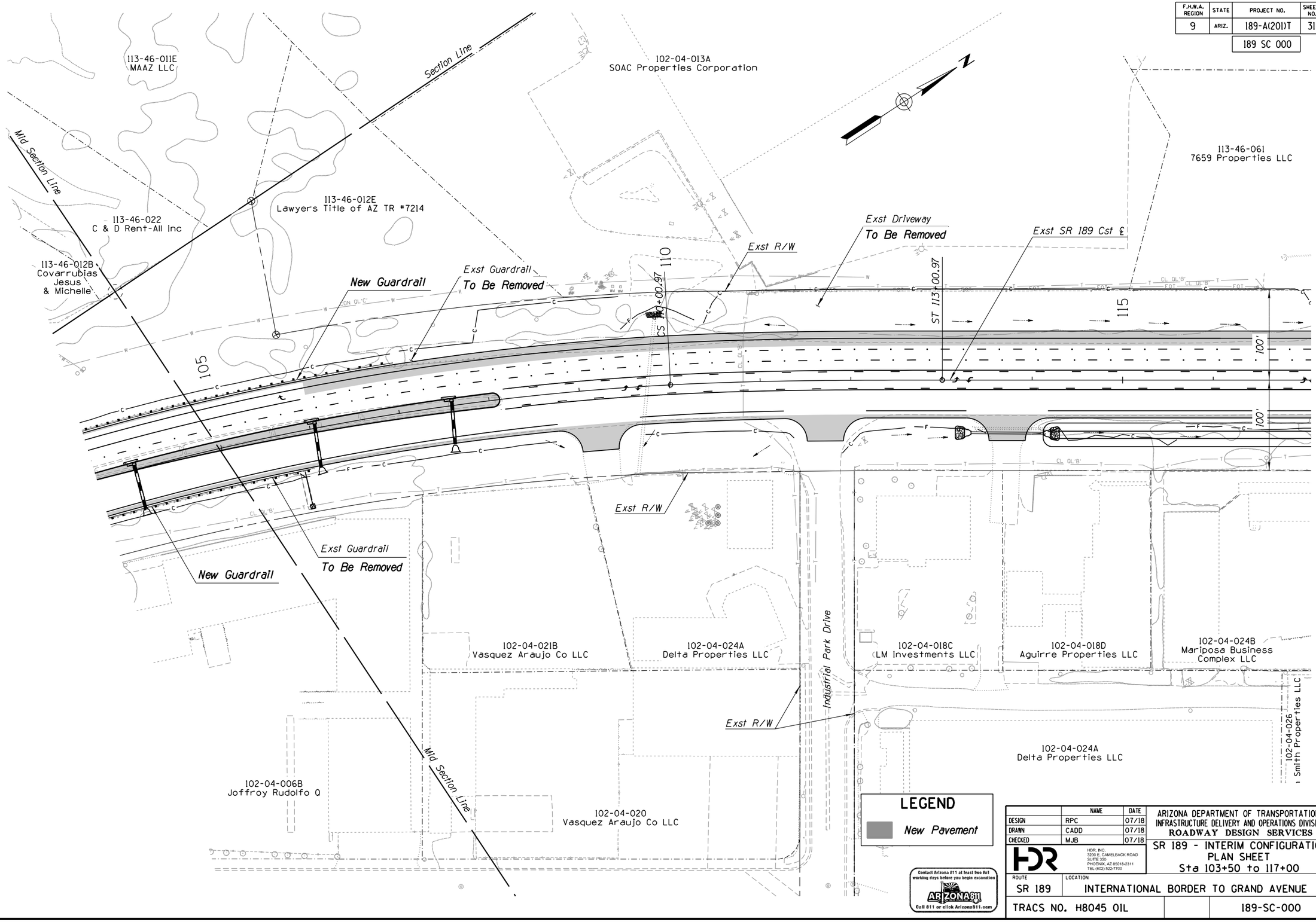
DWG NO. C-01.05

___ OF ___

FILE NAME: c:\pwworking\phx\d0476786\h8045pln05.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:34:45 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	31	163	
		189 SC 000			



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 103+50 to 117+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.06

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045pln06.dgn PLOT DATE=Jul, 24, 2018 TIME=10:34:56 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE
DATE	SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	32	163	
		189 SC 000			

113-46-011C
7569 Properties LLC

113-46-011C
7569 Properties LLC

102-03-010E
Delta Properties LLP

Calle Platino Rd

Loma Mariposa Rd

Exst Drainage Easement

Exst Drainage Easement

New R/W

Exst Driveway
To Be Removed

Exst SR 189 Cst ℄

New Guardrail

Exst R/W

Exst Guardrail
To Be Removed

Exst R/W

120

125

130

PC 128+34.55

100'

100'

100'

New Guardrail

Exst Guardrail
To Be Removed

Exst R/W

Exst Drainage Easement

102-04-024B
Mariposa Business Complex LLC

102-04-025
Mariposa Business Complex LLC

102-04-027
Shannon Brokerage

102-04-010B
Daza Investments LLC

102-04-012D
Capin Hill Properties LLC

102-04-026
Don Smith Properties LLC

102-04-016
Mariposa Manor Community LLC

LEGEND

New Pavement

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ARIZONA811
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION PLAN SHEET
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.07

____ OF ____

FILE NAME:c:\pwworking\phx\d0476786\h8045pln07.dgn PLOT DATE:Jul. 24, 2018 TIME:10:35:07 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	33	163	
		189 SC 000			

102-03-016C
United Churches
Fellowship Inc

102-03-006B
MAG Santa Carolina Limited Partnership

102-03-010E
Delta Properties LLP

Section Line

102-03-010E
Delta Properties LLP

102-03-009
Korean Church of Nogales

N

Mid Section Line

102-03-007
Bond George Thomas
Rev Liv Trust

Exst SR 189 Cst ℄

Exst R/W

135

140

145

PT 141+81.27

PC 144+06.27

100'

100'

Exst Wall
To Be Removed

Exst R/W

Exst Wall
To Be Removed

102-04-012E
Mariposa Road Self Storage Associates

102-04-089
Cismo Investments LLC

Bell Rd

Mariposa Park Plaza

102-04-005A
Garza Perla
Arjelia

Mid Section Line

102-04-005
Fletcher Robert D

102-04-012D
Capin Hill Properties LLC

102-04-016
Mariposa Manor Community LLC

102-04-090
Capin Michael I & Kaarin Michelle

LEGEND

New Pavement

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ARIZONA811
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	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 131+00 to 145+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.08

___ OF ___

FILE NAME: c:\pwworking\phx\d0476786\h8045pln08.dgn | PLOT DATE: Jul. 24, 2018 TIME: 10:35:16 AM | PLOT SCALE: 1:100 | PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	34	163	
		189 SC 000			

102-03-002K
Ma Thena Properties LLP

102-03-002H
Ma Thena Properties LLP

102-03-007
Bond George Thomas
Rev Liv Trust

102-03-002E
Sonora Properties LLC

102-03-049
Matitel Properties II LLC

102-03-024J
Matitel Properties LLC

102-03-026
Circle K Stores Inc.

102-03-025
Pfeiler David R Family Trust

102-03-027
Sonora Properties LLC

102-04-005
Fletcher
Robert D

102-04-007
Kory Properties LLC

102-04-040B
Don Smith
Properties LLC

102-04-040G
UNS Electric Inc

102-04-040F
Zillman Richard
Trustee of the Richard

102-04-040H
Mariposa Land
Management LLC

102-04-002B
DJS Family
Limited Partnership

W Paul Bond Dr
Frank Reed Rd
W Shell Dr
W Carls Jr Rd
Industrial Park Dr
Bell Rd
Section Line

Exst R/W
New R/W
Exst Driveway
To Be Removed
Exst SR 189 Cst ℄
Exst Wall
To Be Removed
Ramp EN Cst ℄
Ramp EN Bridge
IHOP
Valero
Carl's Jr

PT 18+11.39
PC 13+16.14
PT 150+91.14
PT 159+56.14
20+00.00
PC 23+75.19

145
150
155
20

N

LEGEND
New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION PLAN SHEET
Sta 145+00 to 159+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

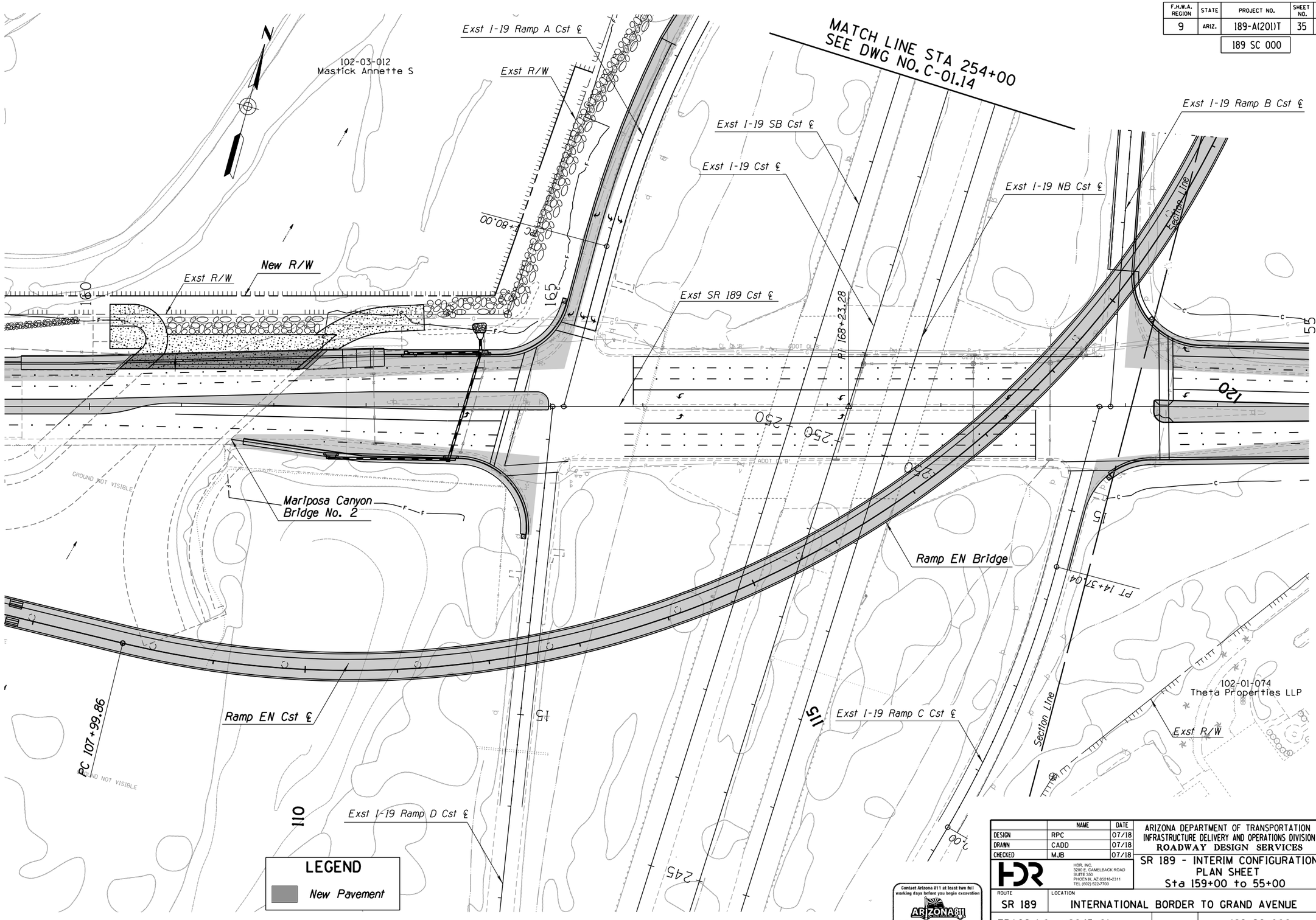
TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.09

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	35	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 159+00 to 55+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.10

___ OF ___

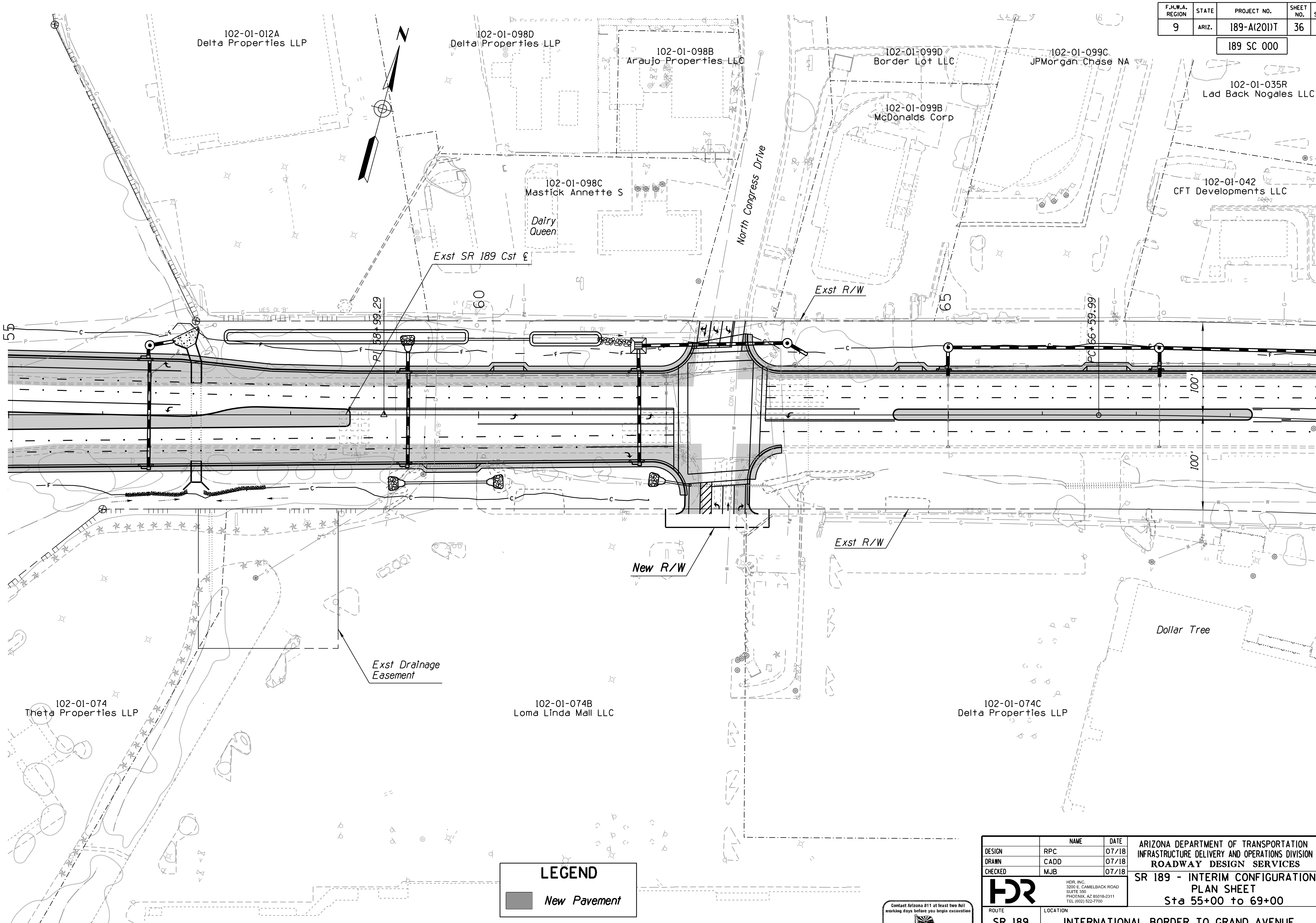
Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME=c:\pwworking\phx\d0476786\h8045pln10.dgn PLOT DATE=Jul, 24, 2018 TIME=10:35:35 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	36	163	

189 SC 000



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA 811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR
HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85016-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 55+00 to 69+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

DWG NO. C-01.11

TRACS NO. H8045 01L

189-SC-000

____ OF ____

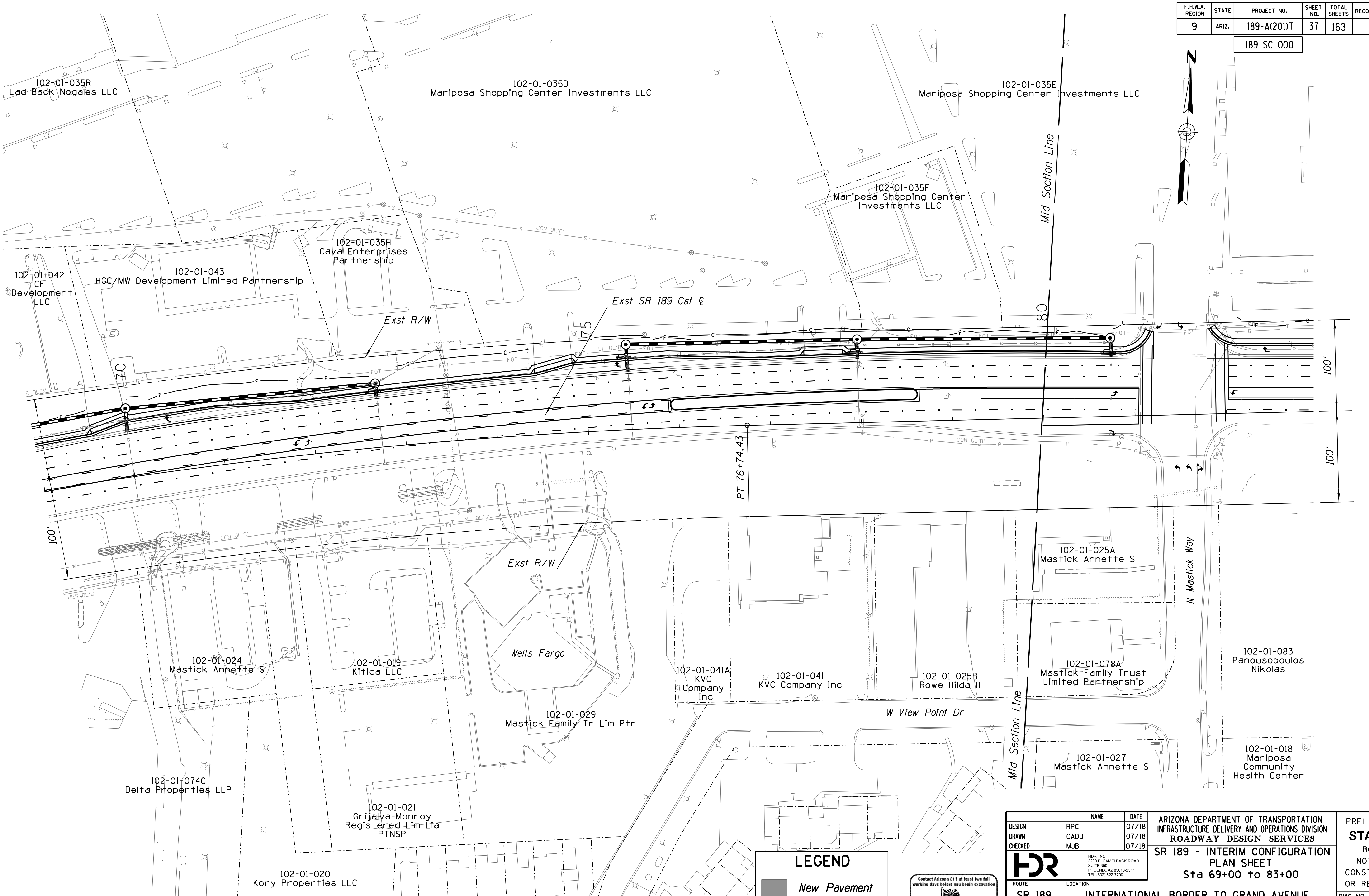
FILE NAME:c:\pwworking\phx\d0476786\h8045pln11.dgn PLOT DATE:Jul. 24, 2018 TIME:10:35:44 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | REVISIONS- | LOCATION- | DATE- | FINISHED PLANS-

FILE NAME: c:\pwworking\phx\d0476786\h8045pln12.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:35:51 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	37	163	

189 SC 000



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR
HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 69+00 to 83+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. C-01.12

TRACS NO. H8045 01L
189-SC-000
____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	38	163	
		189 SC 000			

102-01-035E
Mariposa Shopping Center Investments LLC

102-01-035N
Theta Properties LLP

102-01-035O
Tormey Investments LLC
A Wisconsin

102-06-006

102-01-008C
Tanori Edmundo & Olivia

Exst R/W

Exst 19 Business/Grand Ave Cst ℄

Exst R/W

Exst UPRR

Walgreen's

102-01-034B
Delta Properties LLP

102-01-034C
Tormey Investments LLC

102-01-008E
Machuca Sergio & Lucia

102-01-016
City of Nogales

Exst 45"x 73" Pipe

STA 90+77.00
END PROJECT 189 SC 000

Exst R/W

Exst SR 189 Cst ℄

102-01-008D
Villagran Javier & Gloria

102-01-013
Sedgwick Anthony J

102-01-008A
Bejarano Cruz

E Calle Sonora

100'

Exst R/W

102-01-079
Mastick Annette S

102-01-033
Mastick Family TrR Lim PTNS

102-01-032
Mastick Family TrR Lim PTNS

102-01-040
Mastick Family Trust

102-01-083
Panousopoulos Nikolas

Exst R/W

102-01-014
Badillo Family LLC

102-01-018
Mariposa Community Health Center

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
PLAN SHEET
Sta 83+00 to 90+77

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. C-01.13
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

FILE NAME:c:\pwworking\phx\d0476786\h8045pln13.dgn PLOT DATE:Jul. 24, 2018 TIME:10:35:59 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	39	163	
		189 SC 000			

Exst Drainage Easement

Exst I-19 Ramp A Cst ℄

Exst Drainage Easement

102-03-013A
Nogales Unified School District #1

Exst Drainage Easement

℄ 4+23.59

PC 7+91.67

MATCH LINE STA 254+00
SEE DWG NO. C-01.10

Exst R/W

Exst I-19 SB Cst ℄

TS 256+70.66

TS 256+72.53

SC 259+74.96

SC 259+72.53

Exst I-19 Cst ℄

Exst I-19 NB Cst ℄

TS 256+74.92

SC 259+70.74

PT 8+69.99

℄ 11+03.62

℄ 13+10.96

Section Line

Exst I-19 Ramp B Cst ℄

Ramp EN Cst ℄

New R/W

Section Line

Ramp EN Bridge

Exst R/W

102-01-012A
Delta Properties LLP

PT 126+25.11

PC 128+95.51

Exst Drainage Easement

102-01-036A
Delta Properties LLP

LEGEND

New Pavement

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ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
PLAN SHEET
Sta 254+00 to 268+00

ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

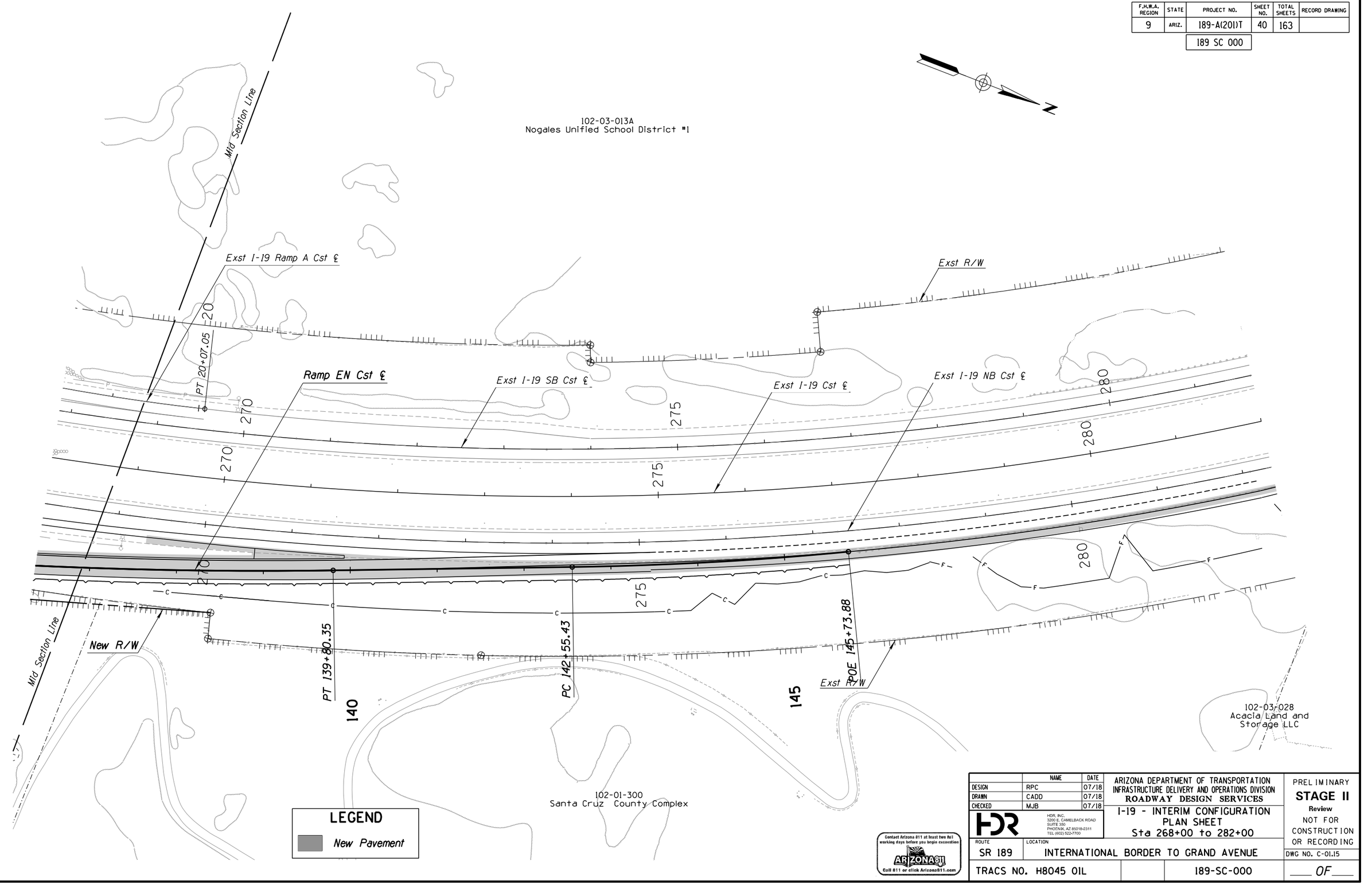
DWG NO. C-01.14

___ OF ___

FILE NAME: e:\pwworking\phx\d0476786\h8045pln14.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:36:08 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	40	163	
		189 SC 000			



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SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click ArizonaBlue.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
PLAN SHEET
Sta 268+00 to 282+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.15

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	41	163	
		189 SC 000			

102-07-067
Lawyers Title of AZ #7214

102-07-073A
Echave
Enrique

102-03-010A
Enciso Mark

102-03-010A
Enciso Mark

N Frank Reed Rd

102-03-010B
Bloodworth Joe D 1/2 Int

102-03-010A
Enciso Mark

102-03-013A
Nogales Unified School District #1

Exst R/W

Exst I-19 SB Cst ℄

Exst I-19 Cst ℄

285

CS 286+19.49

CS 286+63.63

ST 289+23.79

ST 289+63.63

290

295

295+82.86

285

290

295

296+67.49

Exst I-19 NB Cst ℄

CS 287+08.32

ST 290+04.14

Exst R/W

N Frank Reed Rd

102-03-028
Acacia Land and Storage LLC

102-03-001E
Quick Fix Trailer & Truck Repair LLC

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
PLAN SHEET
Sta 282+00 to 295+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.16

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045pln16.dgn PLOT DATE:Jul. 24, 2018 TIME:10:36:26 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	42	163	
		189 SC 000			

102-01-008C
Tanori Edmundo & Olivia

102-01-008D
Villagran Javier
& Gloria

102-01-008E
Machuca Sergio & Lucia

102-01-008A
Bejarano Cruz

102-01-040
Mastick Family Trust

102-01-014
Badillo Family LLC

102-06-006

Match Exst
Sta 50+45.19
31.79' Rt

Exst 19 Business/Grand Ave Cst ℄

E Calle Sonora

Exst UPRR

Exst R/W

MATCH LINE STA 19+00
SEE BELOW LEFT

SC 54+21.44

TS 51+96.36

Exst R/W

Exst R/W

Exst R/W

Exst R/W

Exst SR 189 Cst ℄

55

50

06

45

102-01-035N
Theta Properties LLP

102-01-0350
Tormey Investments LLC
A Wisconsin

102-01-034C
Tormey Investments LLC

102-01-032
Mastick Family TrR Lim PTNS

102-01-033
Mastick Family
TrR Lim PTNS

102-01-040
Mastick Family Trust

102-01-014
Badillo Family LLC

102-01-015A
Castellanos Jose Jesus De La Mora

102-01-015A
Castellanos Jose Jesus De La Mora

Match Exst
Sta 36+00.56
24.15' Rt

Exst R/W

Exst UPRR

102-06-006

Exst 19 Business/Grand Ave Cst ℄

MATCH LINE STA 19+00
SEE ABOVE RIGHT

Exst R/W

POB 29+

102-01-037A
Logan (Nogales) Assoc LLC

102-01-031
Hornes 1777 LLC

102-01-037A
Logan (Nogales) Assoc LLC

102-01-028C
La Placita Plaza

W White Park Dr

LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 BUSINESS/GRAND AVE
PLAN SHEET
164

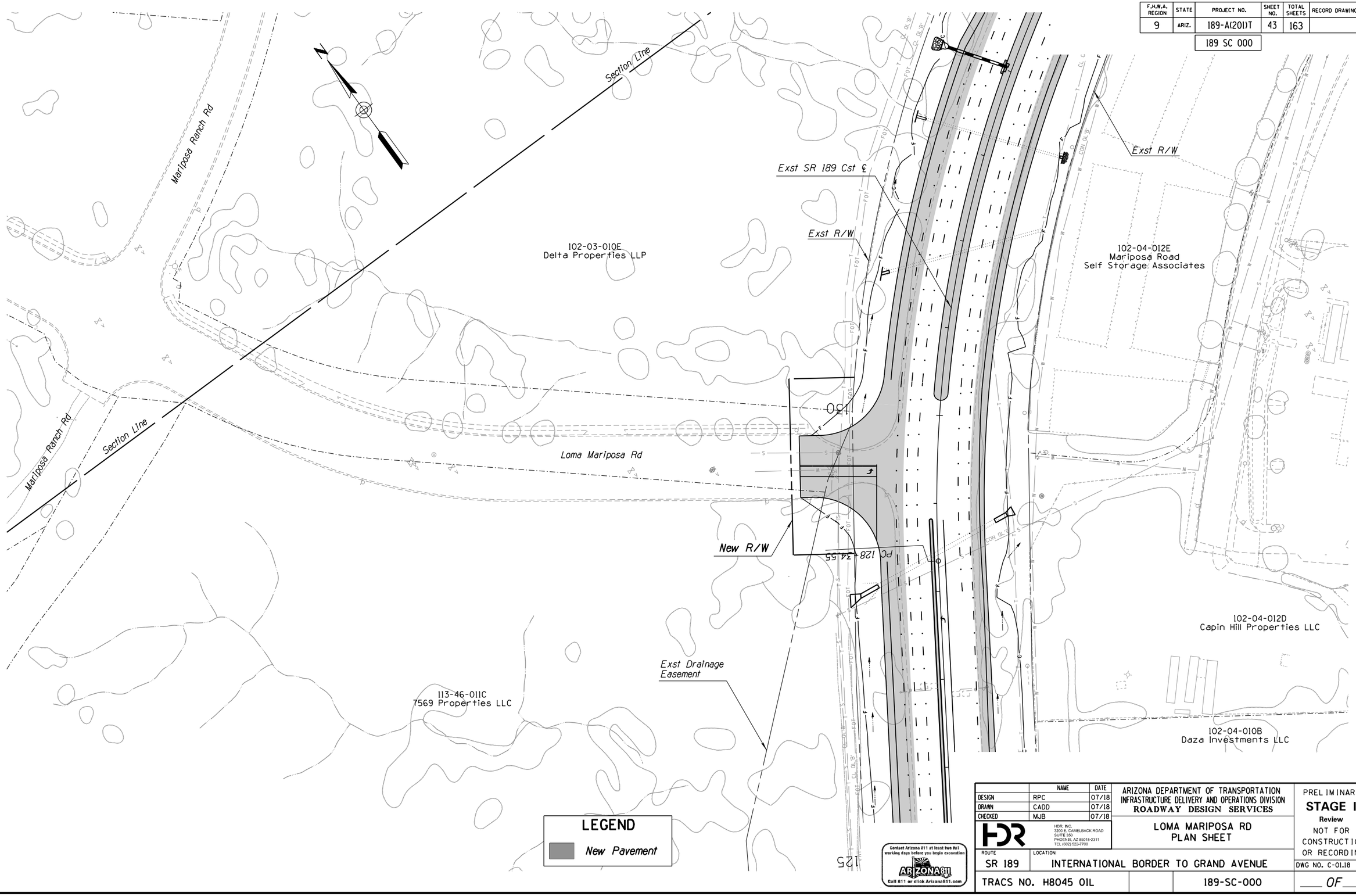
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. C-01.17
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

FILE NAME:c:\pwworking\phx\d0476786\h8045pln17.dgn PLOT DATE:Jul, 24, 2018 TIME:10:36:35 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	43	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

LOMA MARIPOSA RD
PLAN SHEET

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.18

___ OF ___

FILE NAME:c:\pwworking\phx\d0476786\h8045pln18.dgn PLOT DATE:Jul, 24, 2018 TIME:10:36:44 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE
DATE				

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	44	163	
		189 SC 000			

FILE NAME:c:\pwworking\phx\d0476786\h8045pln19.dgn PLOT DATE:Jul. 24, 2018 TIME:10:36:55 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

102-03-024E
Mun Investments LLC

102-03-025
Pfeiler David R Family Trust

Exst SR 189 Cst ℄

W Carls Jr Rd

102-03-026
Circle K Stores Inc.

102-03-012
Mastick Annette S

Section Line

102-03-024J
Matitel Properties LLC

W Shell Dr

Exst R/W

New R/W

Ramp EN Cst ℄

102-03-049
Matitel Properties II LLC

102-03-027
Sonora Properties LLC

102-04-002B
DJS Family Limited Partnership

Exst Industrial Park Dr Cst ℄

Exst Frank Reed Rd Cst ℄

PC 14+50.27

PC 15+53.79

PT 15+53.79

PT 18+11.39

PC 20+18.14

PC 23+75.19

20+00.00

Industrial Park Dr

Frank Reed Rd

PT 26+25.00

102-03-002H
Ma Thena Properties LLP

PT 150+91.14

102-03-002K
Ma Thena Properties LLP

Paul Bond Dr

102-04-040F
Zillman Richard Trustee of the Richard

102-04-040H
Mariposa Land Management LLC

102-04-040G
UNS Electric Inc

102-03-002E
Sonora Properties LLC

102-03-002D
Molera Alvarez Land Development LLC

102-03-007
Bond George Thomas Rev Liv Trust

102-04-040B
Don Smith Properties LLC

LEGEND

New Pavement

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ARIZONA811
Call 811 or eTick ArizonaBlue811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

FRANK REED RD/
INDUSTRIAL PARK DR
PLAN SHEET

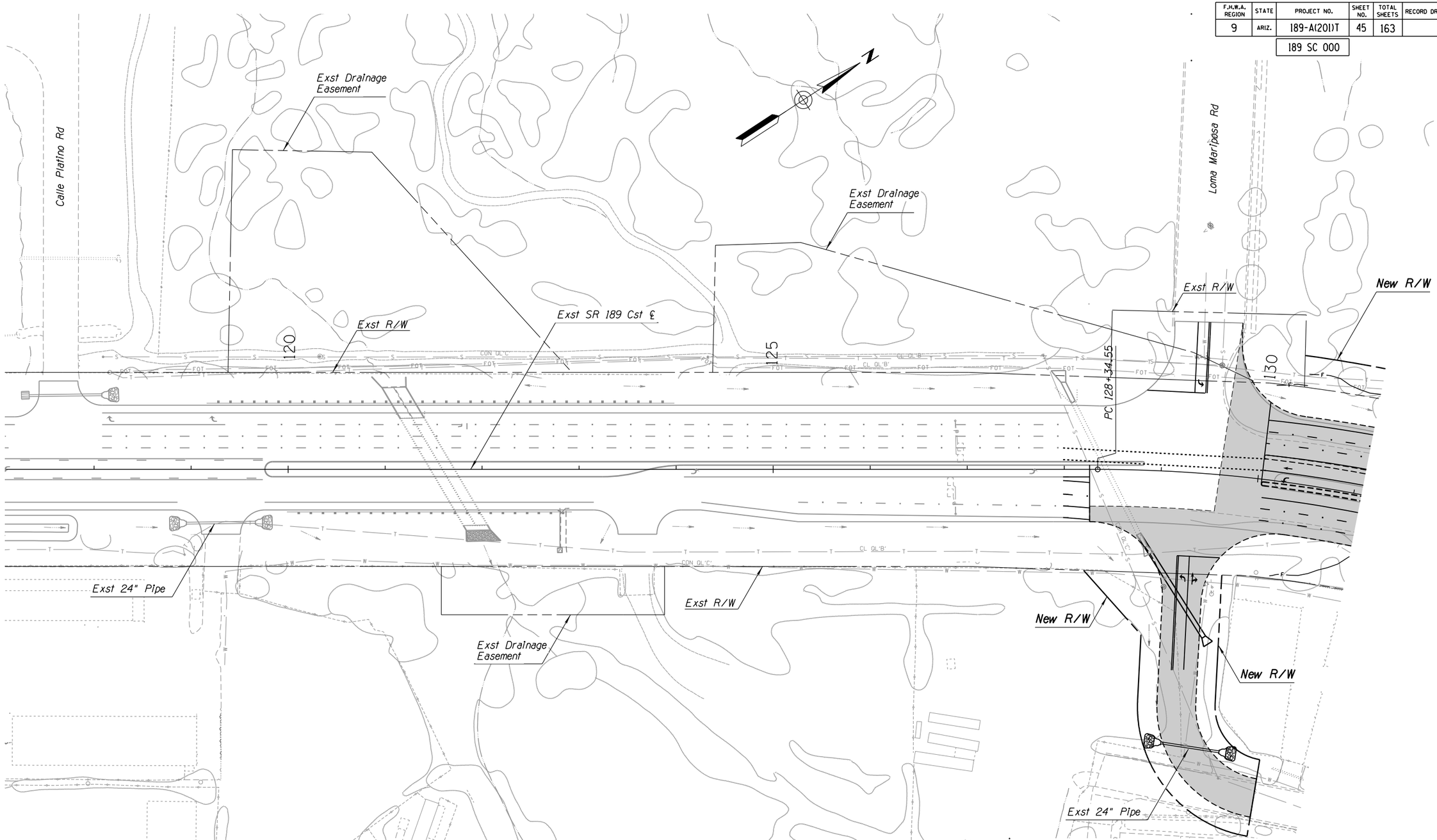
ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-01.19

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	45	163	
		189 SC 000			



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811 BLUE STAKE, INC. Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION PLAN SHEET
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-02.01

____ OF ____

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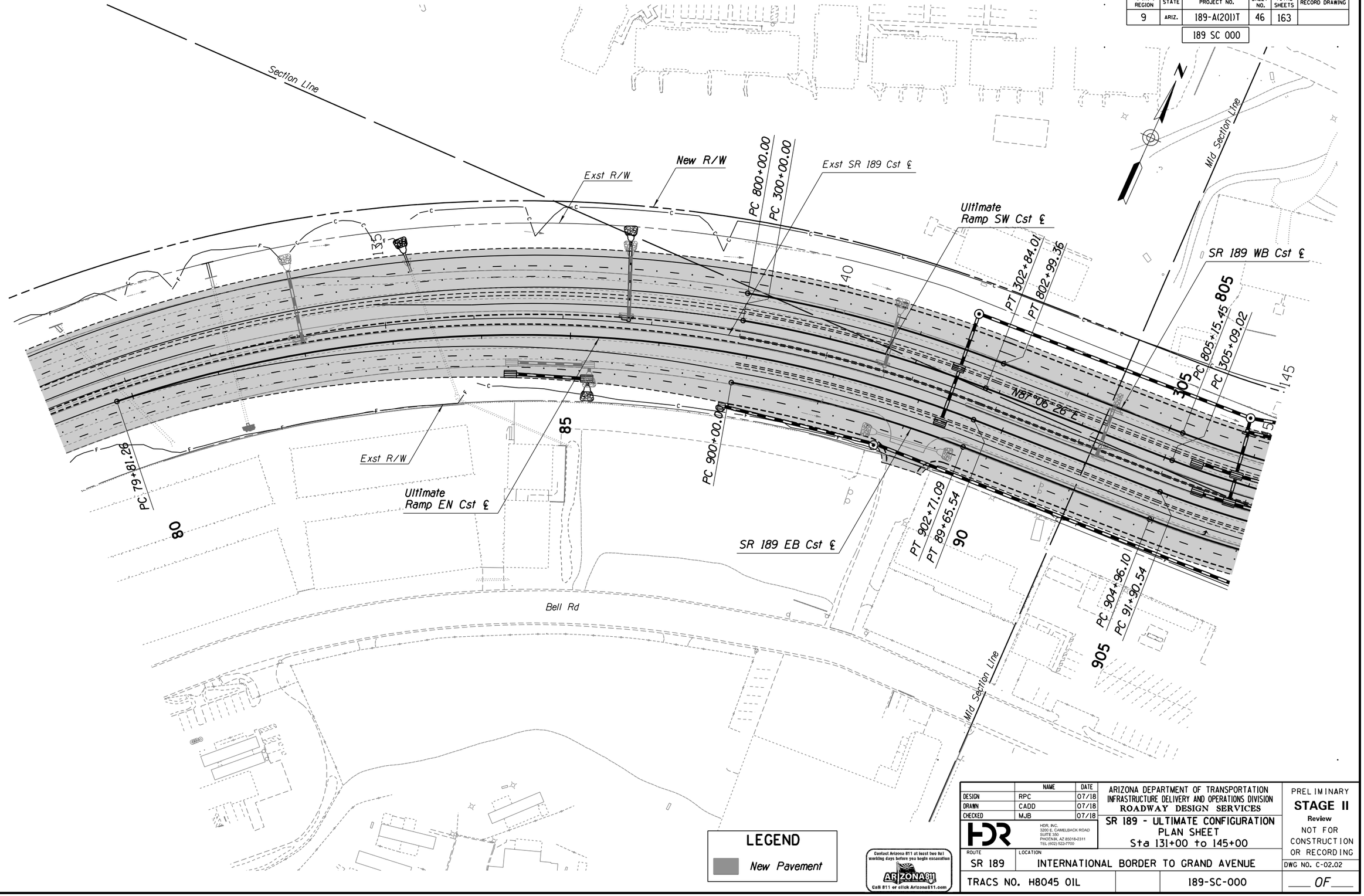
SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	46	163	
		189 SC 000			



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
PLAN SHEET
Sta 131+00 to 145+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

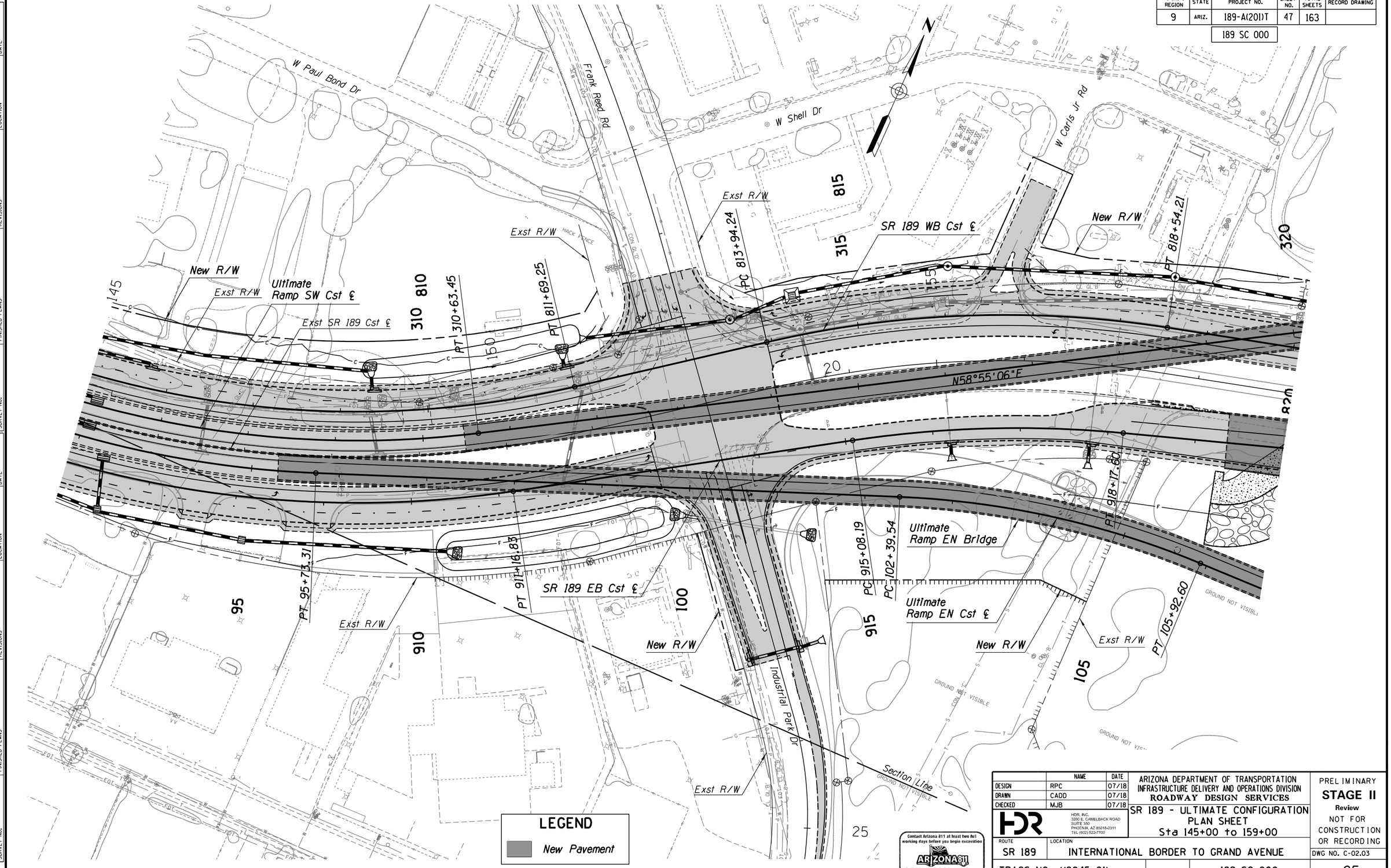
DWG NO. C-02.02

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045_ph_pln08.dgn PLOT DATE=Jul. 24, 2018 TIME=10:37:18 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
DATE-	SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	47	163	
		189 SC 000			



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION PLAN SHEET
Sta 145+00 to 159+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-02.03

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045_ph_pln09.dgn PLOT DATE:Jul 24, 2018 TIME:10:37:28 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	48	163	
		189 SC 000			

MATCH LINE STA 254+00
SEE DWG NO. C-02.05

Exst I-19 Ramp A Cst ℄
New R/W
Ultimate Ramp SW Bridge
Ultimate Ramp SW Cst ℄
Ultimate I-19 Ramp A Cst ℄
SR 189 WB Cst ℄
PC 321+81.79
PC 823+20.62
Exst Bridge Protection
Exst R/W
PRC 825+63.50
NORTH TIE
PC 1+59.88
Exst I-19 SB Cst ℄
PT 3+05.39
Exst I-19 Cst ℄
Exst I-19 NB Cst ℄
Exst I-19 Ramp B Cst ℄
Section Line
Exst SR 189 Cst ℄
PT 827+98.39
POE 829+22.29
ROB 0+00.00
POE 9+80.12
SR 189 EB Cst ℄
PT 927+18.19
Ultimate Ramp EN Cst ℄
Mariposa Canyon Bridge No. 2
PC 923+65.95
Ultimate I-19 Ramp D Cst ℄
New Bridge Protection
Ultimate Ramp EN Bridge
PC 107+99.87
BEGIN NOT VISIBLE
Exst Ramp EN Cst ℄
N3°26'11"W
Exst I-19 Ramp D Cst ℄
POE 929+17.40
Exst Ramp EN Bridge
Exst I-19 Ramp C Cst ℄
Exst R/W
Section Line

MATCH LINE STA 245+00
SEE DWG NO. C-02.07

LEGEND
New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION PLAN SHEET
Sta 159+00 to 55+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-02.04

___ OF ___

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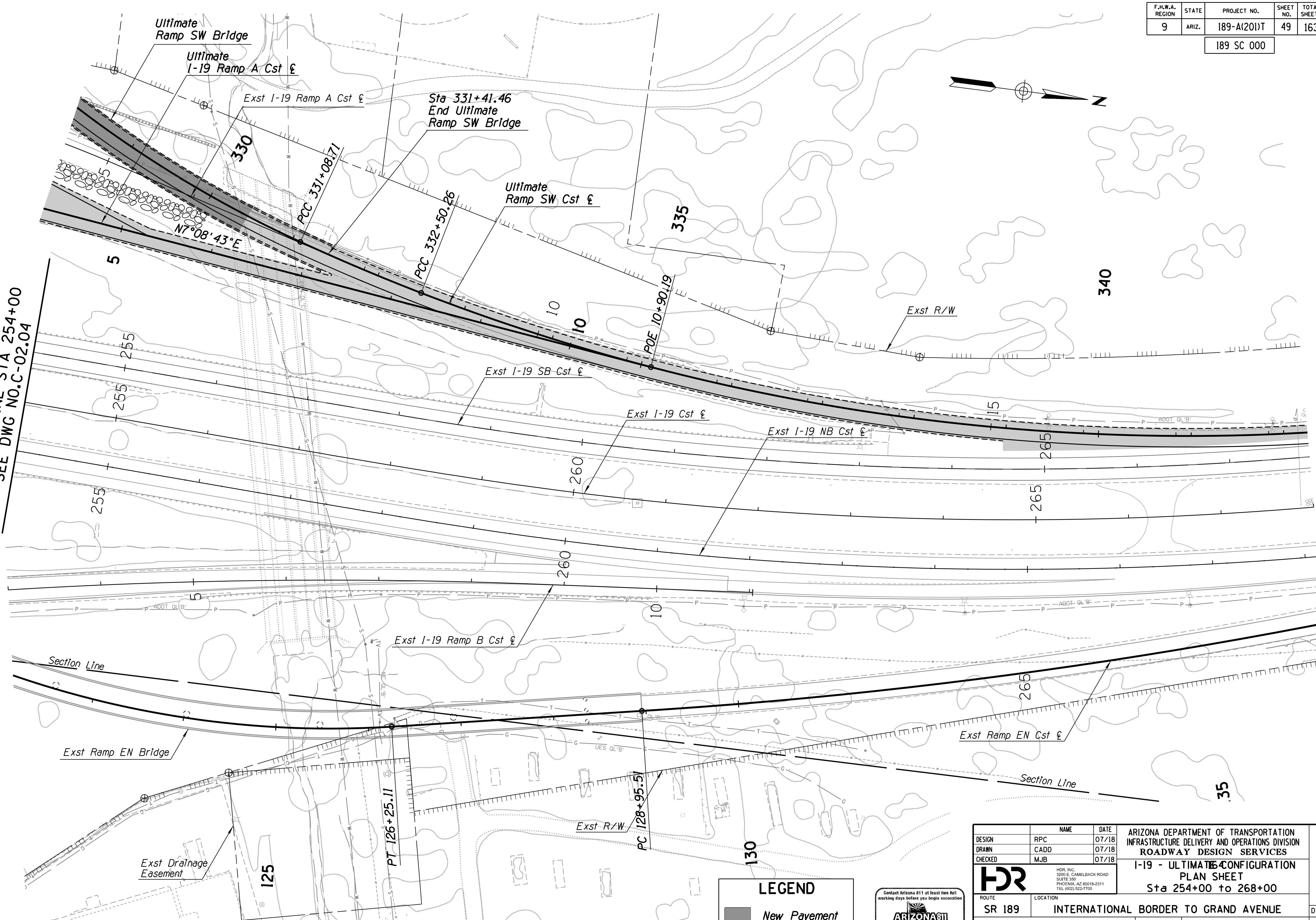
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	49	163	

189 SC 000



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR
HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85016-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
PLAN SHEET
Sta 254+00 to 268+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

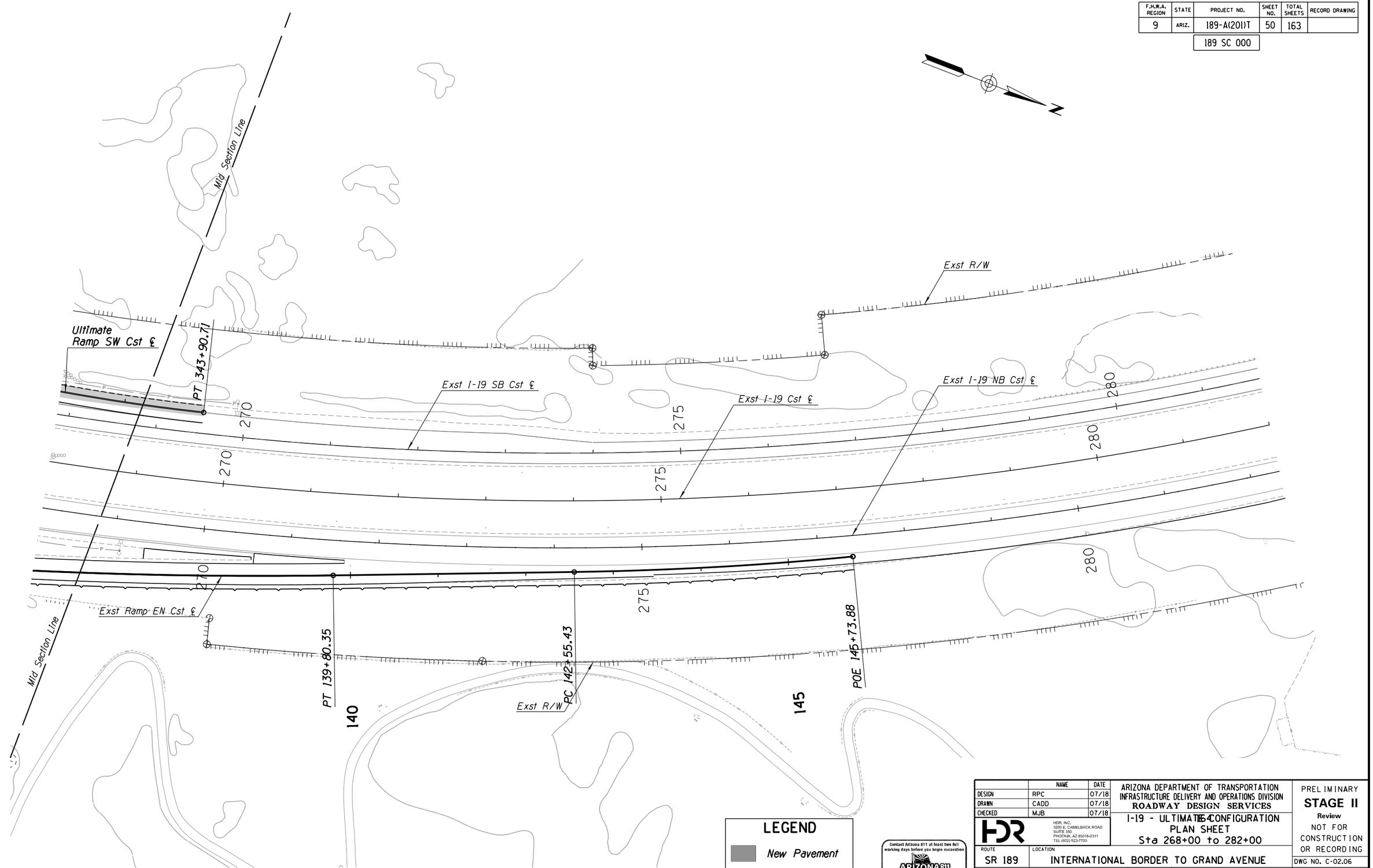
DWG NO. C-02.05

____ OF ____

FILE NAME: c:\pwworking\phx\d0476786\h8045_ph_pln14.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:37:53 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	50	163	
		189 SC 000			



LEGEND

New Pavement

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
PLAN SHEET
Sta 268+00 to 282+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

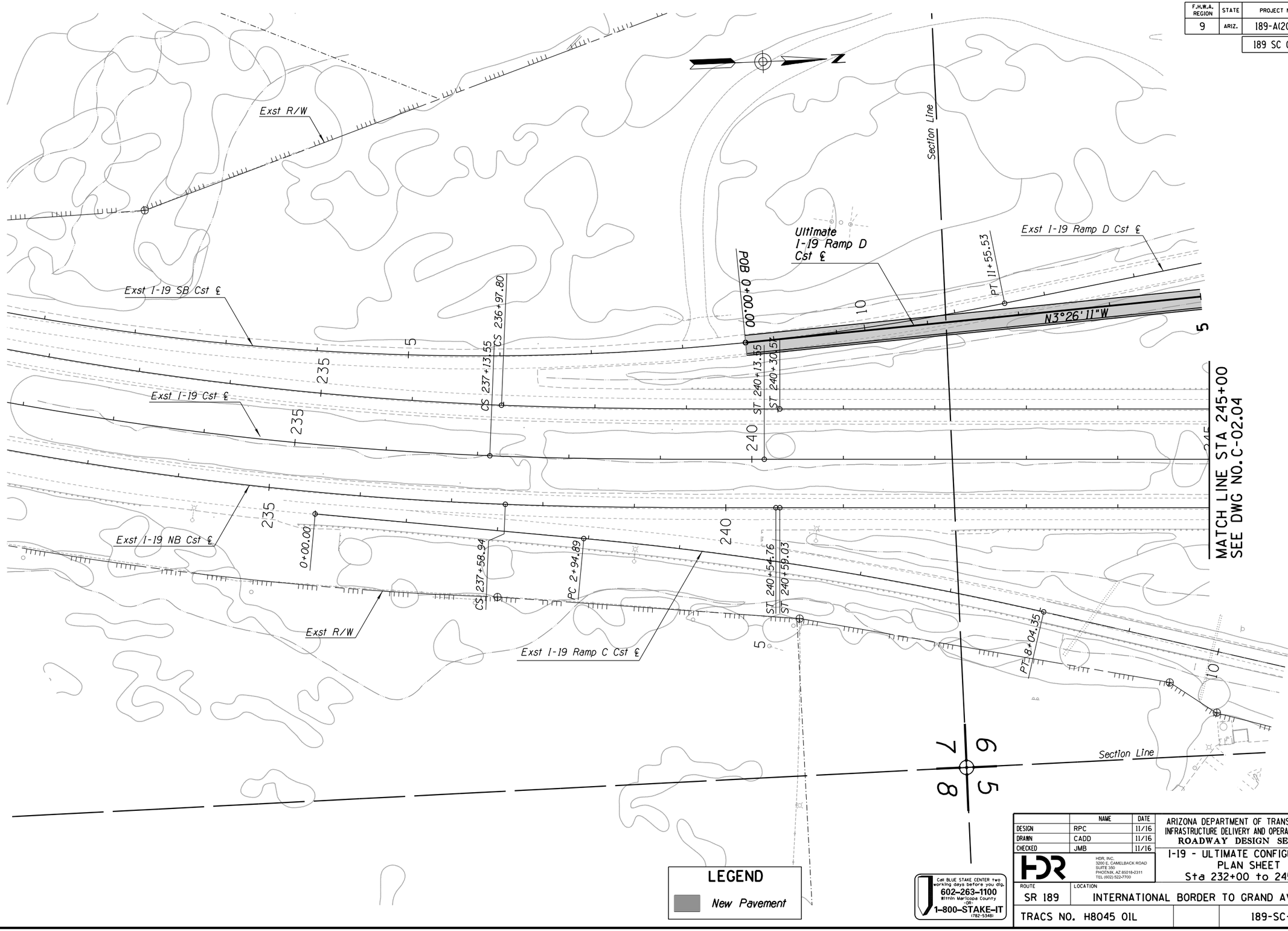
DWG NO. C-02.06

___ OF ___

FILE NAME: E:\pwworking\phx\d0476786\h8045_ph_pln15.dgn PLOT DATE:Jul. 24, 2018 TIME:10:38:03 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	51	163	
		189 SC 000			



Call BLUE STAKE CENTER two working days before you dig.
602-263-1100
Within Maricopa County
-OR-
1-800-STAKE-IT
(782-5348)

	NAME	DATE
DESIGN	RPC	11/16
DRAWN	CADD	11/16
CHECKED	JMB	11/16

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
PLAN SHEET
Sta 232+00 to 245+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 01L	189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

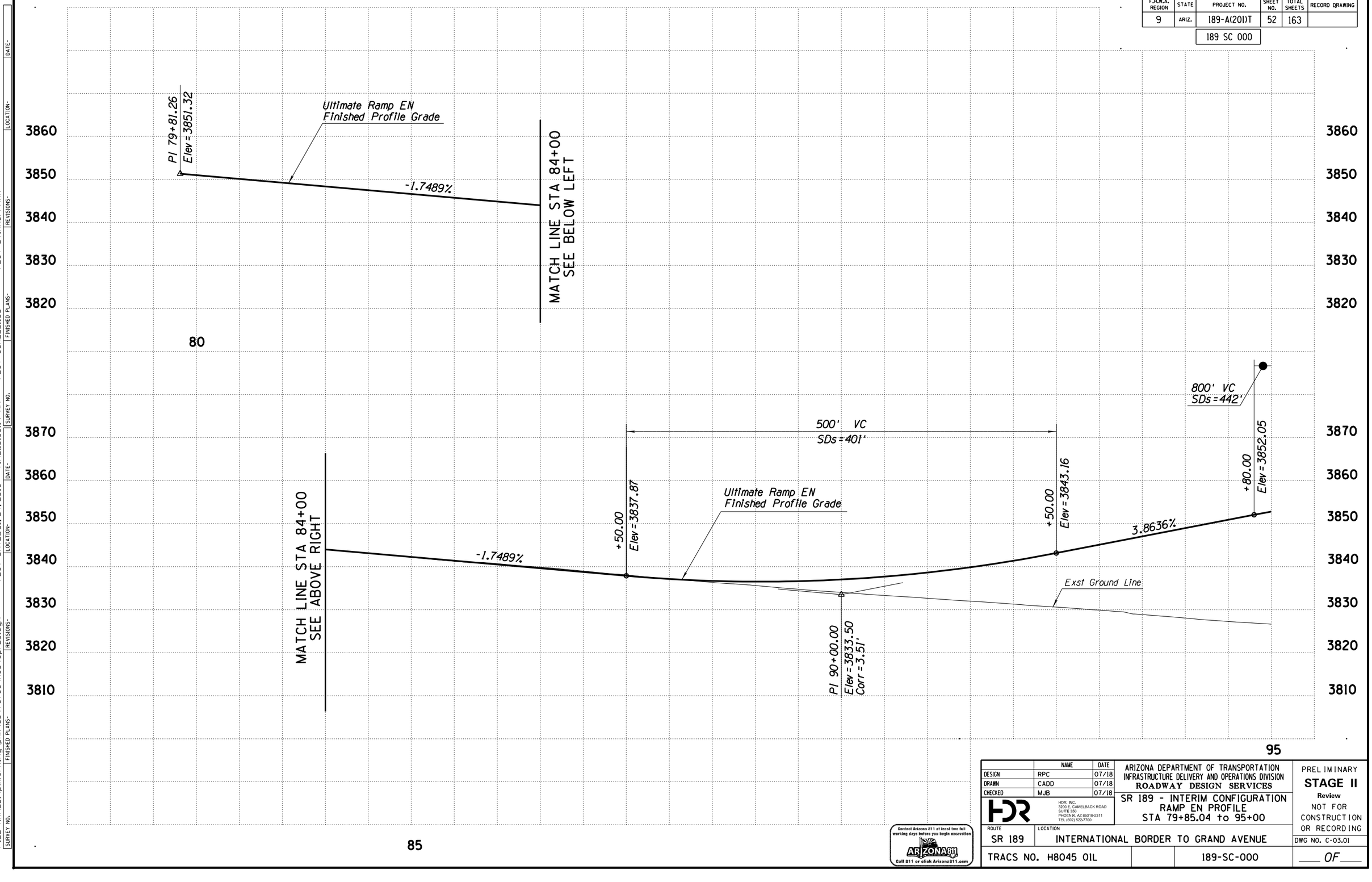
DWG NO. C-02.07

____ OF ____

FILE NAME: c:\pwworking\phx\d0476786\h8045_ph_pln16.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:38:13 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	52	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
RAMP EN PROFILE
STA 79+85.04 to 95+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

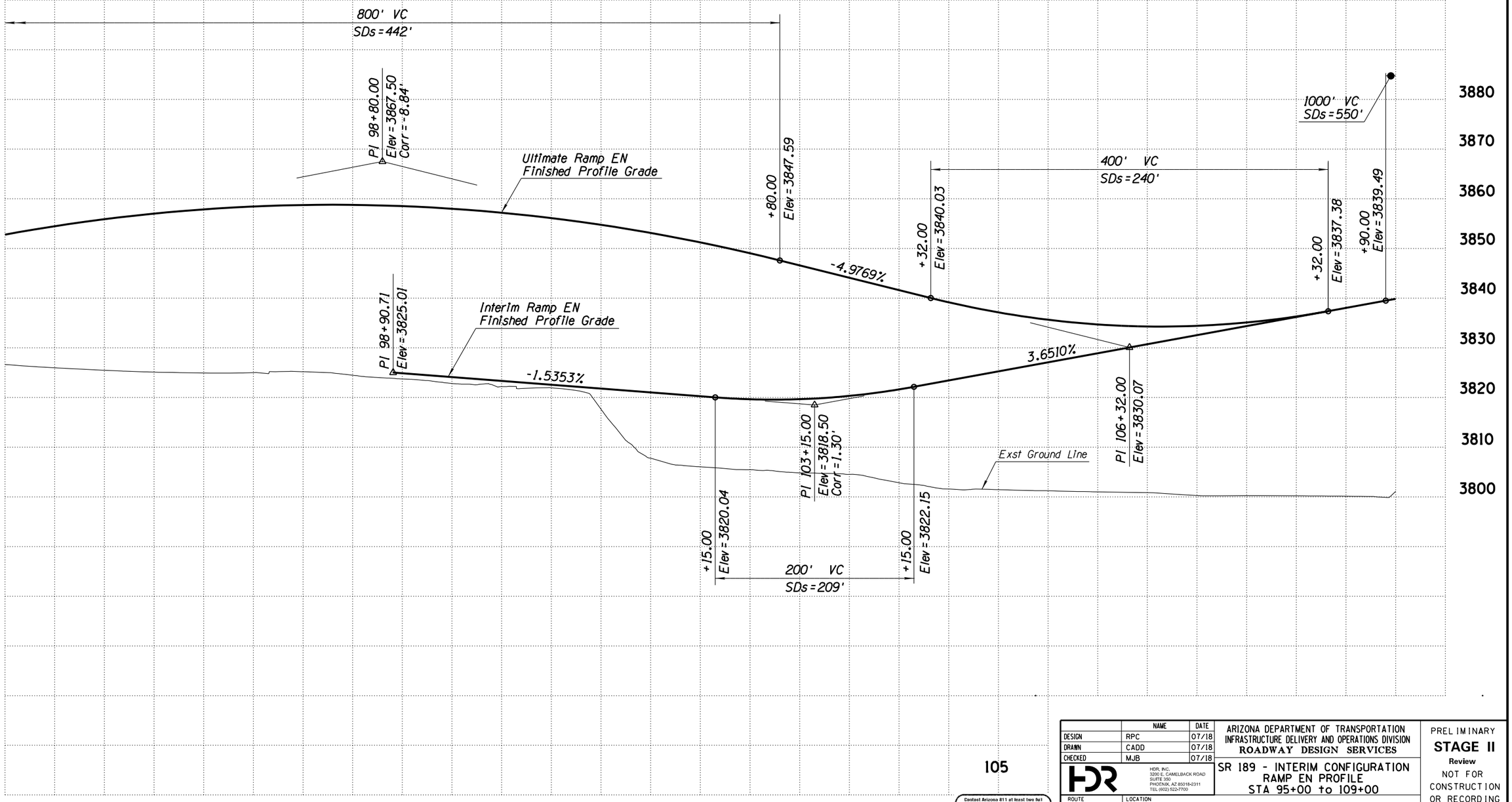
ROUTE	LOCATION	DWG NO. C-03.01
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME=c:\pwworking\phx\d0476786\h8045pr20.dgn PLOT DATE=Jul, 24, 2018 TIME=10:38:19 AM PLOT BY=AHOFFMAN PLOT SCALE=1:100

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE
SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	53	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
RAMP EN PROFILE
STA 95+00 to 109+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

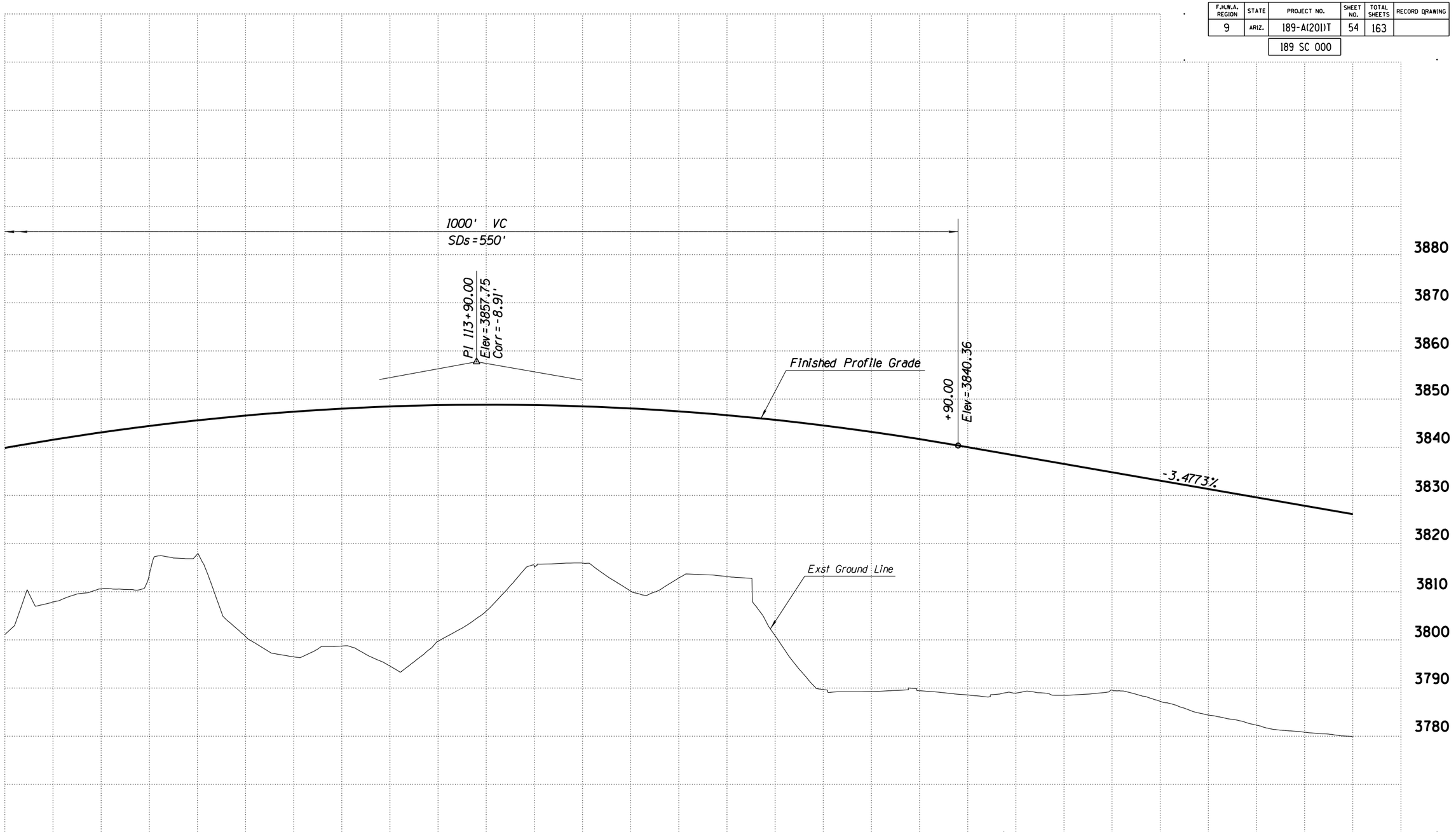
DWG NO. C-03.02

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click ArizonaBlue Stake.com

FILE NAME: c:\pwworking\phx\d0476786\h8045pr21.dgn PLOT DATE: Jul 24, 2018 TIME: 10:38:25 AM PLOT BY: AHOFFMAN PLOT SCALE: 1:100
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	54	163	
		189 SC 000			



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SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

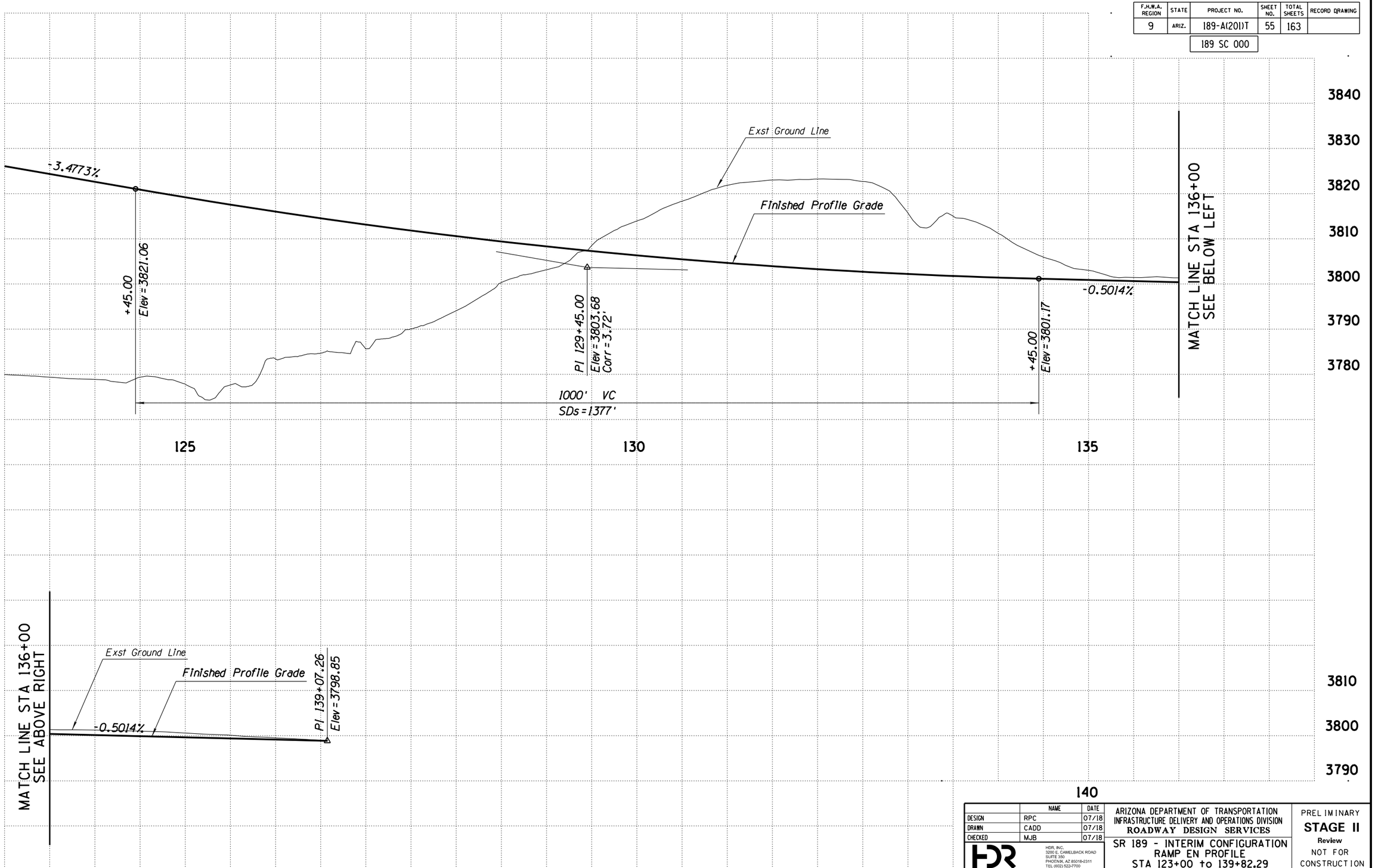
SR 189 - INTERIM CONFIGURATION
RAMP EN PROFILE
STA 109+00 to 123+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	DWG NO. C-03.03
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	55	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
RAMP EN PROFILE
STA 123+00 to 139+82.29

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-03.04

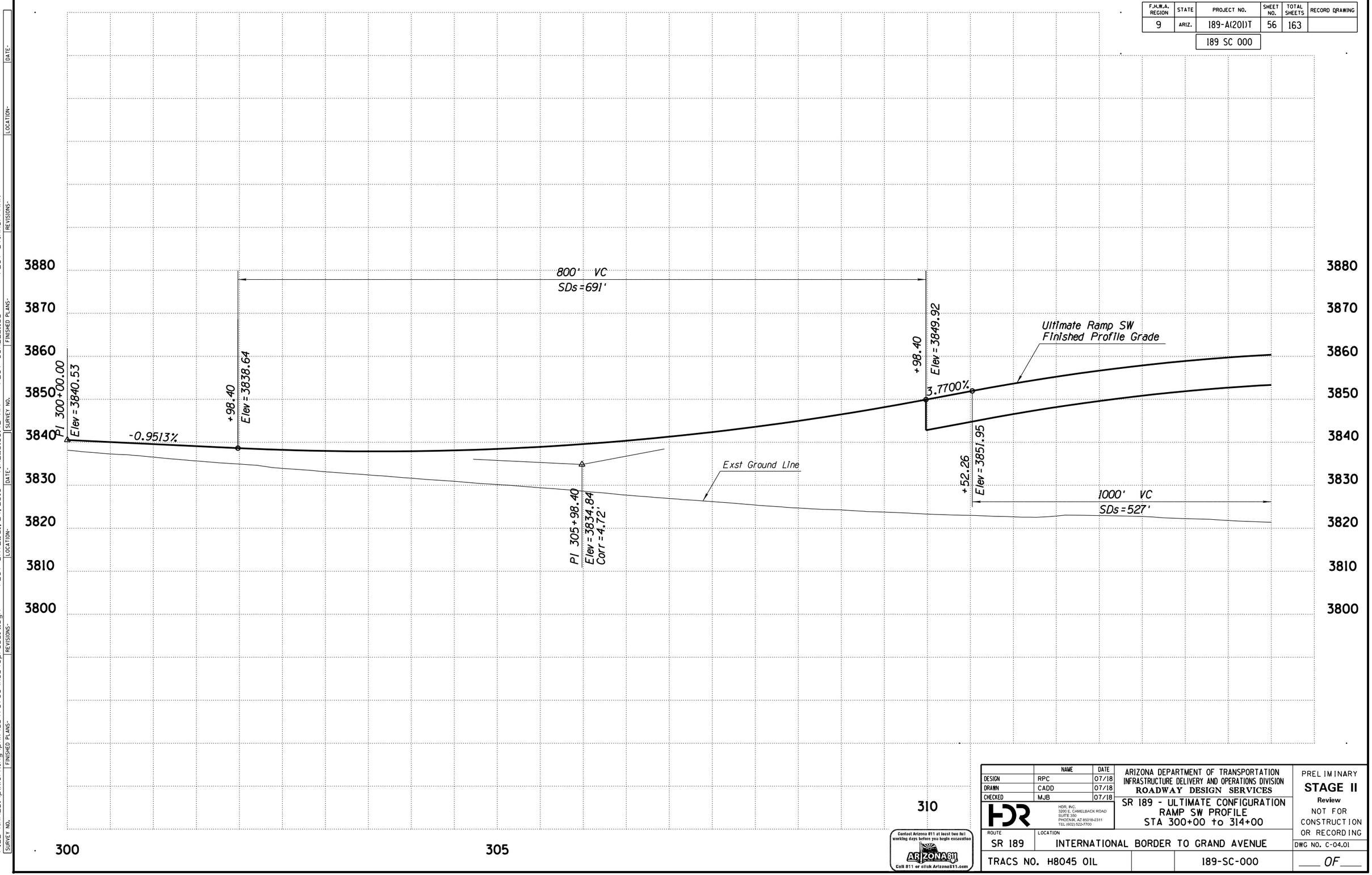
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0476786\h8045pr23.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:38:36 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	56	163	
		189 SC 000			



	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
RAMP SW PROFILE
STA 300+00 to 314+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

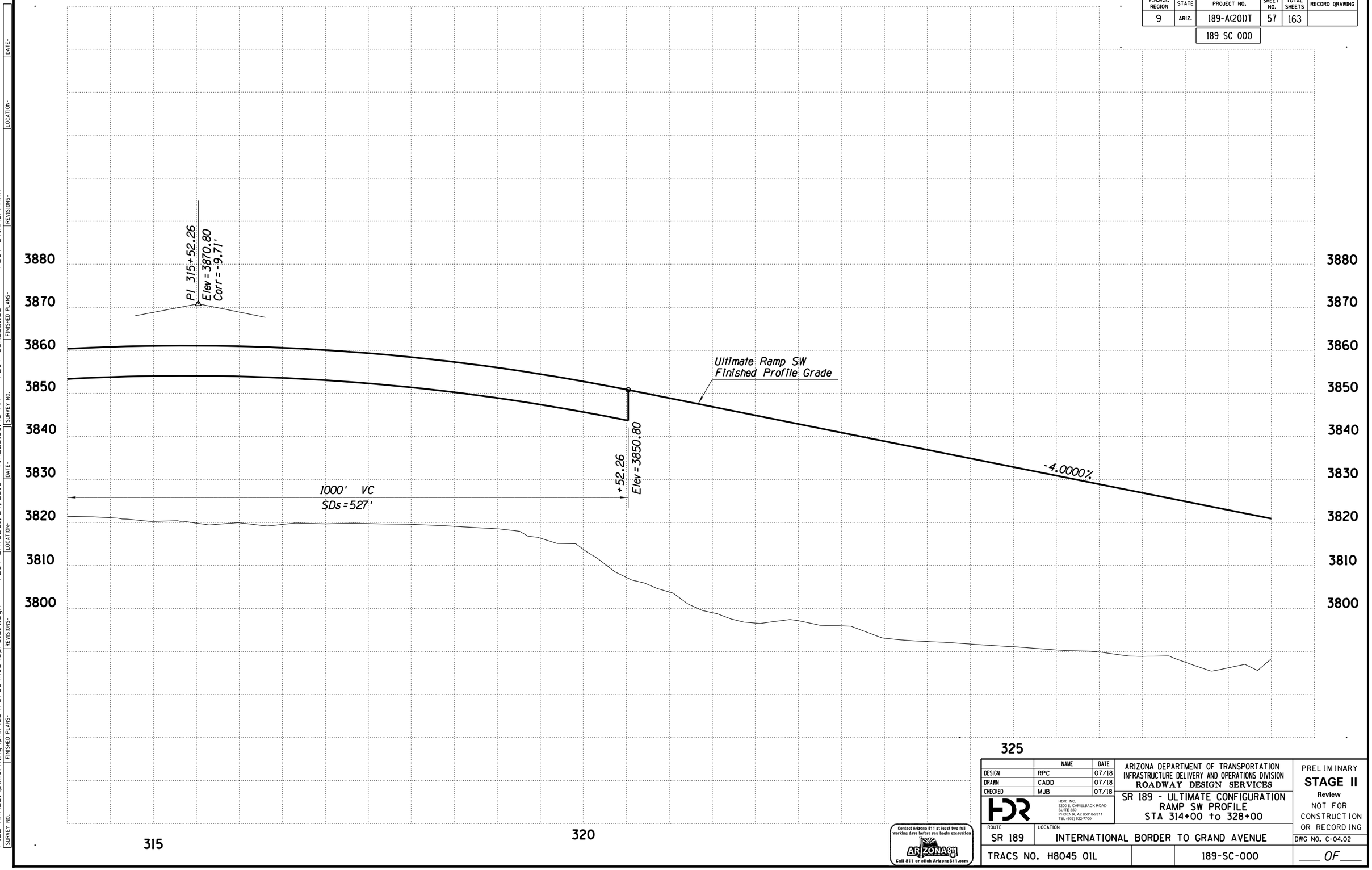
ROUTE	LOCATION	DWG NO. C-04.01
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME=c:\pwworking\phx\d0476786\h8045pr30ult.dgn PLOT DATE=Jul, 24, 2018 TIME=10:36:42 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	57	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
RAMP SW PROFILE
STA 314+00 to 328+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

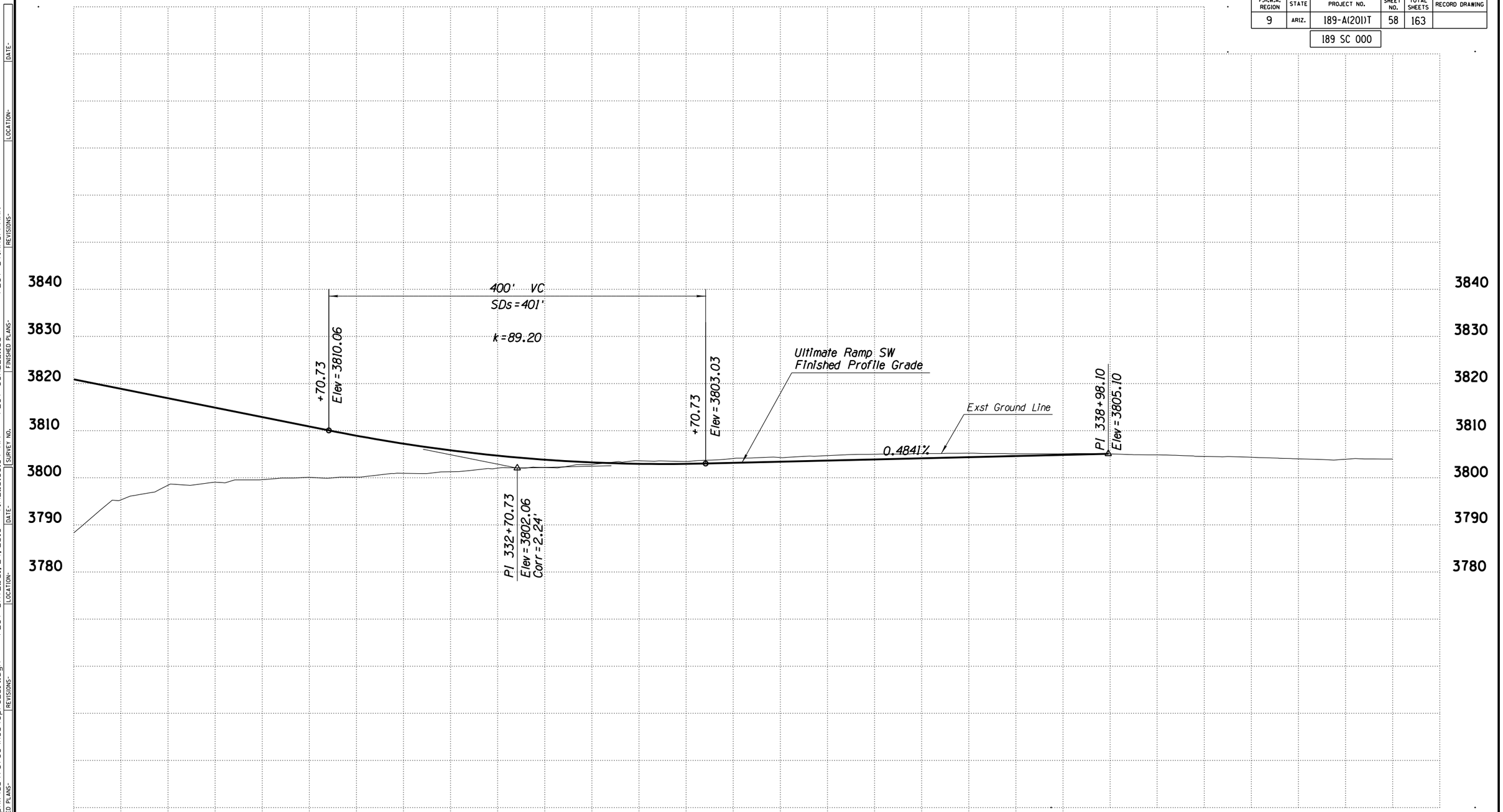
DWG NO. C-04.02

____ OF ____

FILE NAME: c:\pwworking\phx\d0476786\h8045pr31ult.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:38:48 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	58	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
RAMP SW PROFILE
STA 328+00 to 342+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

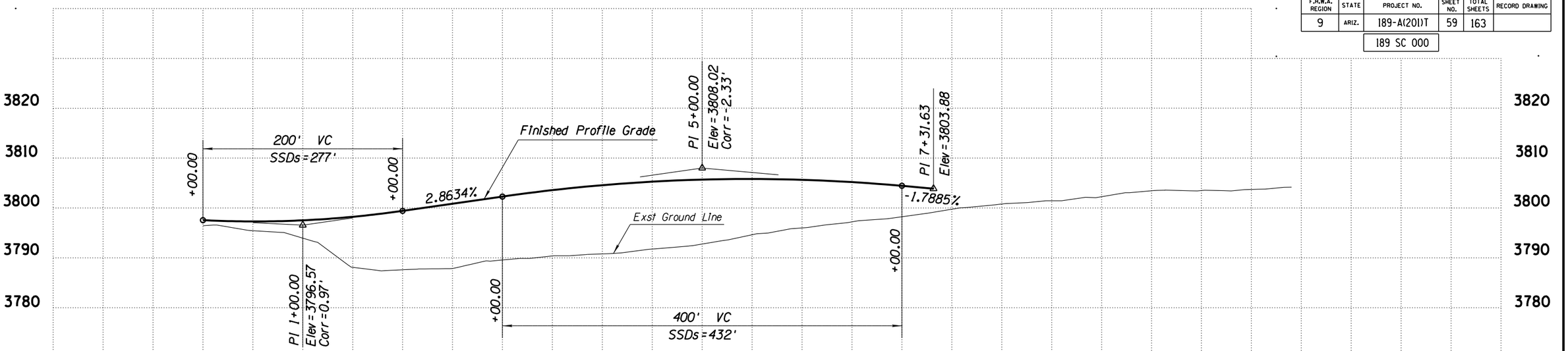
DWG NO. C-04.03

____ OF ____

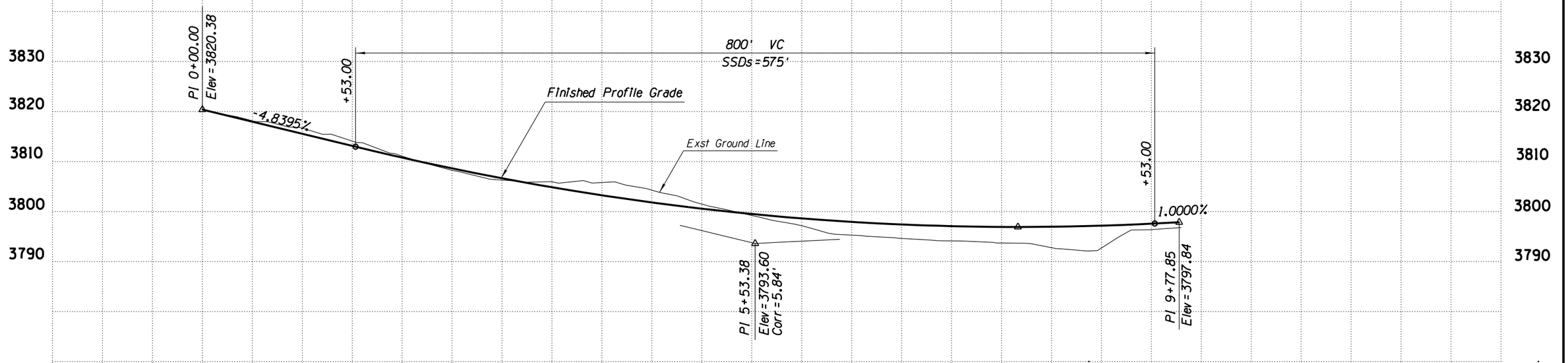
FILE NAME: c:\pwworking\phx\d0476786\h8045pr32ult.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:38:54 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	59	163	
		189 SC 000			



ULTIMATE
I-19 RAMP A



ULTIMATE
I-19 RAMP D

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
I-19 RAMP A PROFILE
I-19 RAMP D PROFILE

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

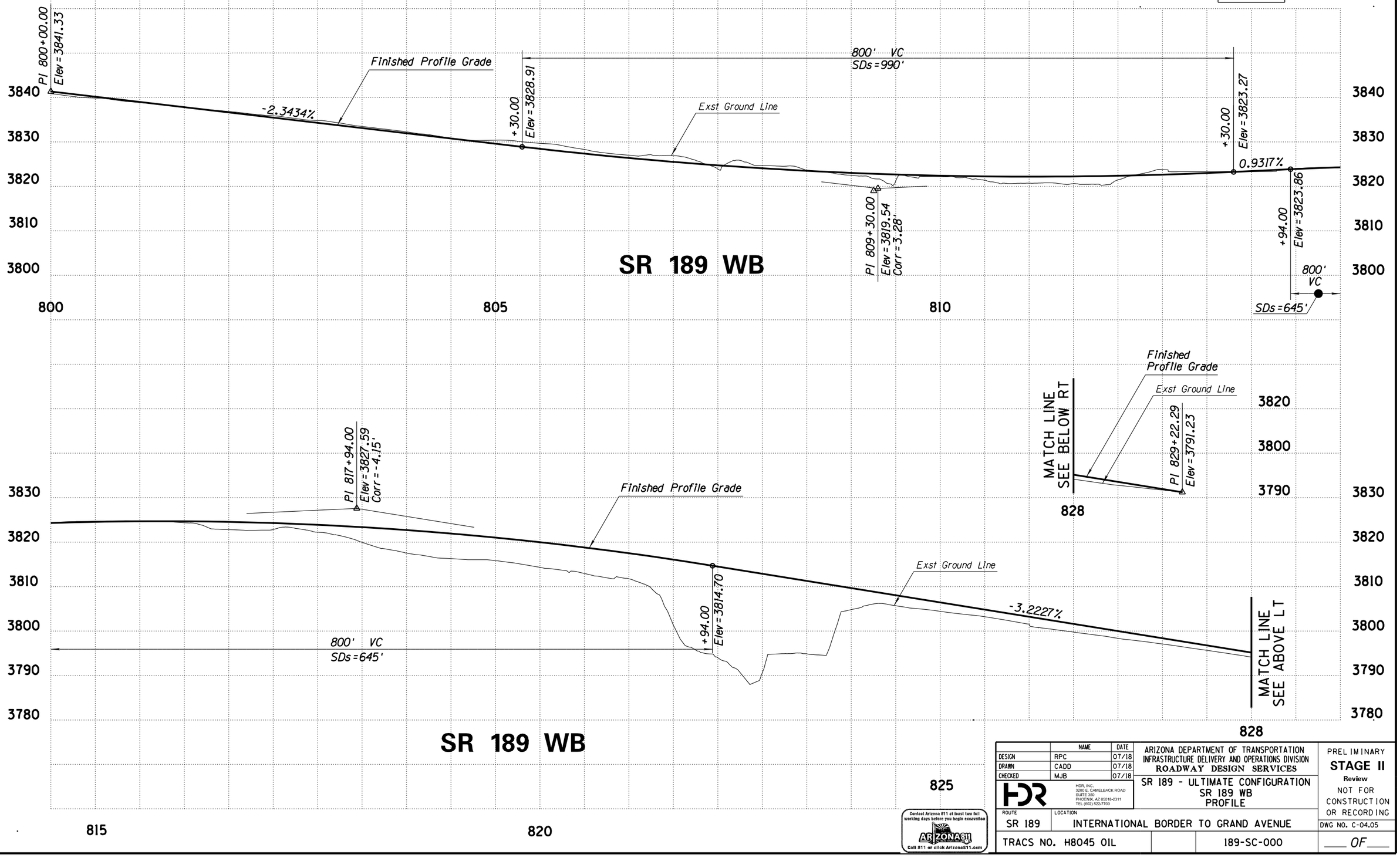
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-04.04

____ OF ____

FILE NAME=c:\pwworking\phx\d0476786\h8045pr33ult.dgn PLOT DATE=Jul. 24, 2018 TIME=10:39:00 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	60	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 BLUE STAKE, INC.
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
SR 189 WB
PROFILE

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

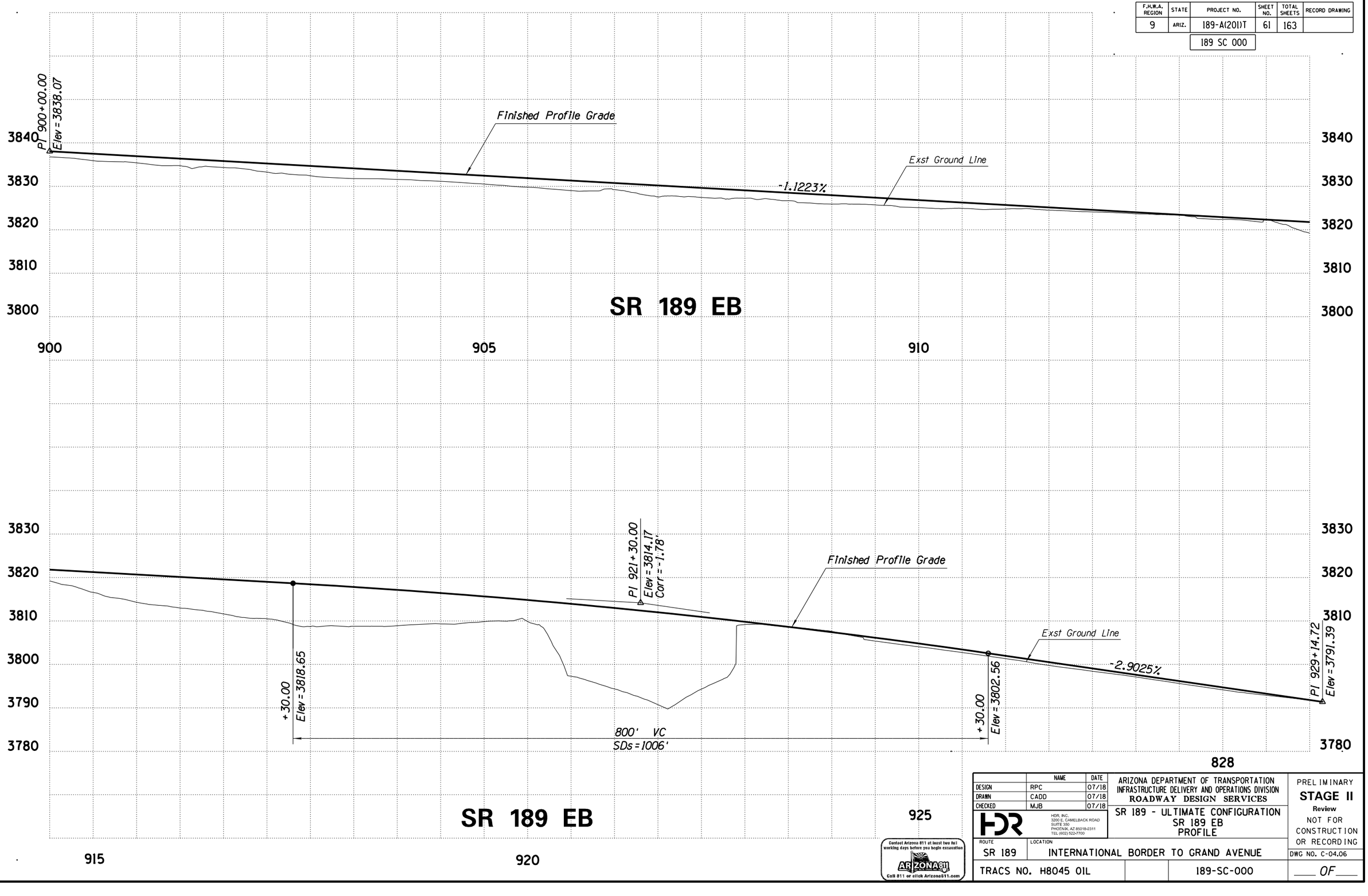
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-04.05

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045pr34ult.dgn PLOT DATE=Jul. 24, 2018 TIME=10:39:06 AM PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE | PLOT SCALE=1:100

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	61	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	RPC	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
SR 189 EB
PROFILE

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. C-04.06

___ OF ___

FILE NAME=c:\pwworking\phx\d0476786\h8045pr35jlt.dgn PLOT DATE=Jul, 24, 2018 TIME=10:39:12 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	62	163	
		189 SC 000			

N

STA 45+65.00
BEGIN PROJECT 189 SC 000

Exst SR 189 Cst ℄

Exst R/W

Exst Slope Easement

Exst 2-48" Pipe

Exst R/W

Exst Slope Easement

35

40

45

100'

100'

LEGEND

New Pavement

Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811

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	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 45+65 to 48+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

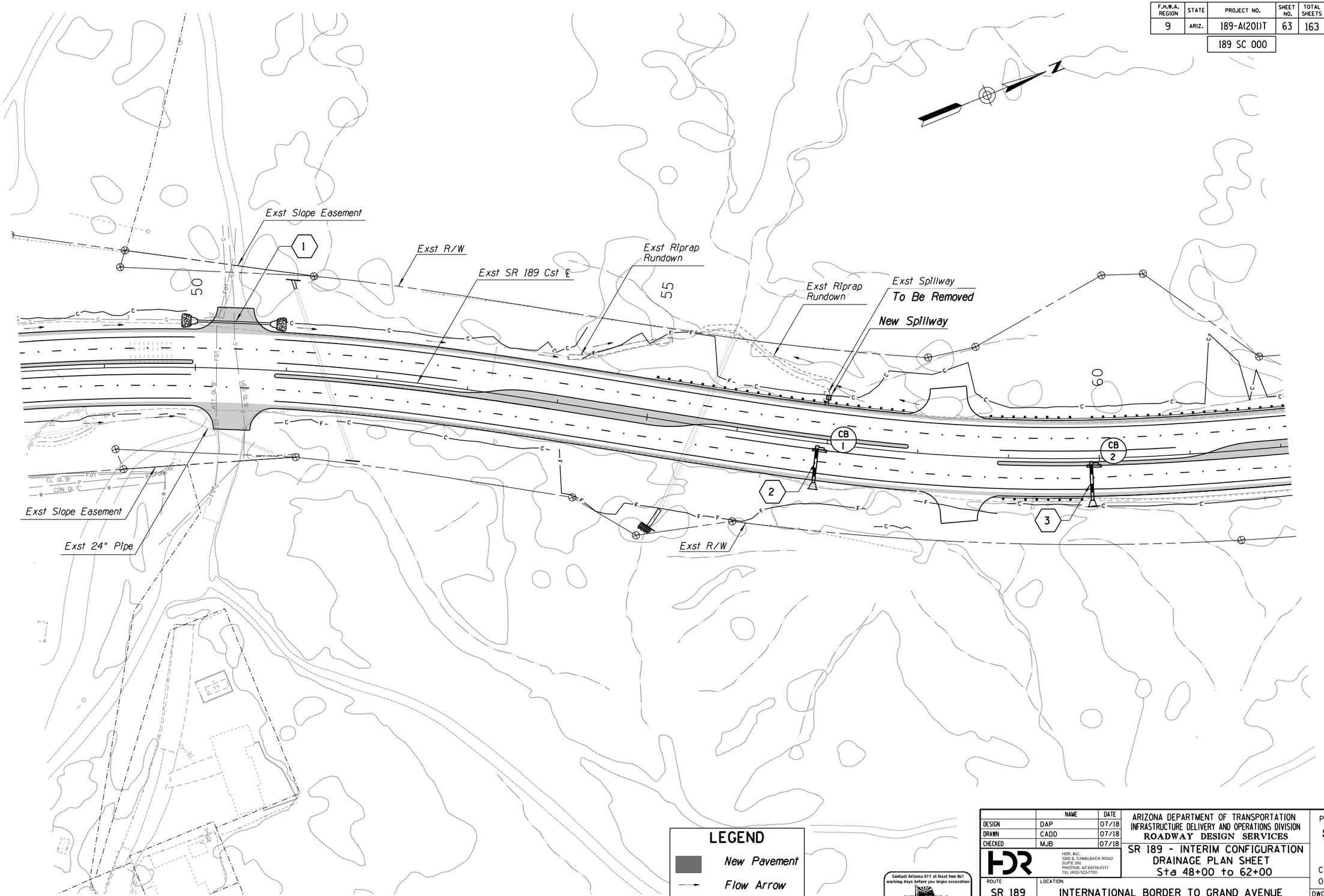
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.01

___ OF ___

FILE NAME c:\pwworking\phx\d0522167\h8045d01.dgn PLOT SCALE 1:100 PLOT BY:AHOFFMAN
PLOT DATE Jul. 24, 2018 TIME 10:39:23 AM
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	63	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 48+00 to 62+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

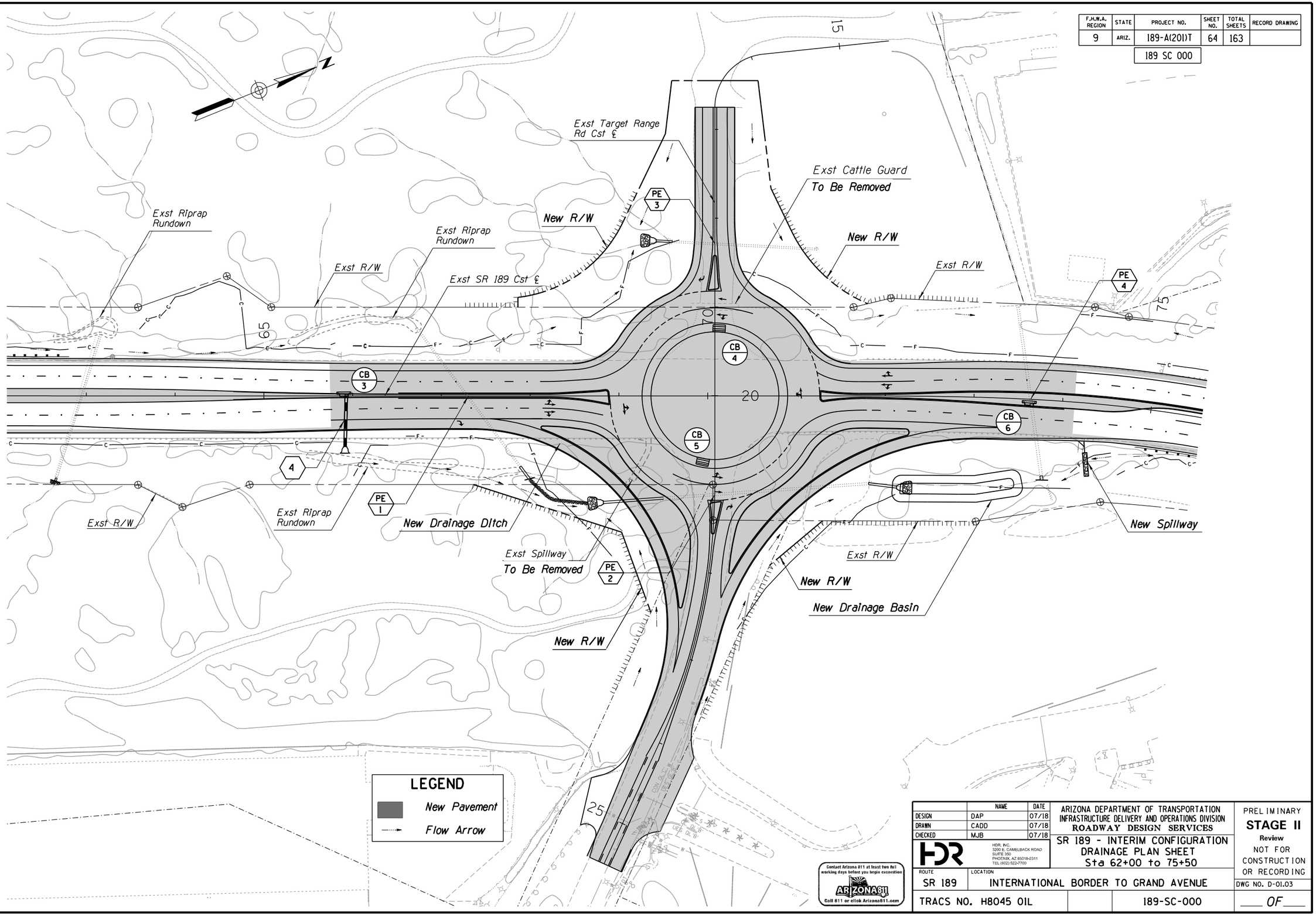
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.02

____ OF ____

FILE NAME=c:\pwworking\phx\d0522167\h8045dp02.dgn PLOT DATE=Jul, 24, 2018 TIME=10:39:34 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	64	163	
		189 SC 000			



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 62+00 to 75+50

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.03

___ OF ___

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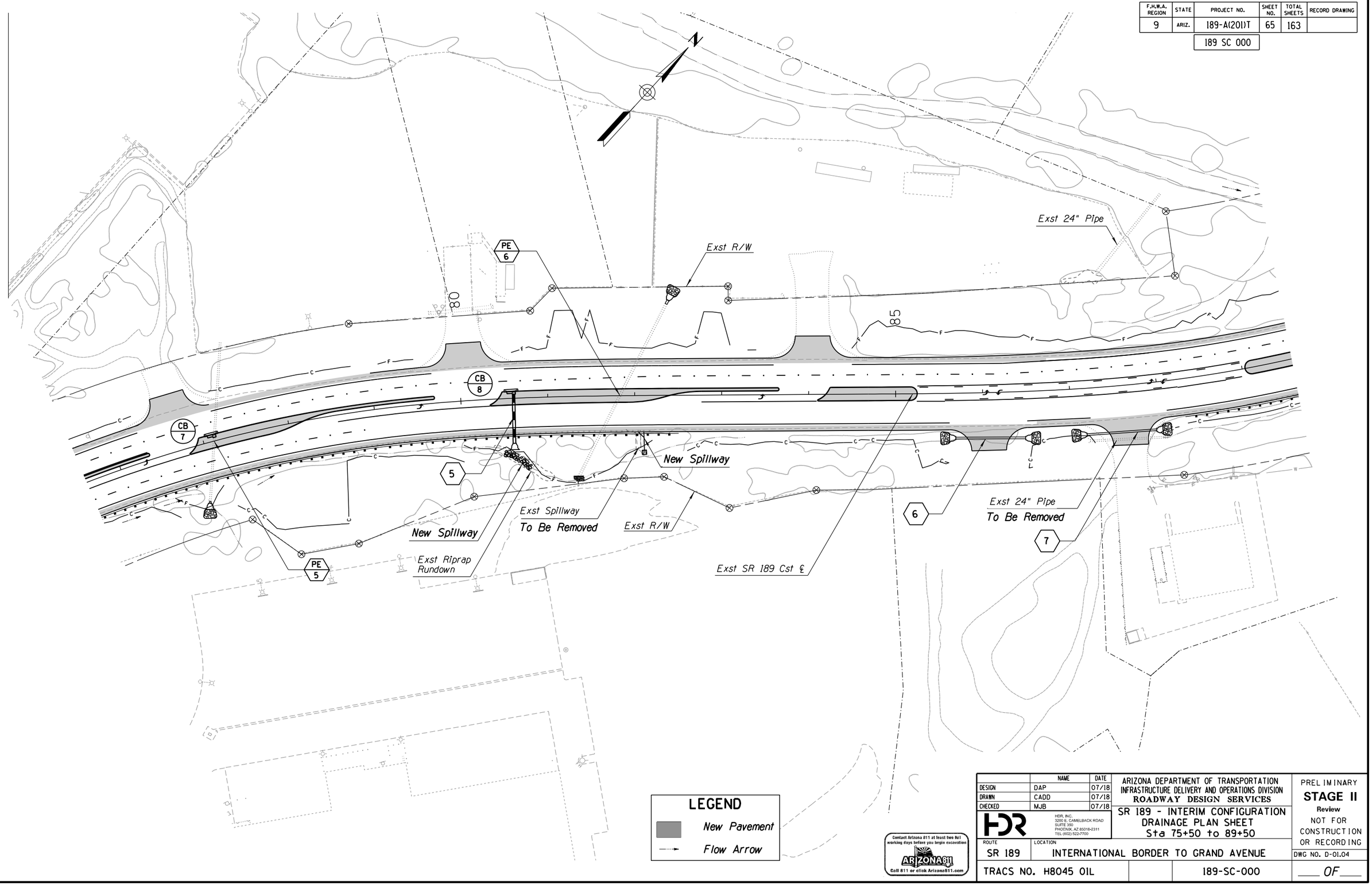
FILE NAME: c:\pwworking\phx\d0522167\h8045d03.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:39:43 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	65	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 75+50 to 89+50

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.04

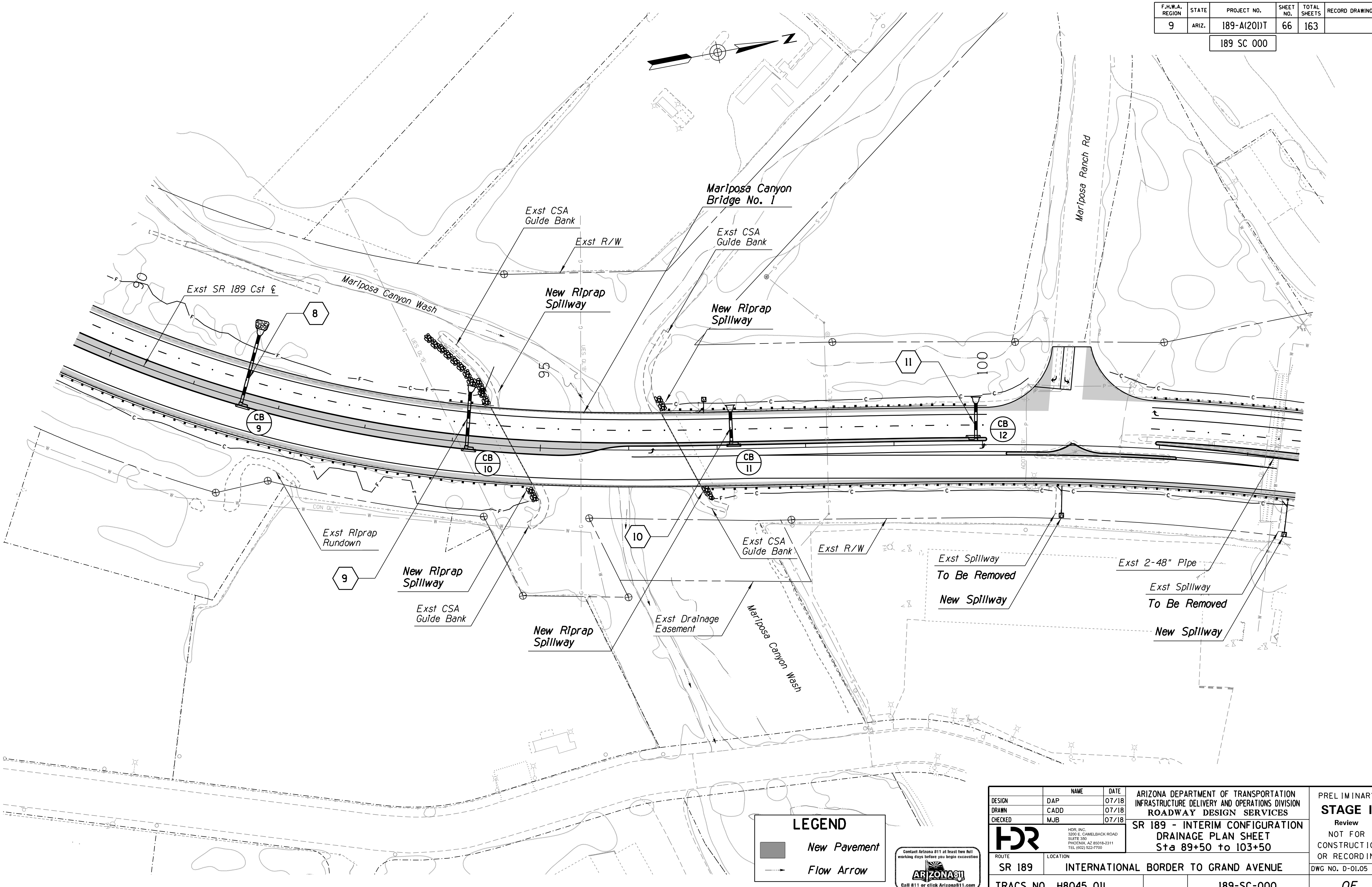
___ OF ___

FILE NAME: c:\pwworking\phx\d0522167\h8045dp04.dgn | PLOT DATE: Jul. 24, 2018 | TIME: 10:39:54 AM | PLOT SCALE: 1:100 | PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	66	163	

189 SC 000



Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811

Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC. 3200 E. CAMELBACK ROAD SUITE 350 PHOENIX, AZ 85016-2311 TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 89+50 to 103+50

ROUTE: SR 189

LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L

189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

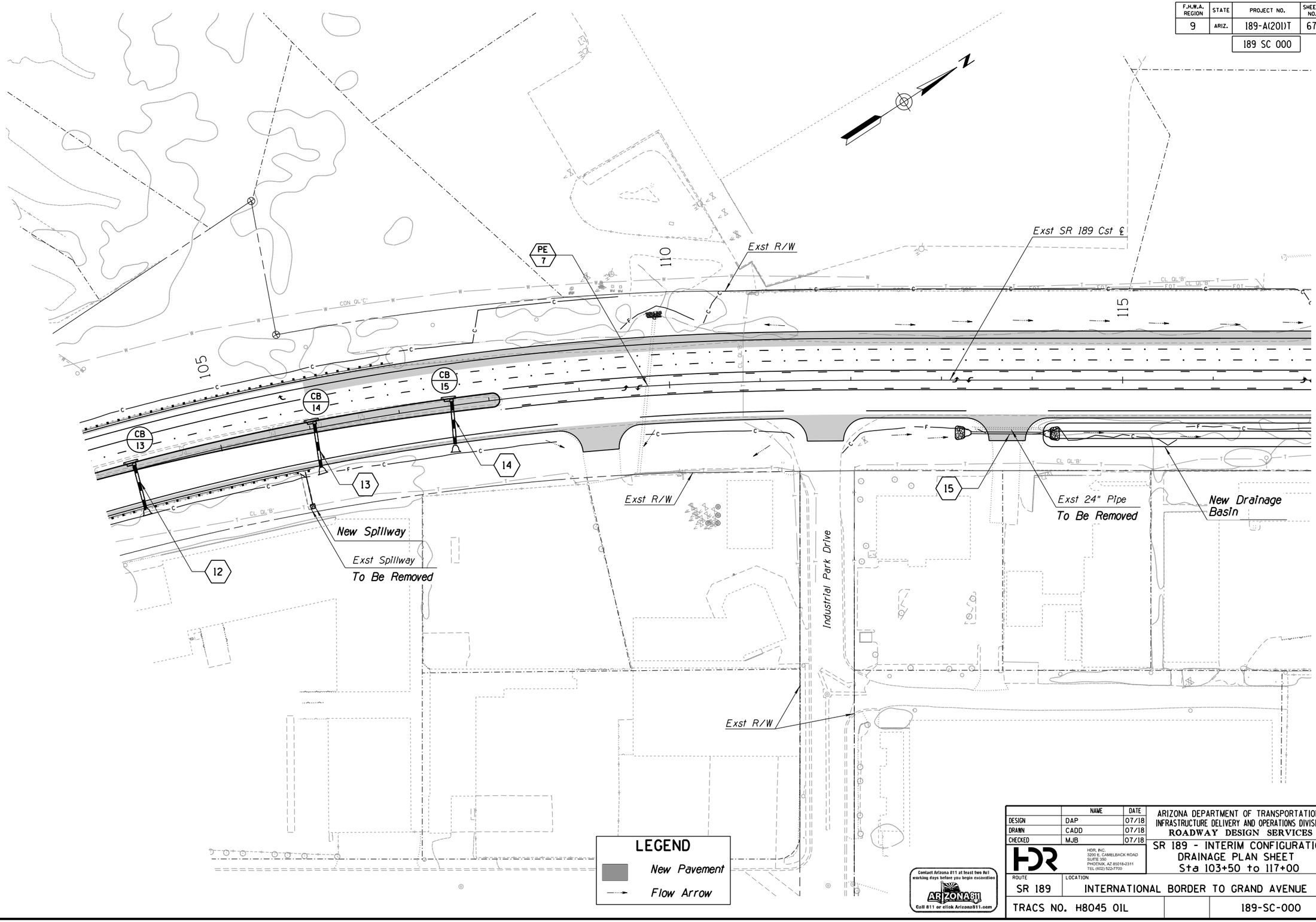
DWG NO. D-01.05

____ OF ____

FILE NAME: c:\pwworking\phx\d0522167\h8045dp05.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:40:04 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	67	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 103+50 to 117+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. D-01.06
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

FILE NAME=c:\pworking\phx\d0522167\h8045dp06.dgn PLOT DATE=Jul, 24, 2018 TIME=10:40:16 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	68	163	
		189 SC 000			

Calle Platino Rd

Exst Drainage Easement

Loma Mariposa Rd

New R/W

Exst Drainage Easement

16

Exst 24" Pipe To Be Removed

Exst SR 189 Cst ℄

Exst R/W

BE 1

120

125

Exst R/W

130

CB 16

Exst 24" Pipe To Be Removed

17

New Drainage Basin

New 2-10'x4' CBC Extension & New Riprap Outlet Pad See Detail D13

Exst Drainage Easement

New Spillway

Exst R/W

Exst Riprap Spillway

PE 8

LEGEND

New Pavement

Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC. 3200 E. CAMELBACK ROAD SUITE 350 PHOENIX, AZ 85018-2311 TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

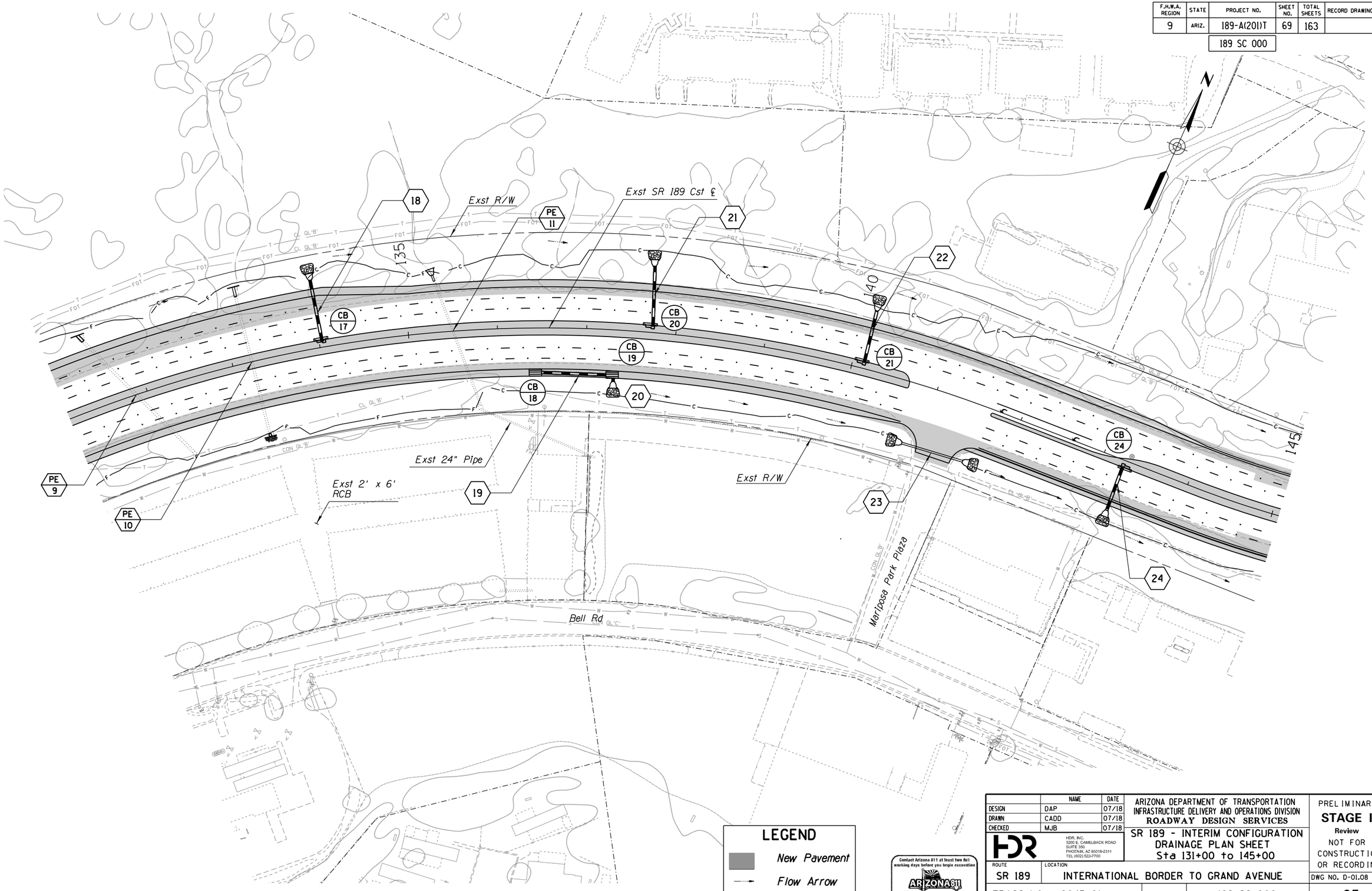
DWG NO. D-01.07

TRACS NO. H8045 01L | 189-SC-000 | ___ OF ___

FILE NAME=c:\pwworking\phx\d0522167\h8045dp07.dgn PLOT DATE:Jul. 24, 2018 TIME:10:40:28 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	69	163	
		189 SC 000			



LEGEND

- New Pavement
- Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 131+00 to 145+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.08

___ OF ___

FILE NAME: c:\pwworking\phx\d0522167\h8045dp08.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:40:38 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	70	163	
		189 SC 000			

W Paul Bond Dr
Exst R/W
Frank Reed Rd
W Shell Dr
Exst R/W
W Carls Jr Rd
N
Exst Storm Drain
To Be Removed
Exst SR 189
Cst ℄
Exst Storm Drain
To Be Removed
Exst Storm Drain
To Be Removed
Exst R/W
145
New R/W
CB 30
CB 31
CB 33
MH 2
MH 3
32
33
34
35
36
37
38
CB 29
MH 1
CB 35
CB 32
Exst R/W
New R/W
Exst Storm Drain
To Be Removed
29
150
155
20
25
CB 23
CB 28
CB 26
CB 27
28
30
39
Exst Storm Drain
To Be Removed
CB 25
CB 24
26
27
Ramp EN Bridge
Ramp EN Cst ℄
New Drainage
Basin
Exst R/W
31
New Abutment
Protection
See Detail DI5
CB 34
New R/W
Exst R/W
Industrial Park Dr
Exst R/W
Exst R/W
Bell Rd
25

LEGEND
New Pavement
Flow Arrow

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ARIZONA811
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	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

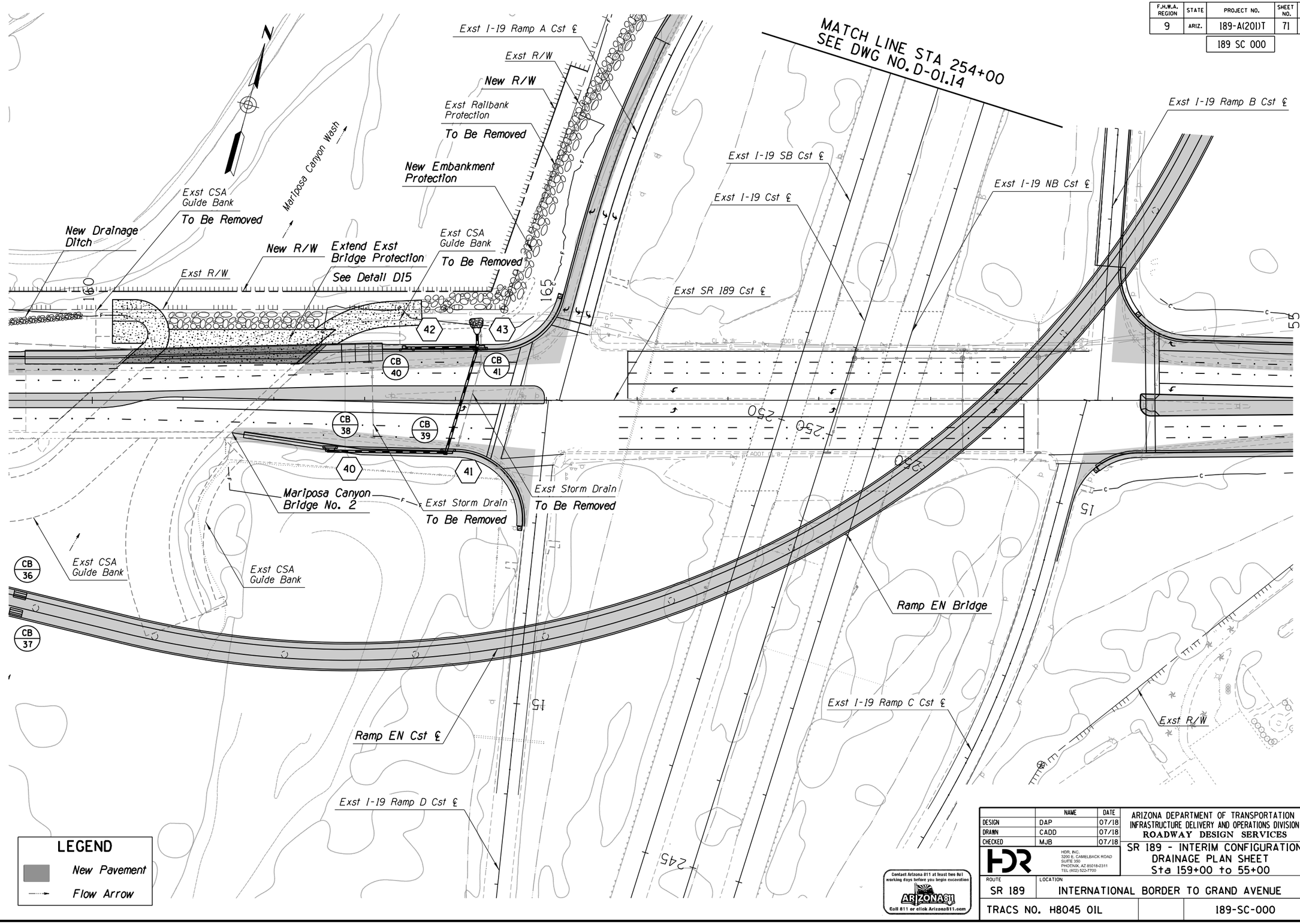
SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 145+00 to 159+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. D-01.09
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

FILE NAME=c:\pwworking\phx\d0522167\h8045dp09.dgn PLOT DATE=Jul, 24, 2018 TIME=10:40:51 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	71	163	
		189 SC 000			



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 159+00 to 55+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.10

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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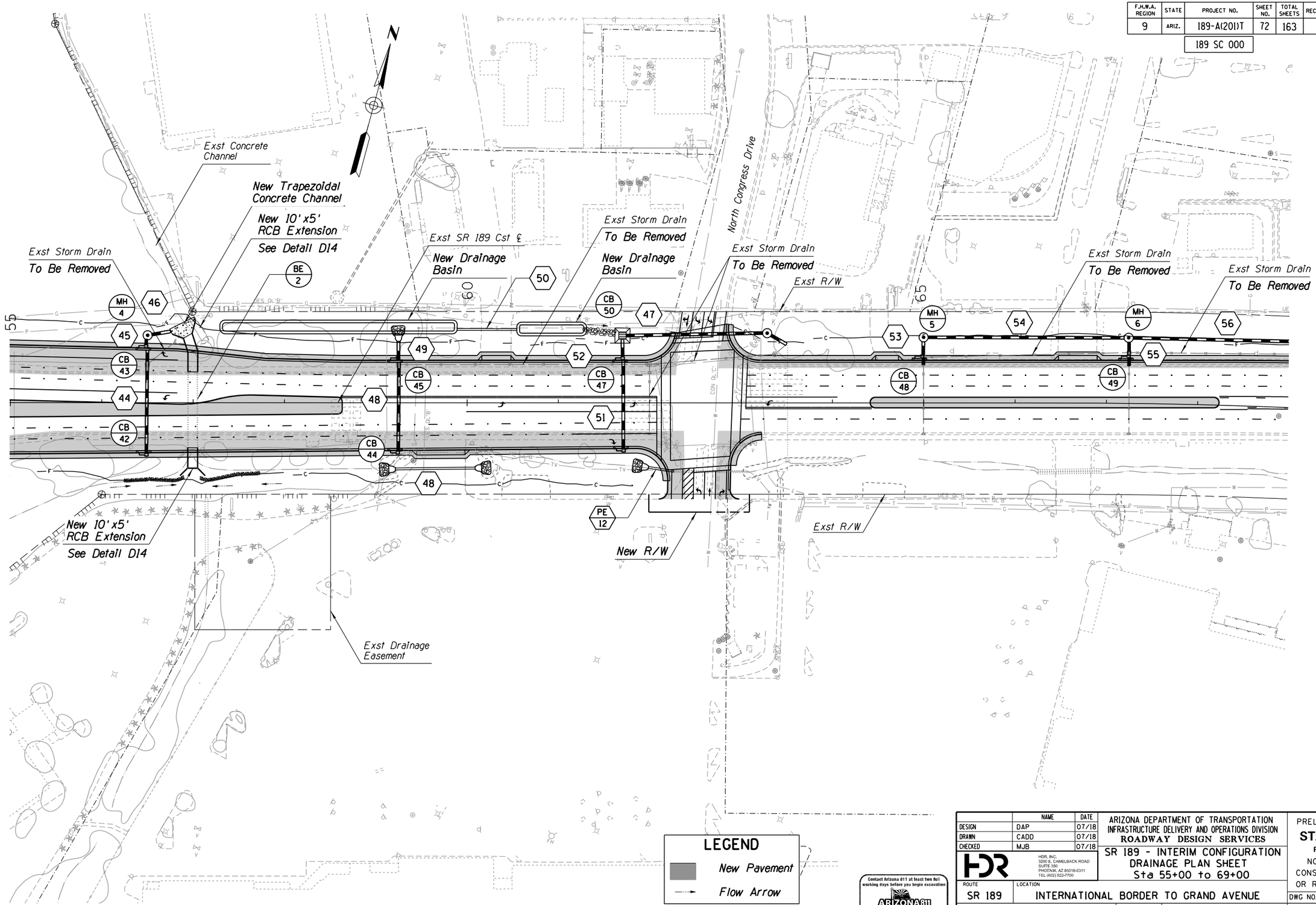
FILE NAME: c:\pwworking\phx\d0522167\h8045dp10.dgn
PLOT SCALE: 1:100
PLOT DATE: Jul. 24, 2018
TIME: 10:41:01 AM
PLOT BY: AHOFFMAN
FINISHED PLANS | LOCATION | DATE | REVISIONS | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	72	163	
		189 SC 000			



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 55+00 to 69+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

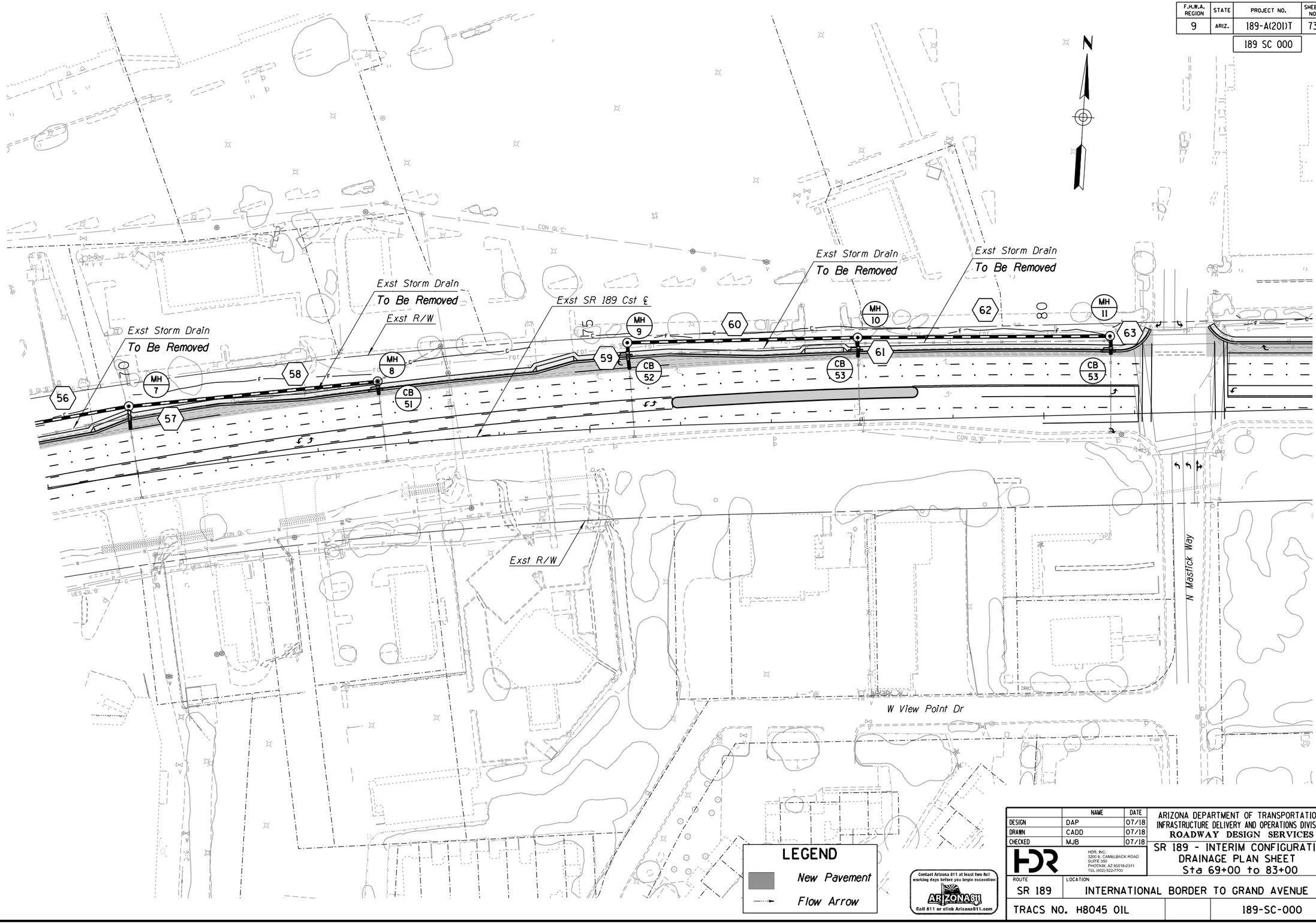
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.11

____ OF ____

FILE NAME: c:\pwworking\phx\d0522167\h8045dp11.dgn PLOT SCALE:1:100 PLOT BY:AHOFFMAN
PLOT DATE:Jul. 24, 2018 TIME:10:41:11 AM
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	73	163	
		189 SC 000			



LEGEND

- New Pavement
- Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 69+00 to 83+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

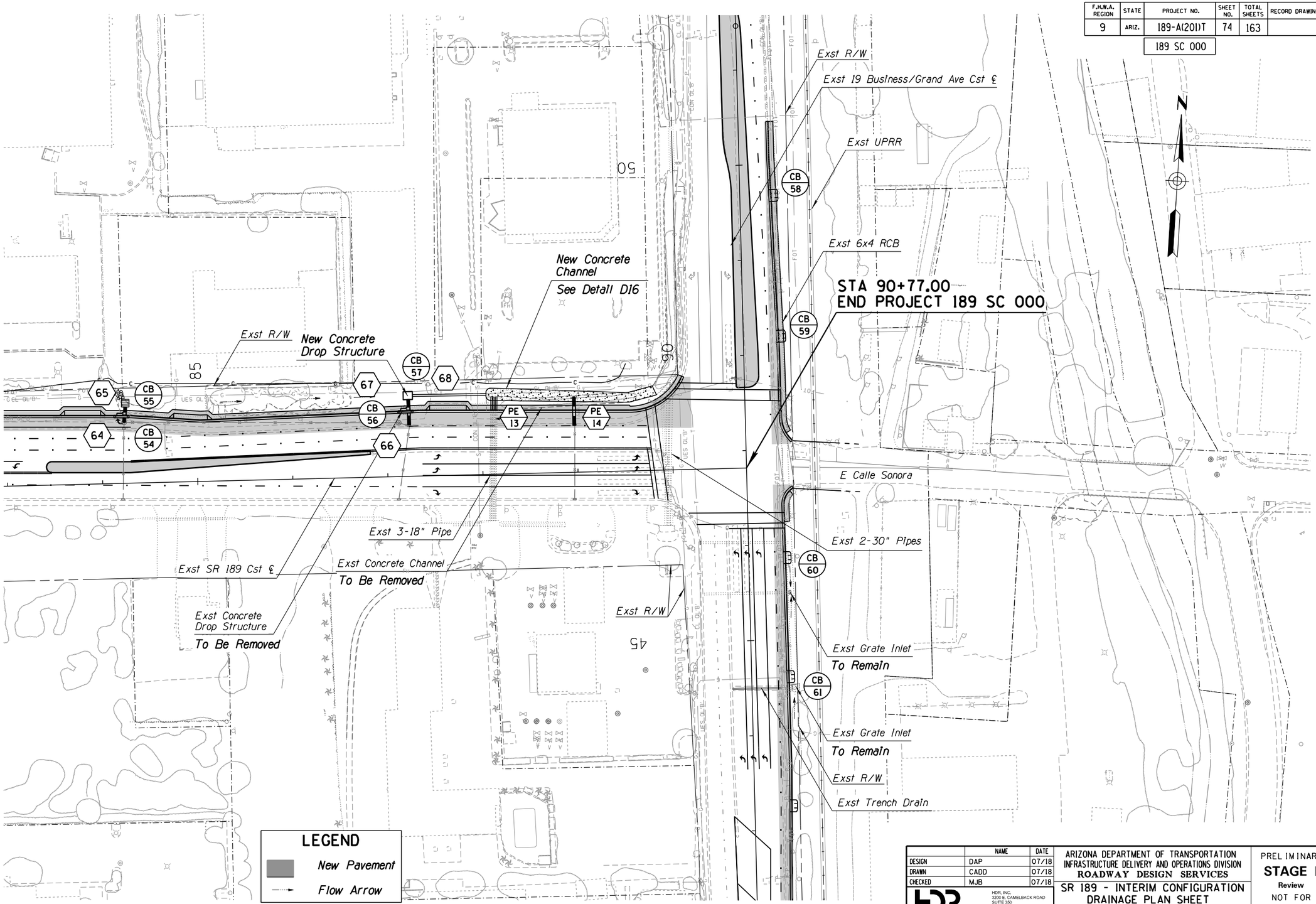
DWG NO. D-01.12

___ OF ___

FILE NAME: c:\pwworking\phx\d0522167\h8045dp12.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:41:21 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE
DATE				

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	74	163	
		189 SC 000			



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 83+00 to 90+77

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.13

___ OF ___

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FILE NAME:c:\pwworking\phx\d0522167\h8045dp13.dgn PLOT DATE:Jul. 24, 2018 TIME:10:41:31 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	75	163	
		189 SC 000			

Exst Drainage Easement
New Embankment Protection
Exst Rail Bank Protection
To Be Removed
Exst I-19 Ramp A Cst ℄
Exst Drainage Easement
Exst Drainage Easement
Mariposa Canyon Wash
Exst Spillway
To Be Removed
New Spillway
MATCH LINE STA 254+00
SEE DWG NO. D-01.10
Exst R/W
Exst I-19 SB Cst ℄
Exst I-19 Cst ℄
Exst I-19 NB Cst ℄
Exst 3-14' CMP's
Exst I-19 Ramp B Cst ℄
Ramp EN Bridge
New R/W
Exst R/W
Mariposa Canyon Wash
Sta 128+15.45
End Ramp EN Bridge
Ramp EN Cst ℄
Exst Drainage Easement

LEGEND

- New Pavement
- Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

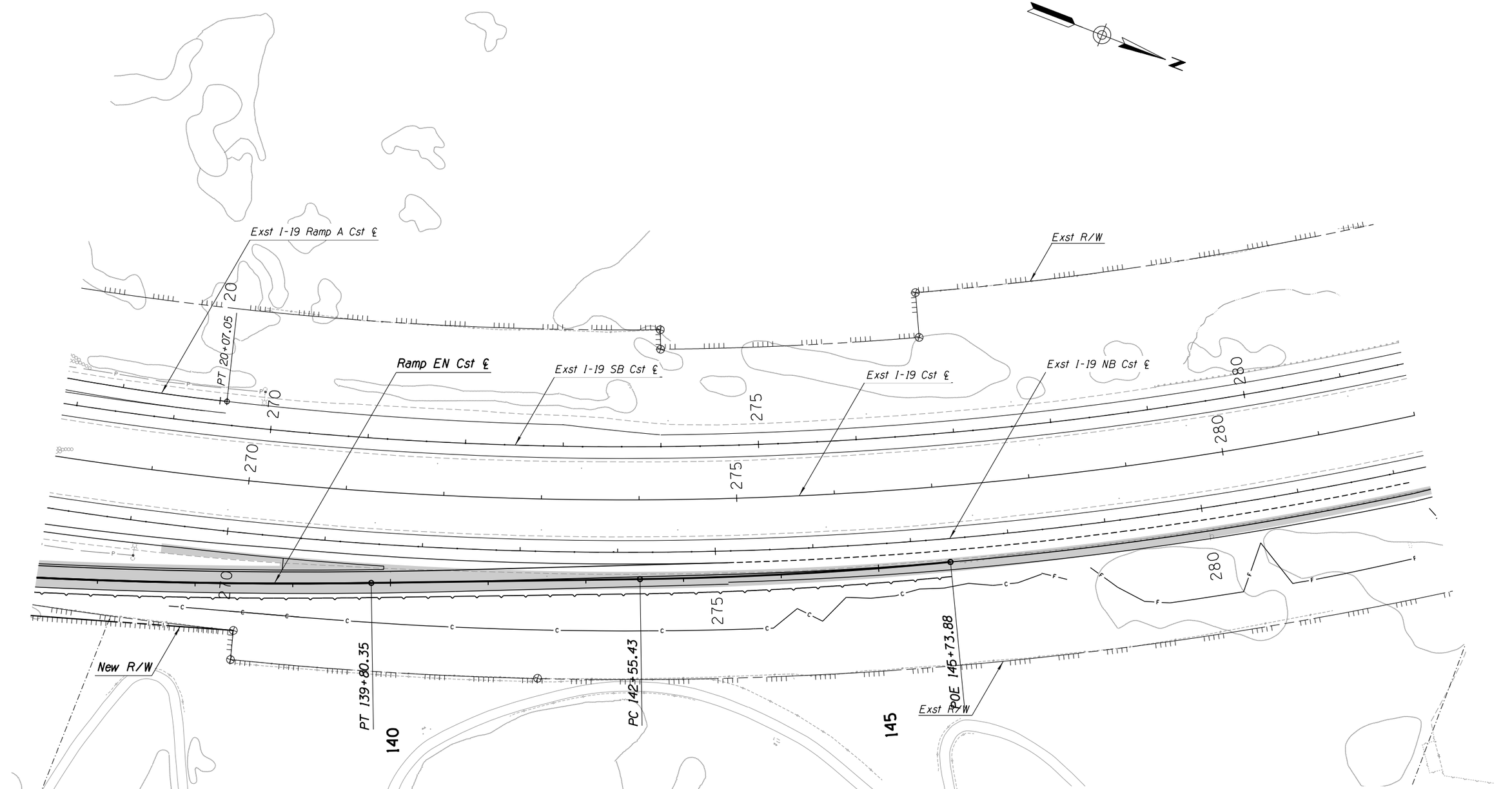
I-19 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 254+00 to 268+00

ROUTE	LOCATION		
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE		
TRACS NO. H8045 01L		189-SC-000	

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. D-01.14
___ OF ___

FILE NAME: E:\pwworking\phx\d0522167\h8045dp14.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:41:42 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	76	163	
		189 SC 000			



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 268+00 to 282+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

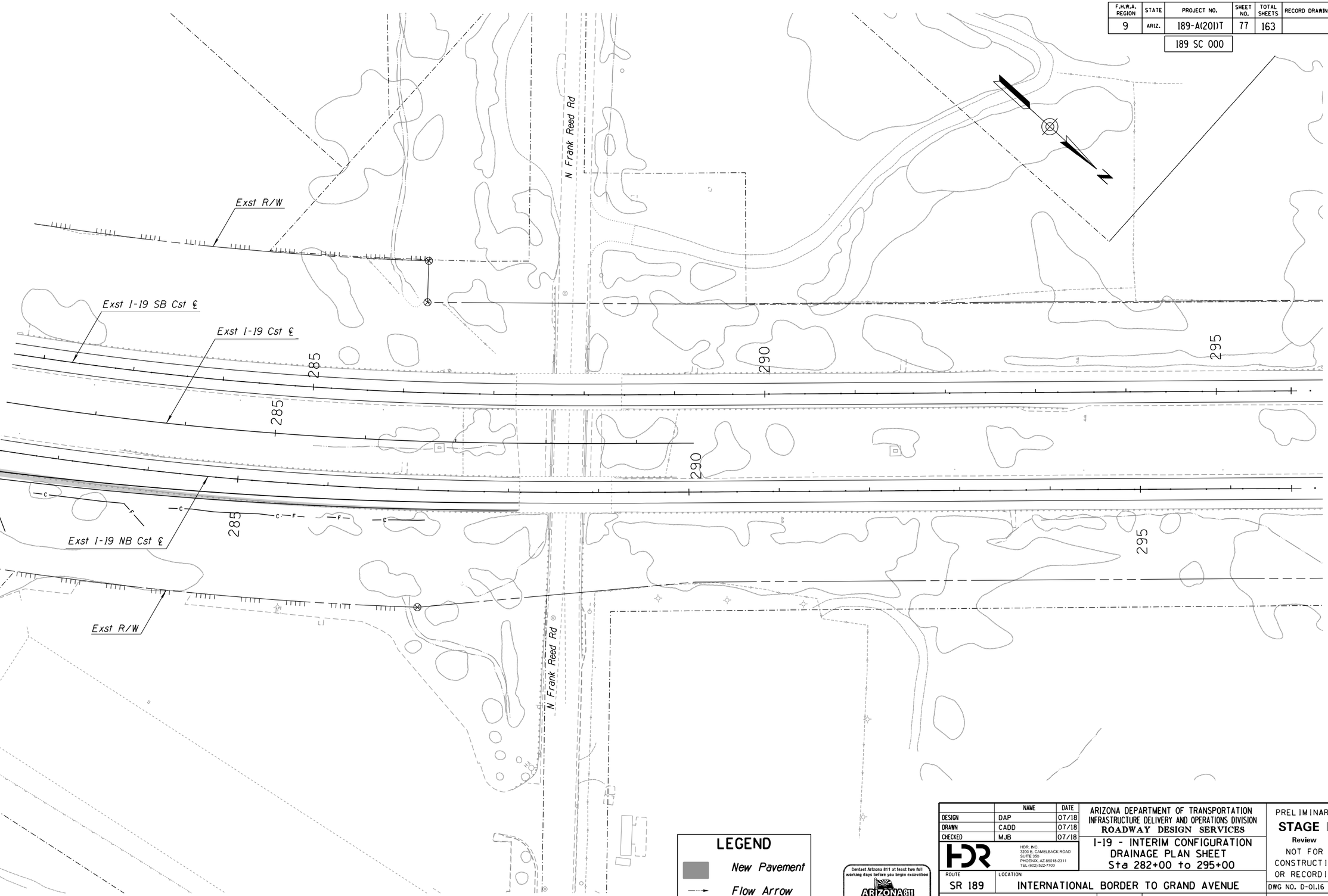
ROUTE	LOCATION	DWG NO.
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	D-01.15
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME=E:\pwworking\phx\d0522167\h8045dp15.dgn PLOT DATE:Jul. 24, 2018 TIME:10:41:52 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	77	163	
		189 SC 000			



LEGEND

- New Pavement
- Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
DRAINAGE PLAN SHEET
Sta 282+00 to 295+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-01.16

____ OF ____

FILE NAME=c:\pwworking\phx\d0522167\h8045dp16.dgn PLOT DATE:Jul. 24, 2018 TIME:10:42:04 AM PLOT SCALE=1:100 PLOT BY:AHOFFMAN

SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	78	163	
		189 SC 000			

Exst Drainage Easement

Calle Platino Rd

Exst 24" Pipe

120

Exst R/W

Exst 2-10'x4' CBC

Exst SR 189 Cst ℄

125

Exst Drainage Easement

Loma Mariposa Rd

Exst R/W

New R/W

PC 128+34.55

130

PE 200

Exst 24" Pipe

Exst R/W

Exst Drainage Easement

Exst Pipe & Headwall

To Be Removed

Exst R/W

New R/W

200

CL OL'B'

CON OL'C'

CL OL'C'

LEGEND

New Pavement

Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811

Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-02.01

____ OF ____

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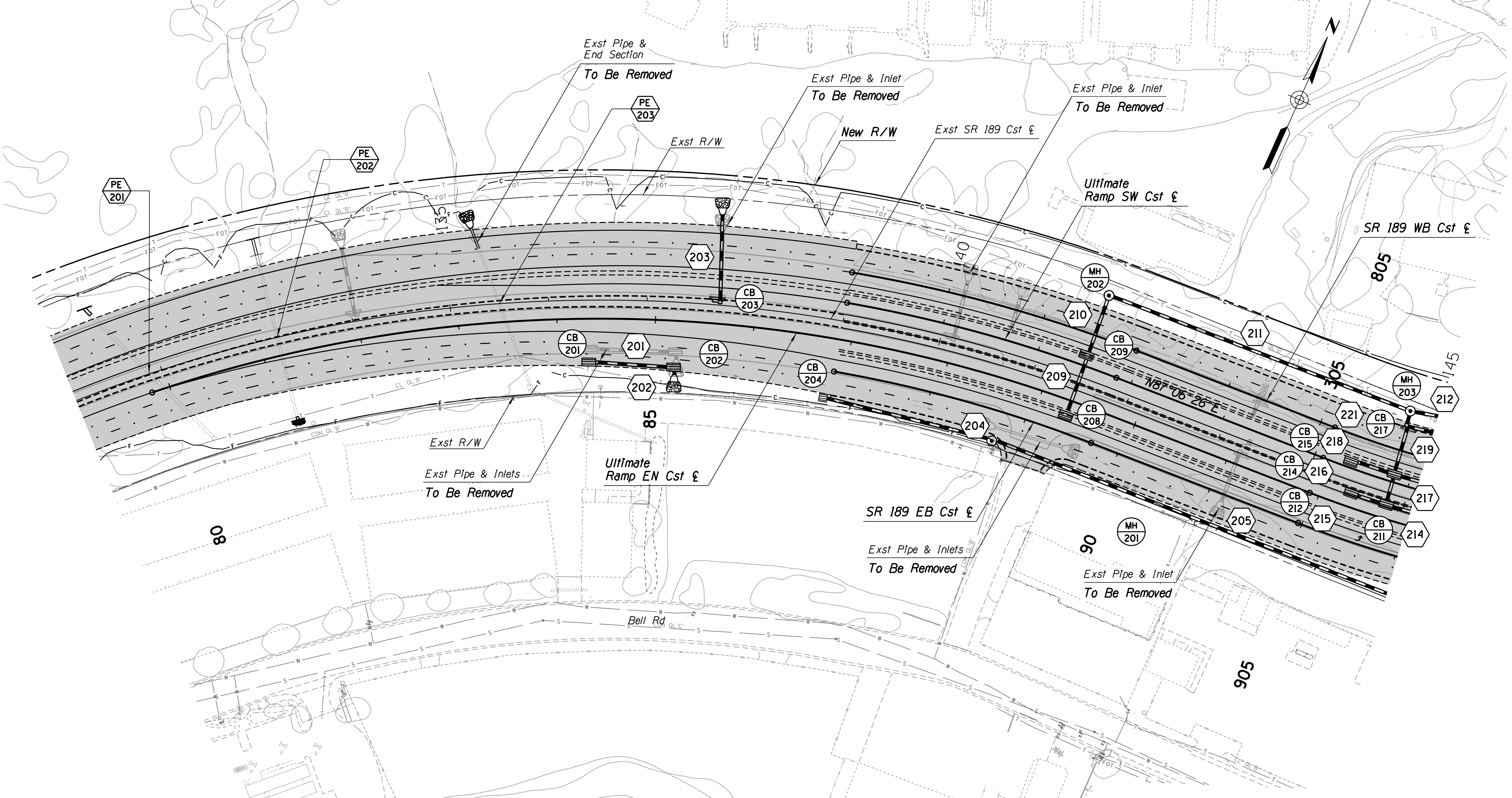
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	79	163	

189 SC 000



LEGEND

- New Pavement
- Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR
HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85016-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 131+00 to 145+00

PRELIMINARY
STAGE II
Review
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. D-02.02

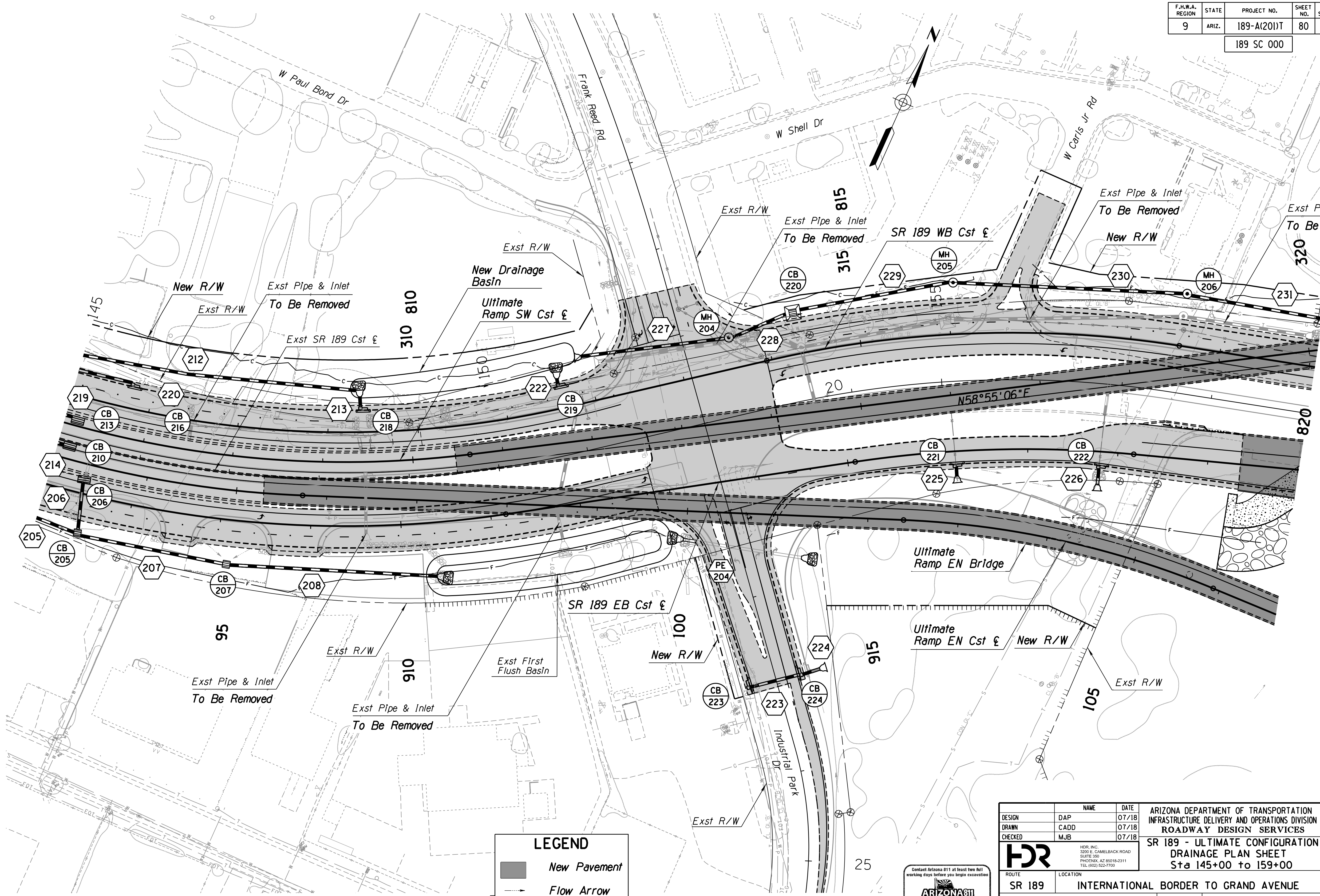
TRACS NO. H8045 01L
189-SC-000
____ OF ____

FILE NAME:c:\pwworking\phx\d0522168\h8045_ph_dp08.dgn PLOT DATE:Jul. 24, 2018 TIME:10:42:32 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	80	163	

189 SC 000



	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 145+00 to 159+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. D-02.03

TRACS NO. H8045 01L
189-SC-000
____ OF ____

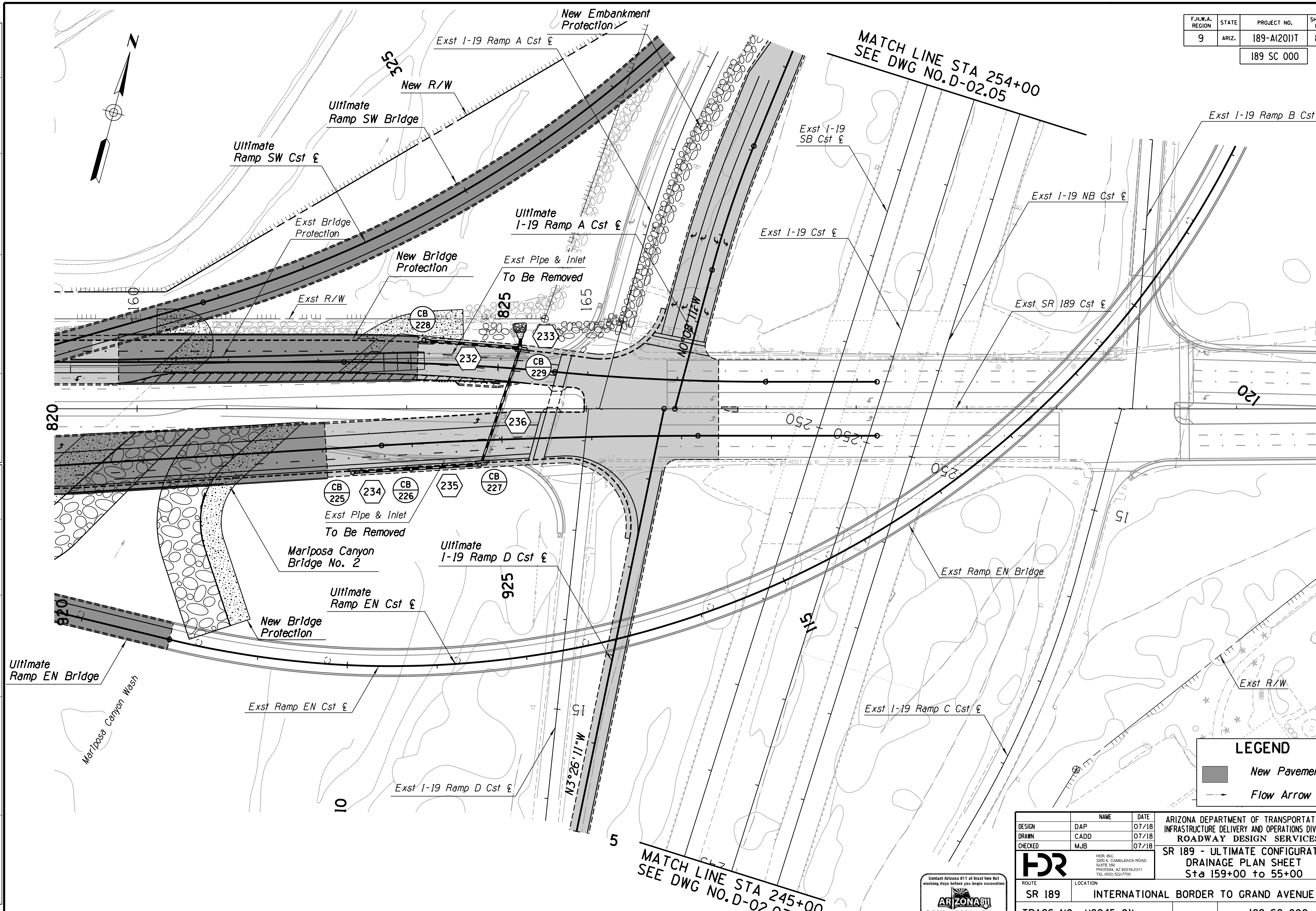
Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0522168\h8045_ph_dp09.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:42:45 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	81	163	

189 SC 000



LEGEND

- New Pavement
- Flow Arrow

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 159+00 to 55+00

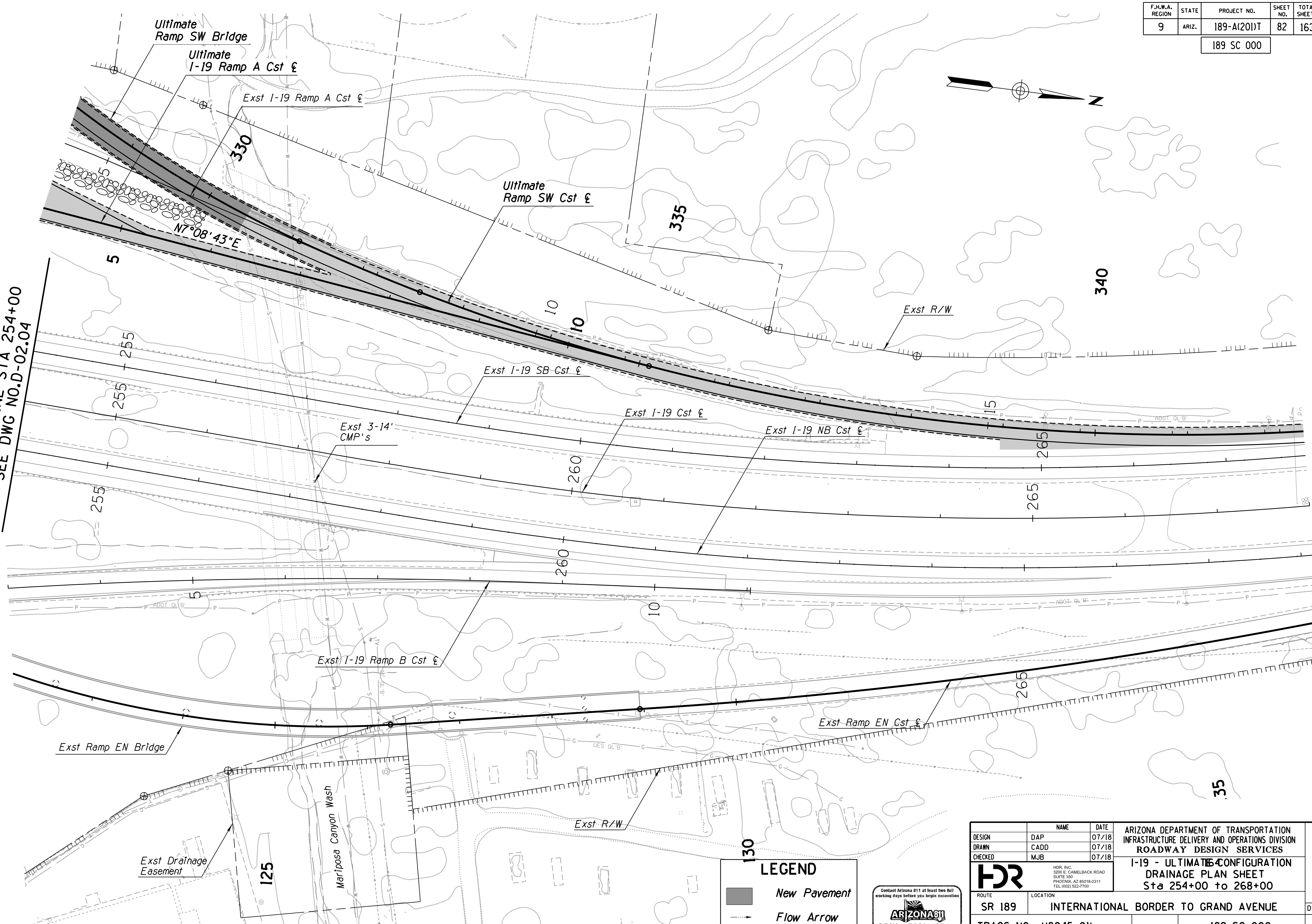
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 189 | LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE | DWG NO. D-02.04

TRACS NO. H8045 01L | 189-SC-000 | ____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME:c:\pwworking\phx\d0522168\h8045_ph_dp10.dgn PLOT DATE:Jul. 24, 2018 TIME:10:42:58 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	82	163	

189 SC 000

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC. 3200 E. CAMELBACK ROAD SUITE 350 PHOENIX, AZ 85018-2311 TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 254+00 to 268+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

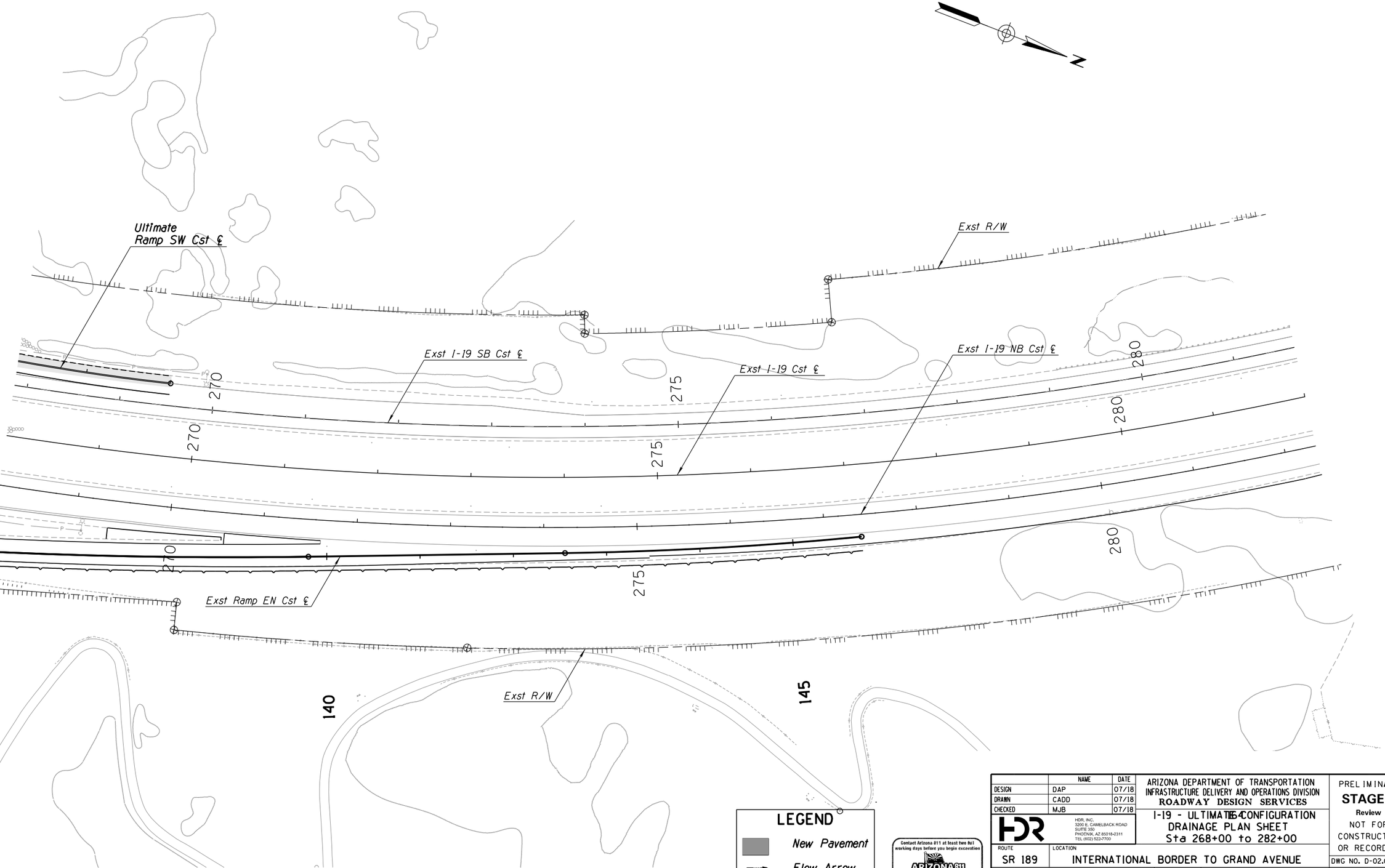
ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. D-02.05

TRACS NO. H8045 01L
189-SC-000
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0522168\h8045_ph_dp14.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:43:11 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	83	163	
		189 SC 000			



LEGEND

New Pavement

Flow Arrow

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
DRAINAGE PLAN SHEET
Sta 268+00 to 282+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

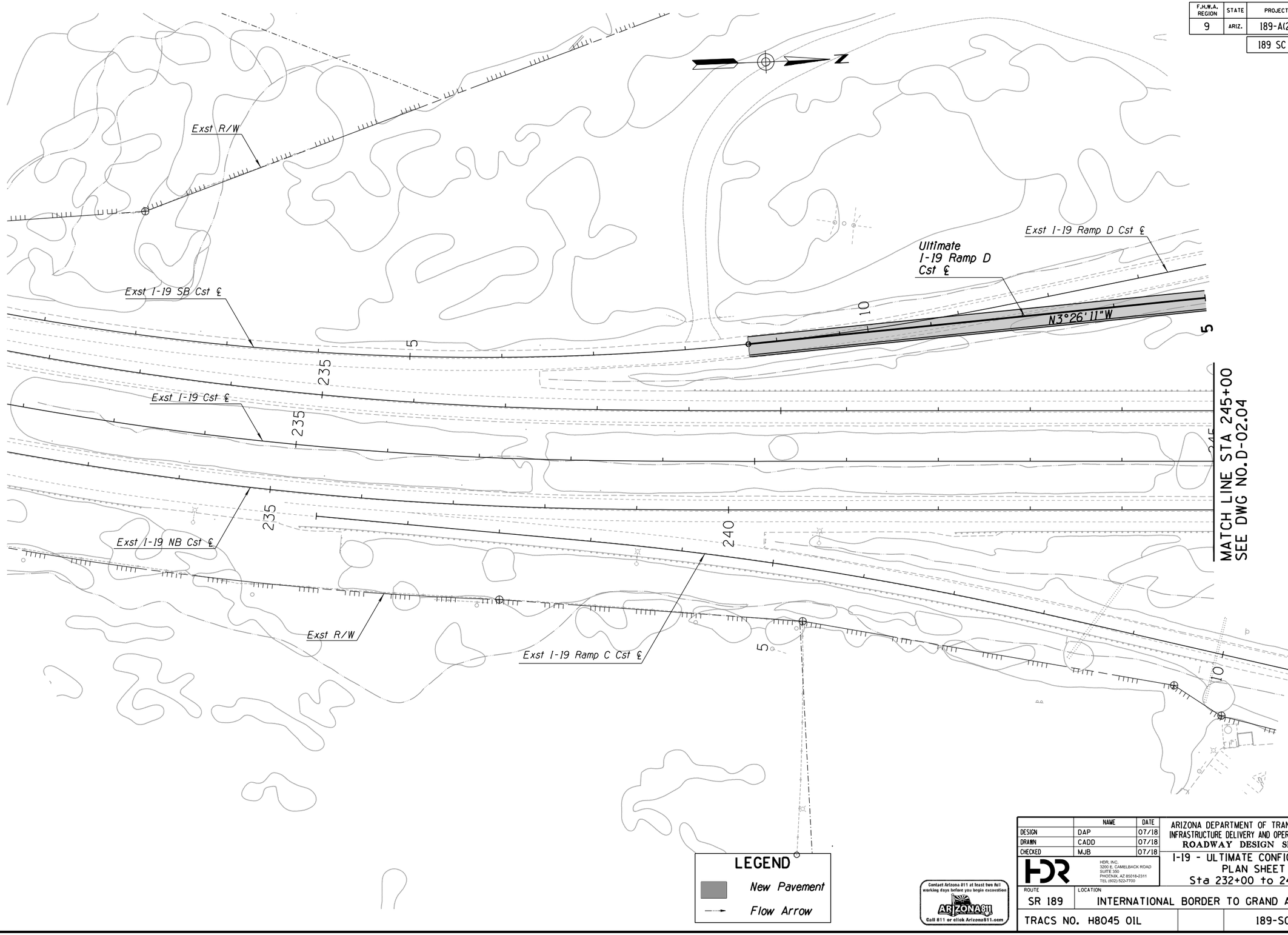
DWG NO. D-02.06

___ OF ___

FILE NAME: E:\pwworking\phx\d0522168\h8045_ph_dp15.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:43:23 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	84	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
PLAN SHEET
Sta 232+00 to 245+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

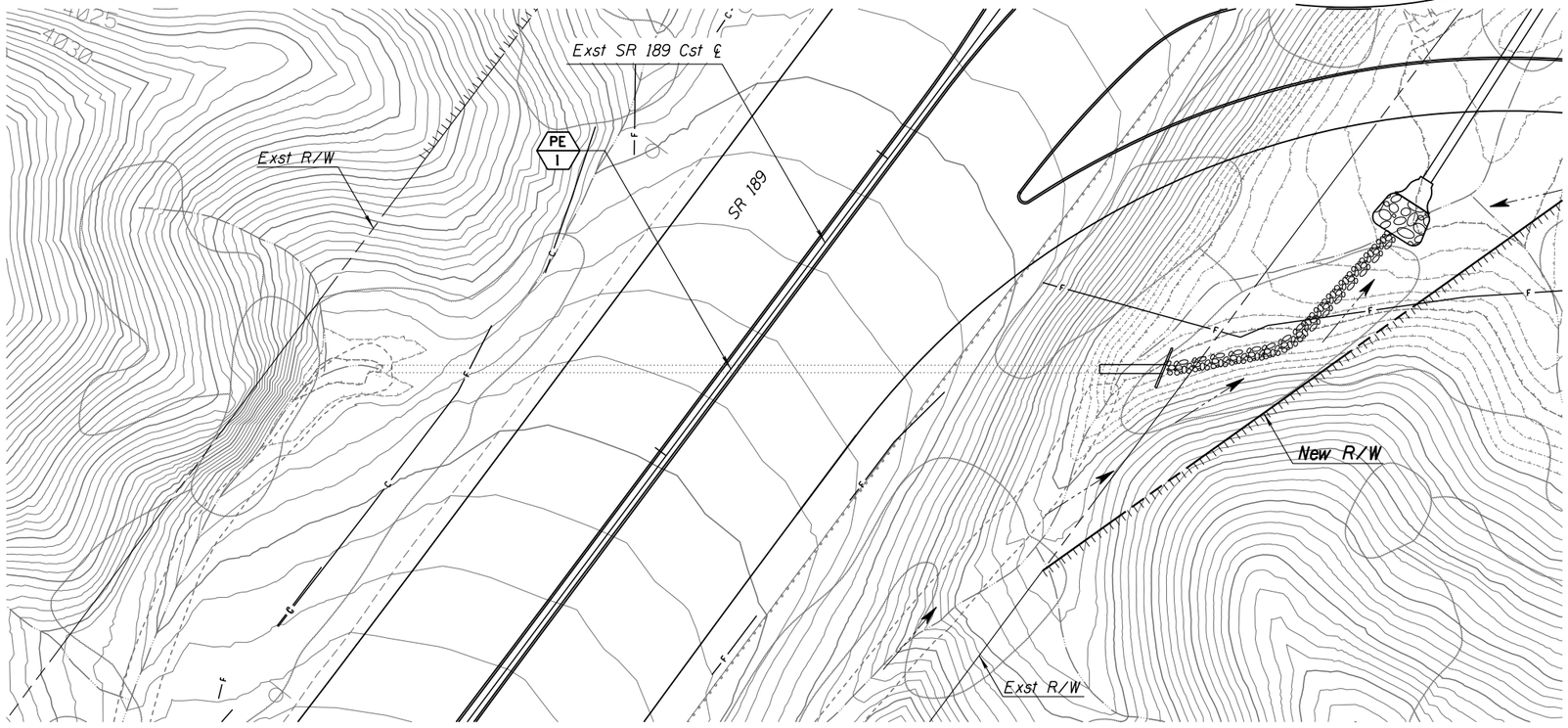
DWG NO. D-02.07

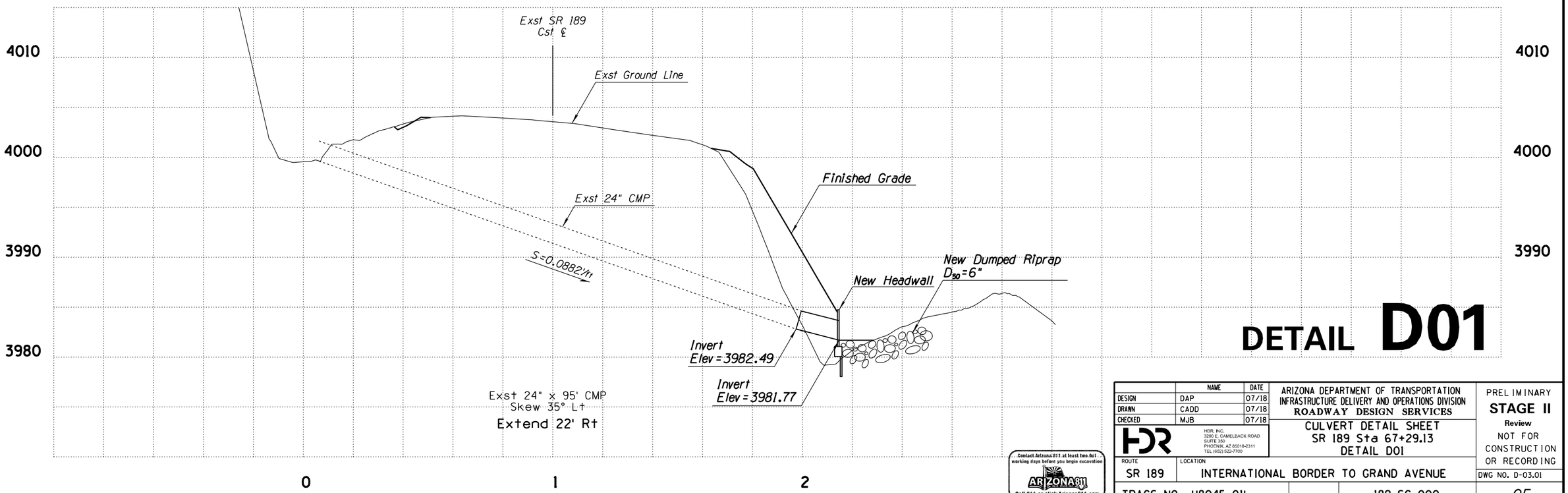
___ OF ___

FILE NAME: c:\pwworking\phx\d0522168\h8045_ph_dp16.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:43:35 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	85	163	
		189 SC 000			





DETAIL D01

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
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PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 67+29.13
DETAIL D01

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.01

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
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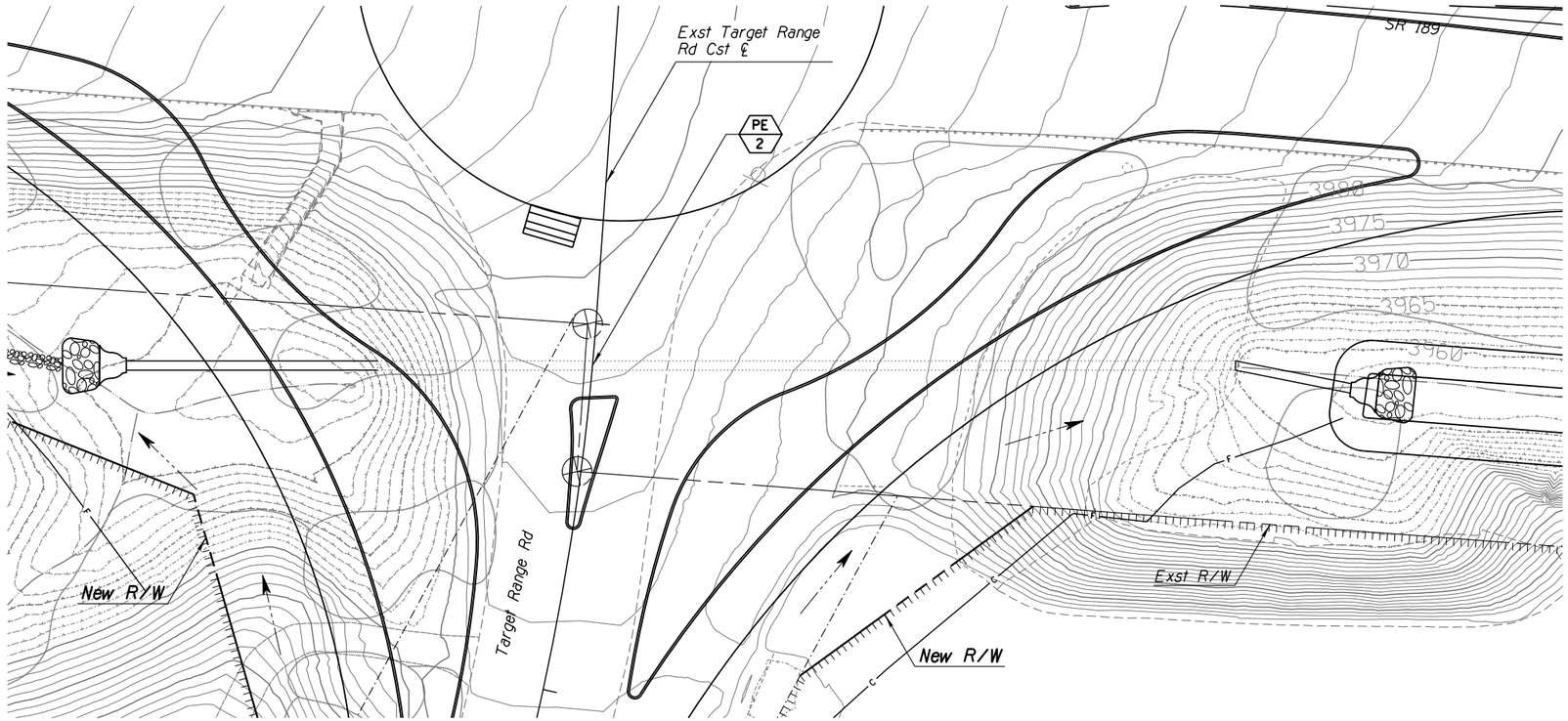
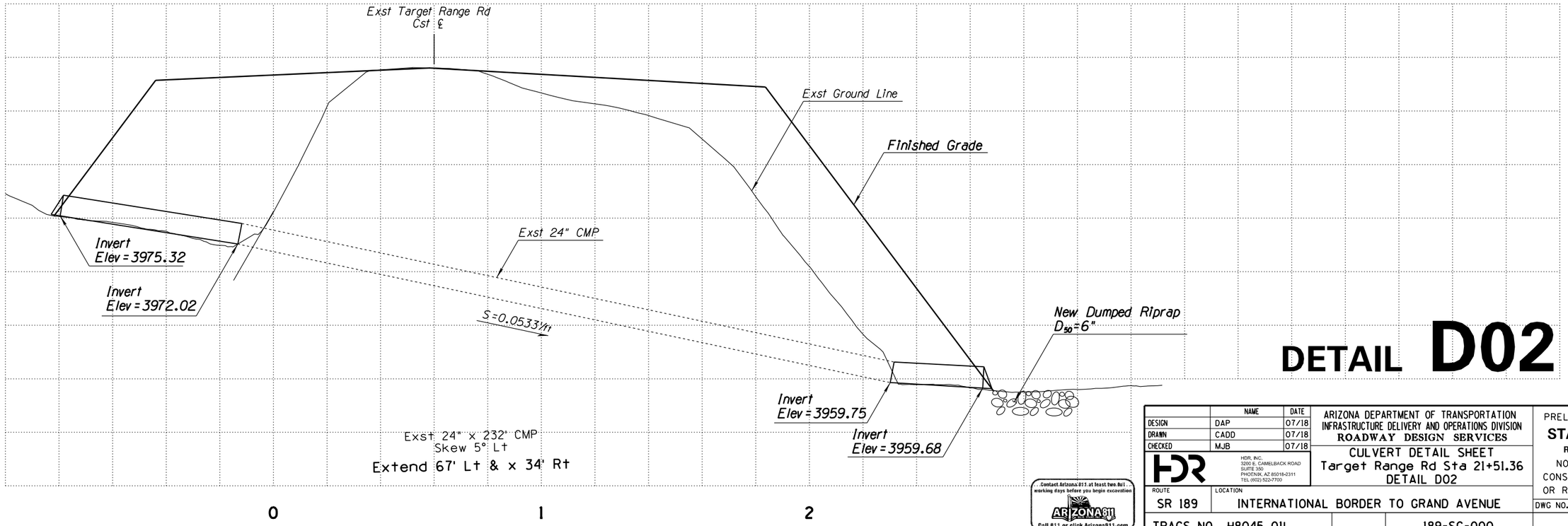
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	86	163	
		189 SC 000			





DETAIL D02

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
Target Range Rd Sta 21+51.36
DETAIL D02

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

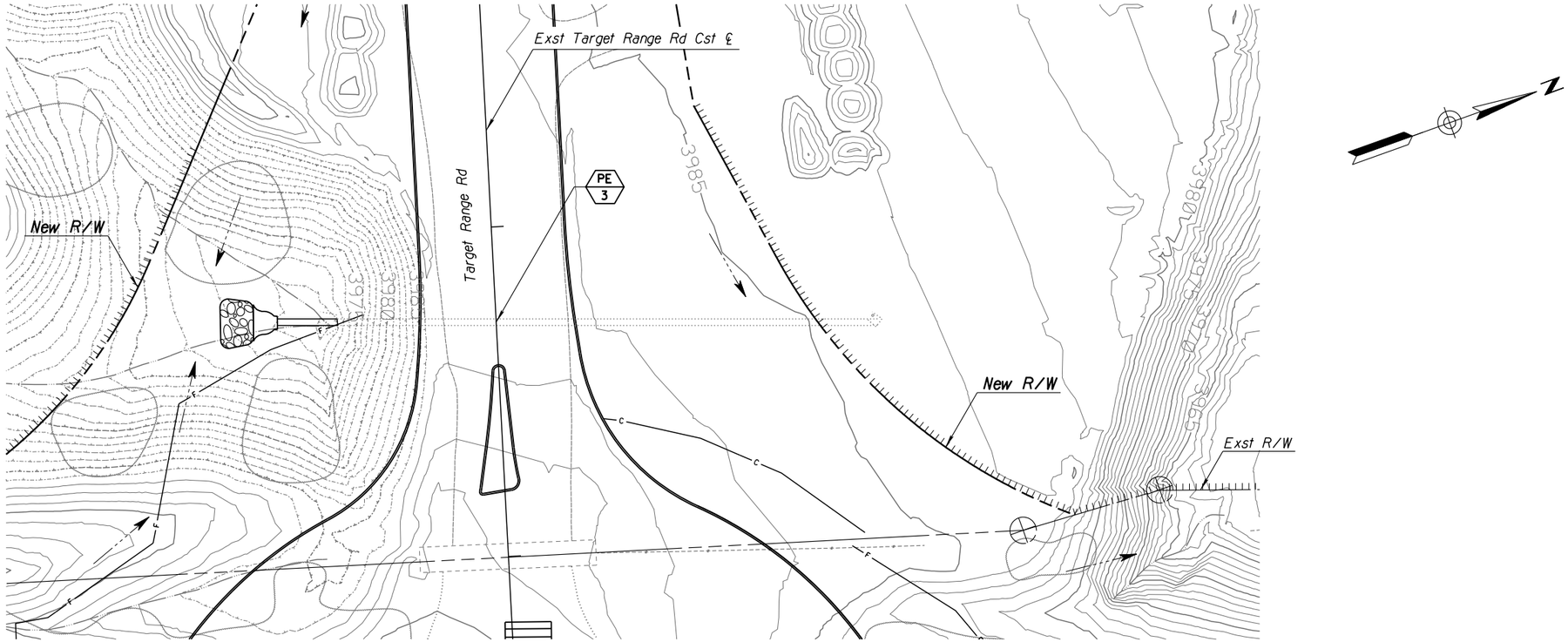
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

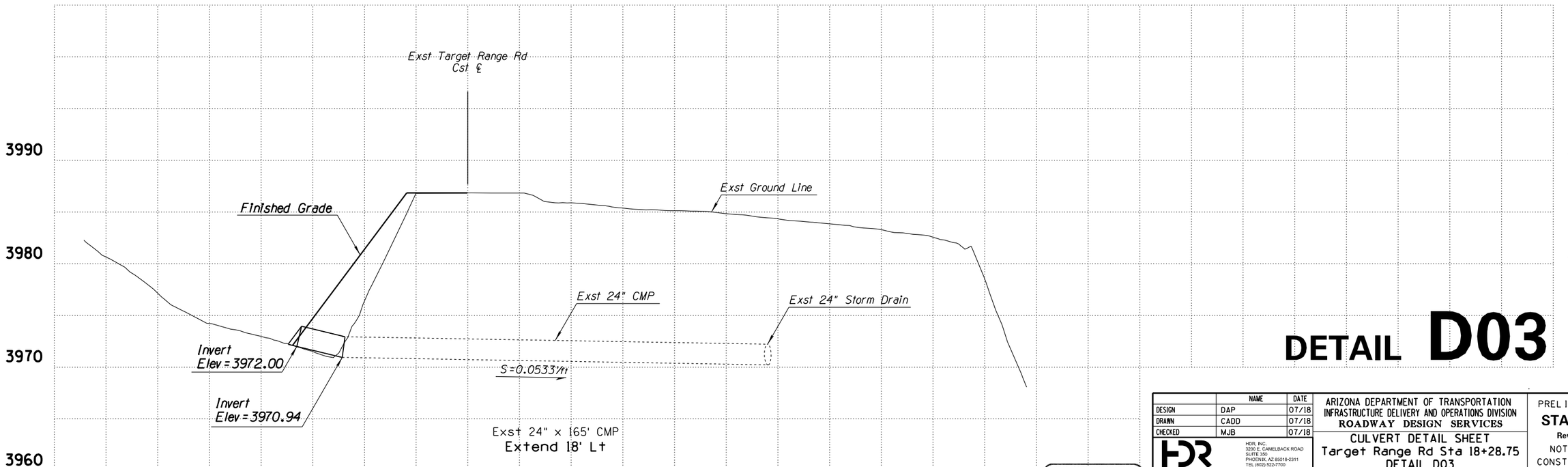
DWG NO. D-03.02

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	87	163	
		189 SC 000			





DETAIL D03

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
Target Range Rd Sta 18+28.75
DETAIL D03

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

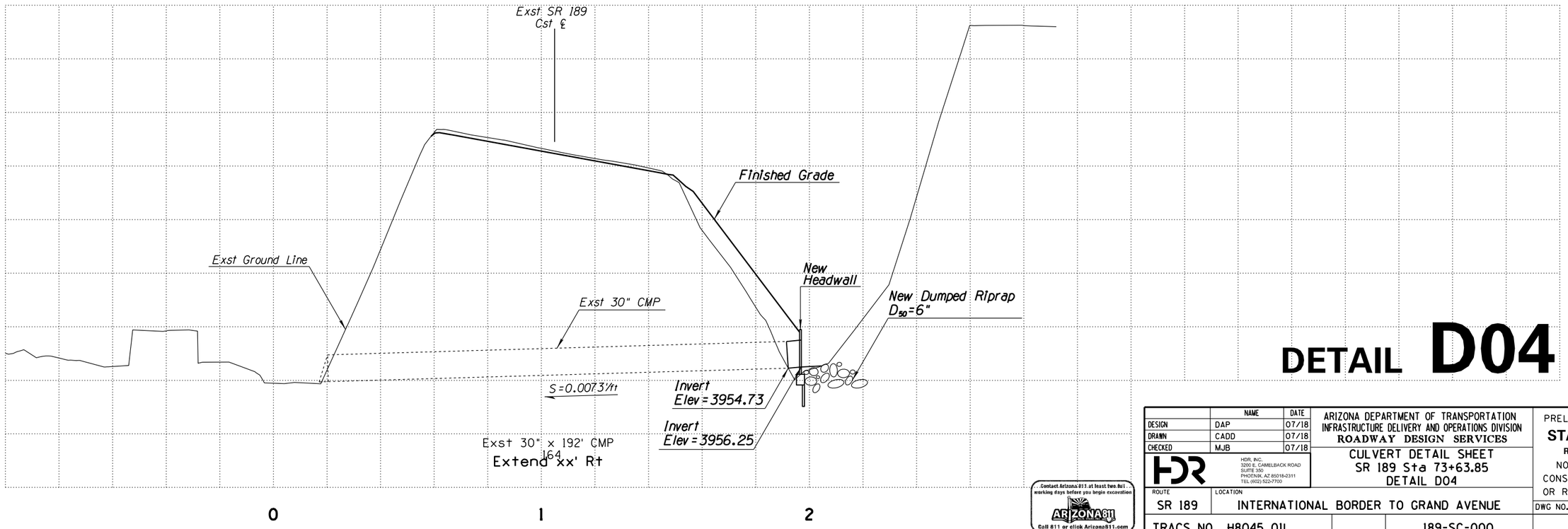
TRACS NO.		
H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.03

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	88	163	
		189 SC 000			



DETAIL D04

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 73+63.85
DETAIL D04

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

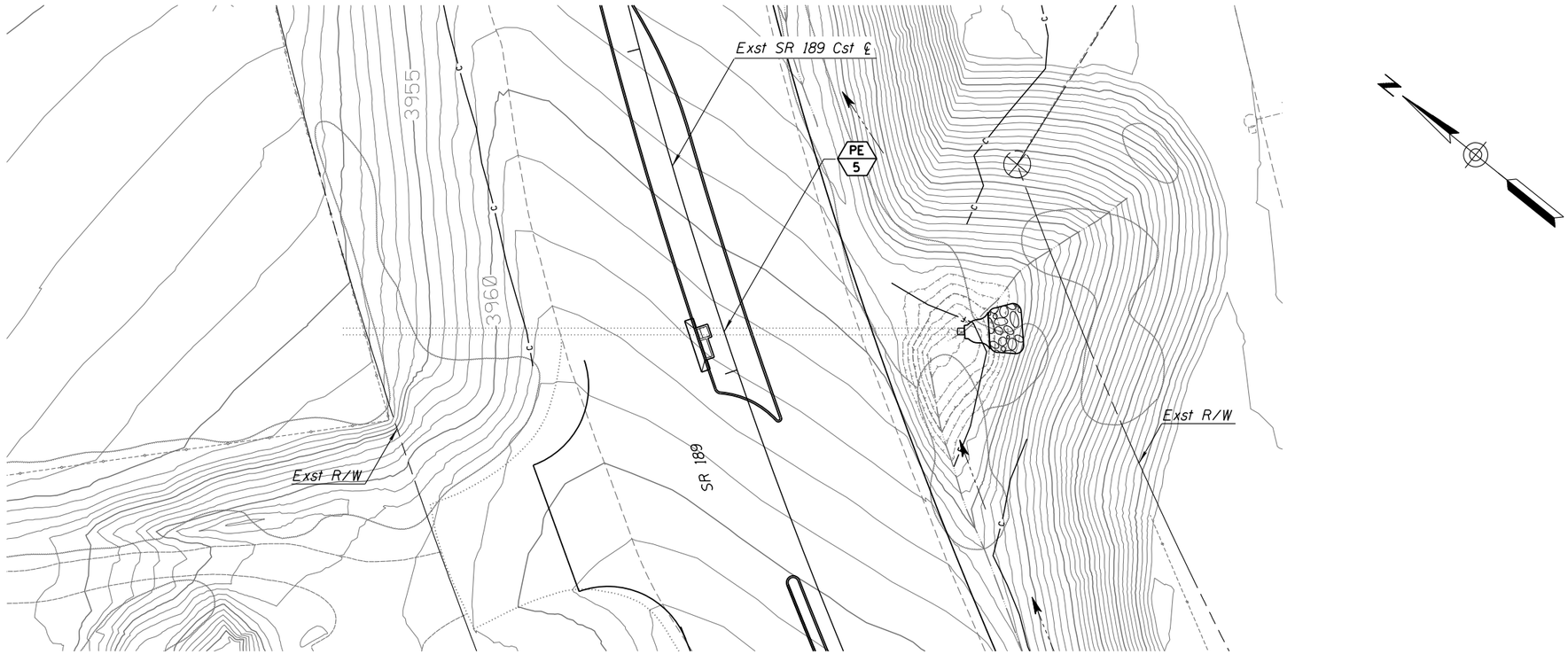
DWG NO. D-03.04

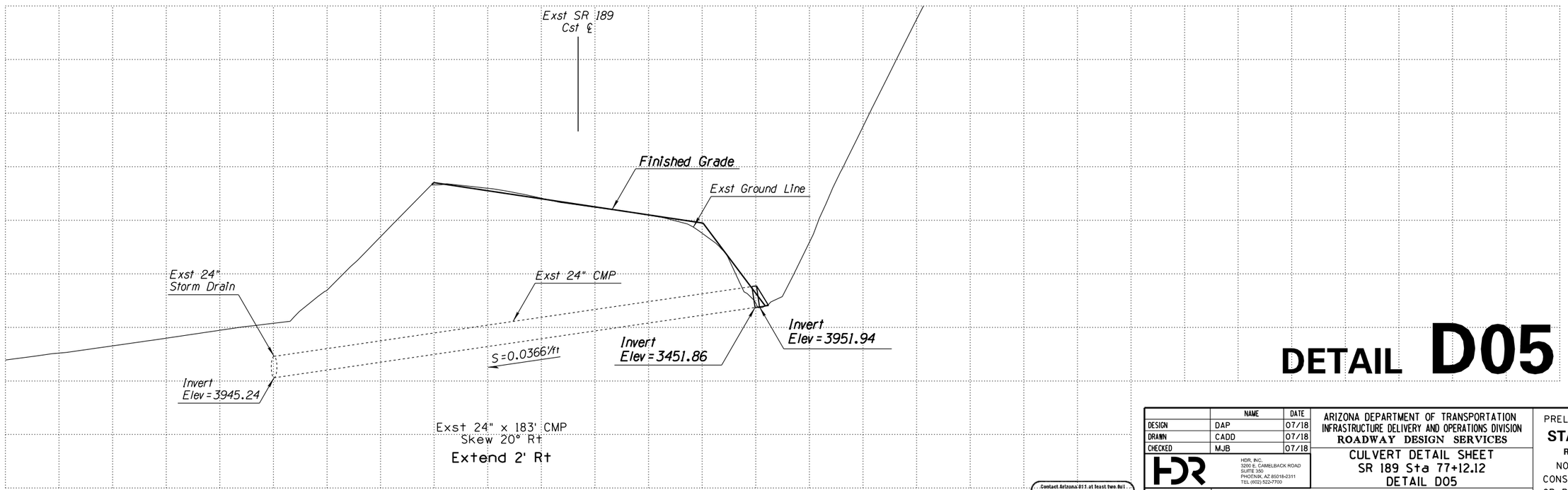
___ OF ___

FILE NAME=c:\pworking\phx\d0522167\h8045dd04.dgn PLOT DATE=Jul, 24, 2018 TIME=10:44:23 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	89	163	
		189 SC 000			





DETAIL D05

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 77+12.12
DETAIL D05

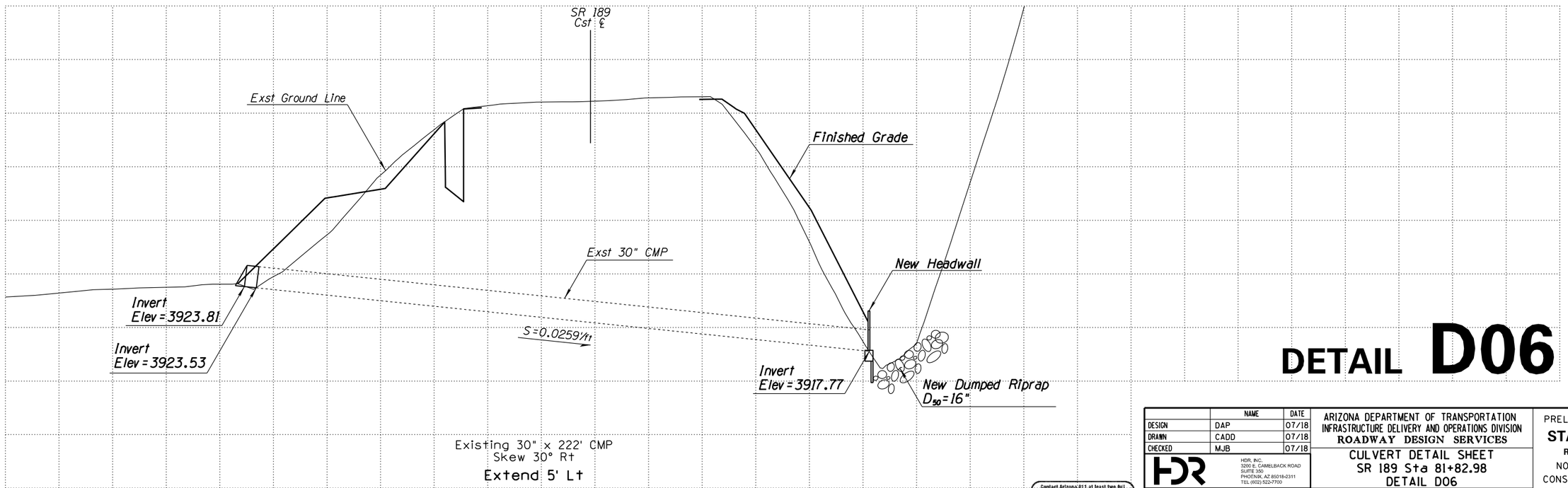
ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 OIL		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.05

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	90	163	
		189 SC 000			



Existing 30" x 222' CMP
Skew 30° Rt
Extend 5' Lt

DETAIL D06

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 81+82.98
DETAIL D06

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L — 189-SC-000

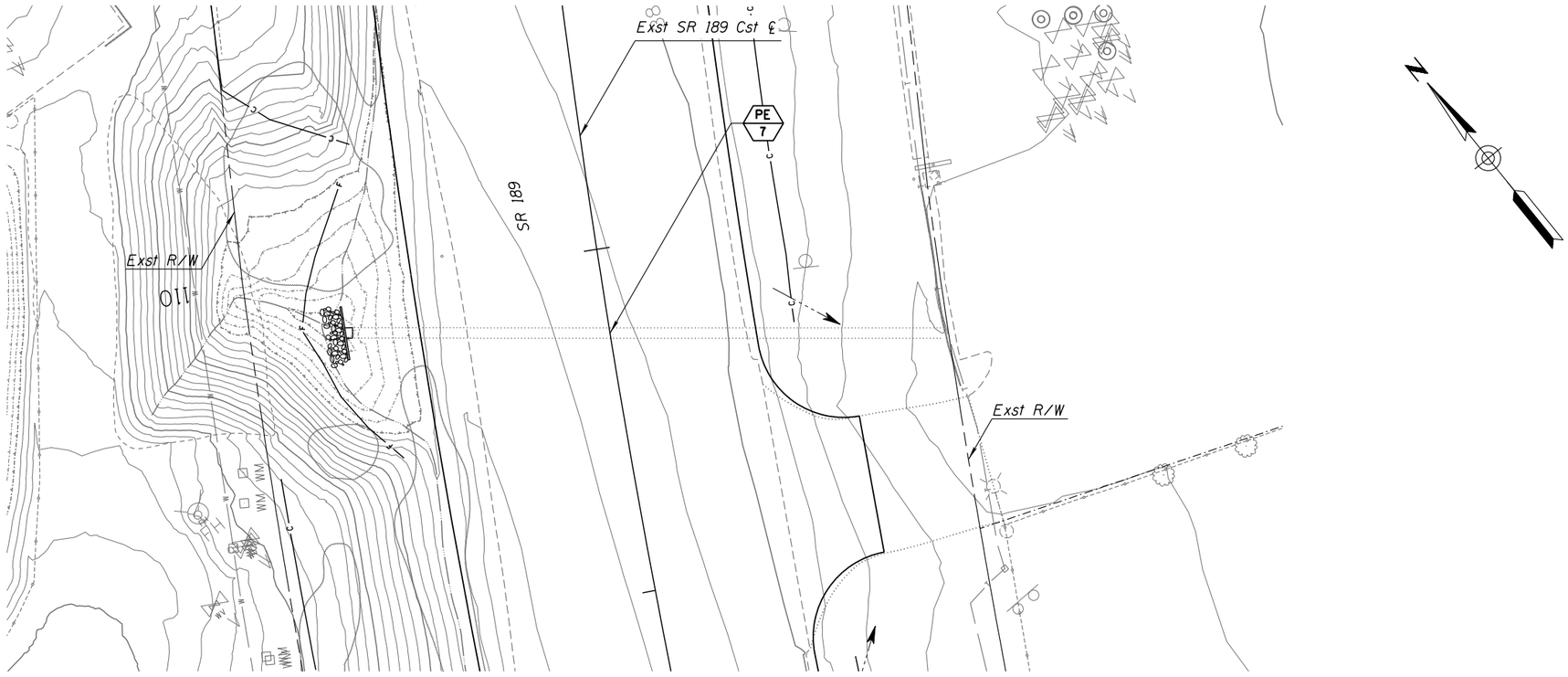
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

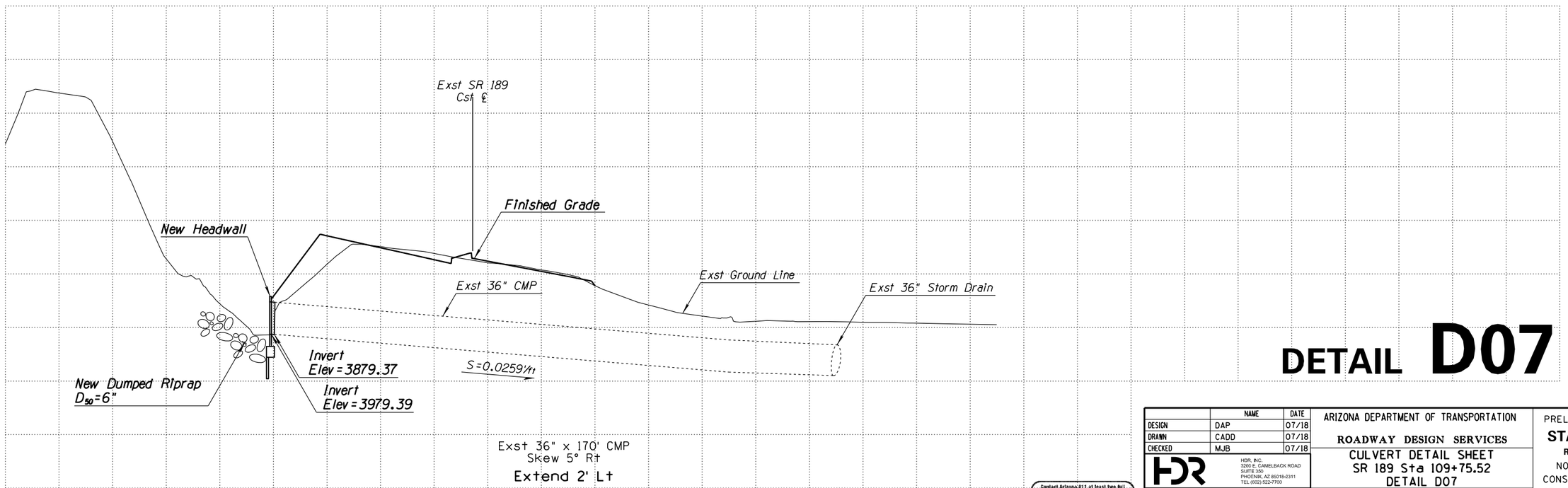
DWG NO. D-03.06

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	91	163	
		189 SC 000			





DETAIL D07

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN SERVICES
CULVERT DETAIL SHEET
SR 189 Sta 109+75.52
DETAIL D07

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
TRACS NO. H8045 OIL
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.07
___ OF ___

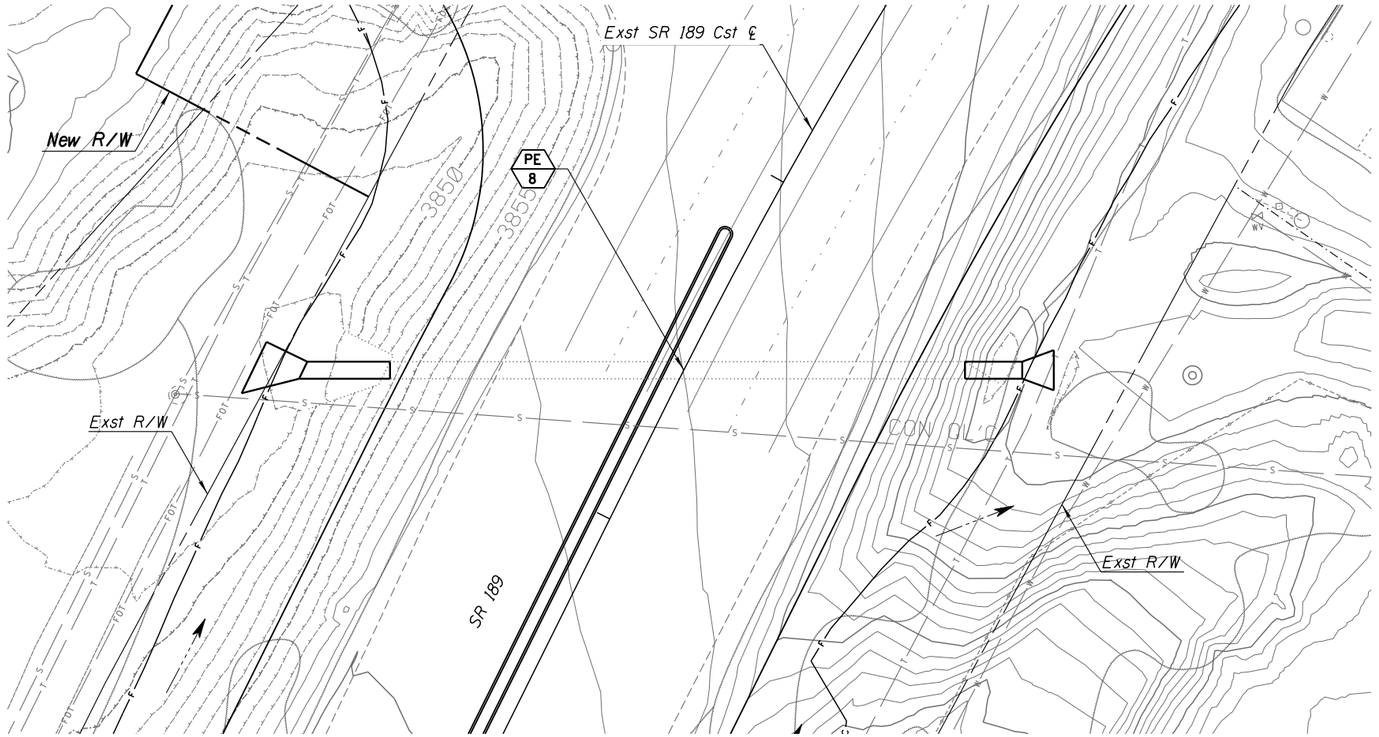
Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

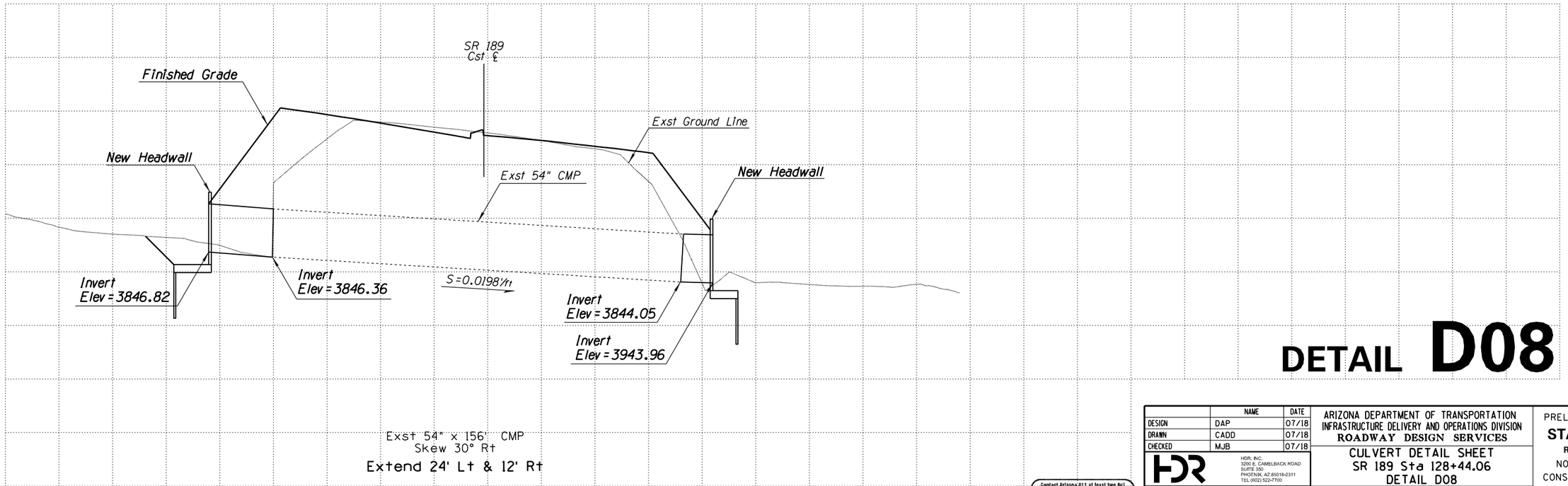
FILE NAME: c:\pwworking\phx\d0522167\h8045dd07.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:44:59 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

FILE NAME:c:\pwworking\phx\d0522167\h8045d08.dgn TIME:10:45:11 AM PLOT DATE:Jul, 24, 2018 PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	92	163	
		189 SC 000			





Exst 54" x 156' CMP
Skew 30° Rt
Extend 24' Lt & 12' Rt

DETAIL D08

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 128+44.06
DETAIL D08

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

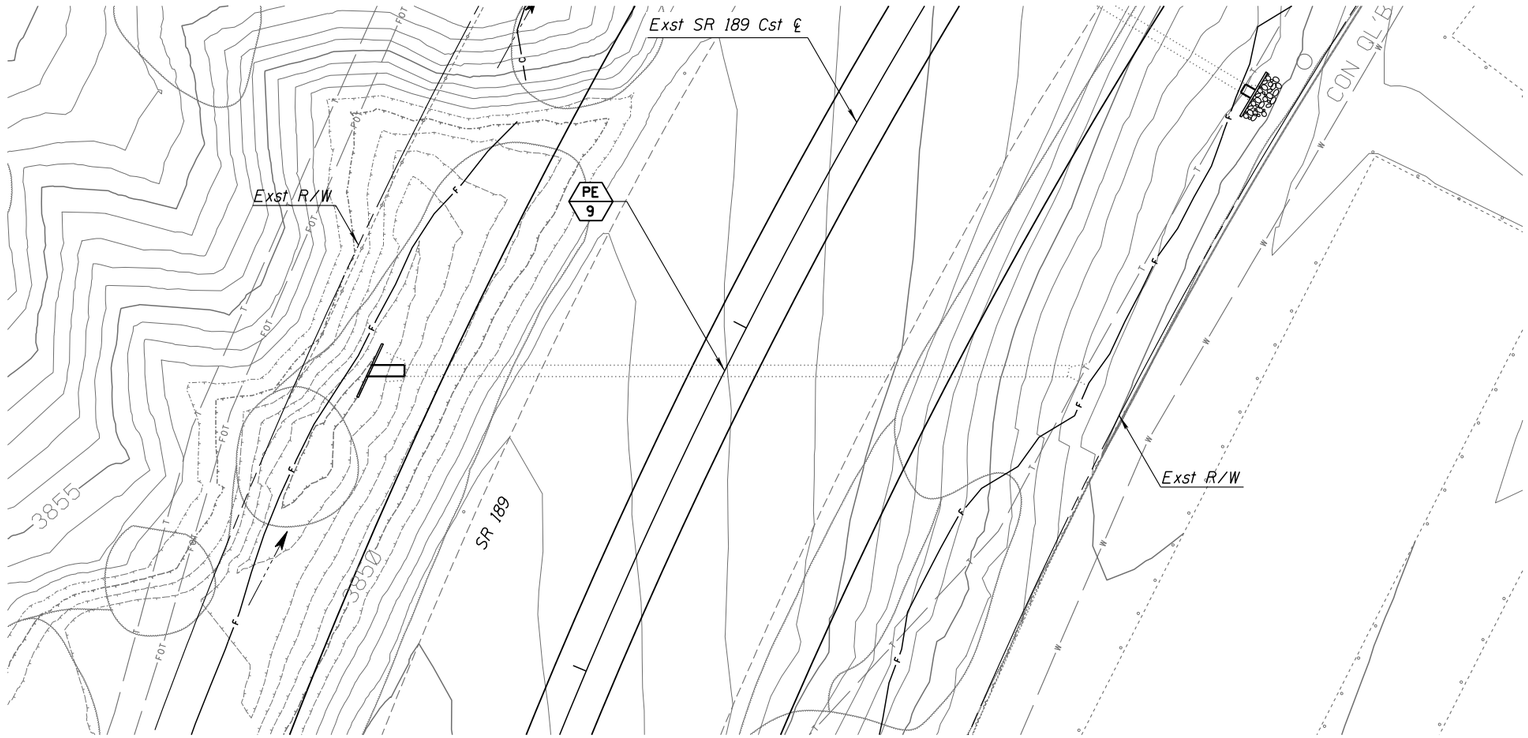
TRACS NO. H8045 01L | 189-SC-000

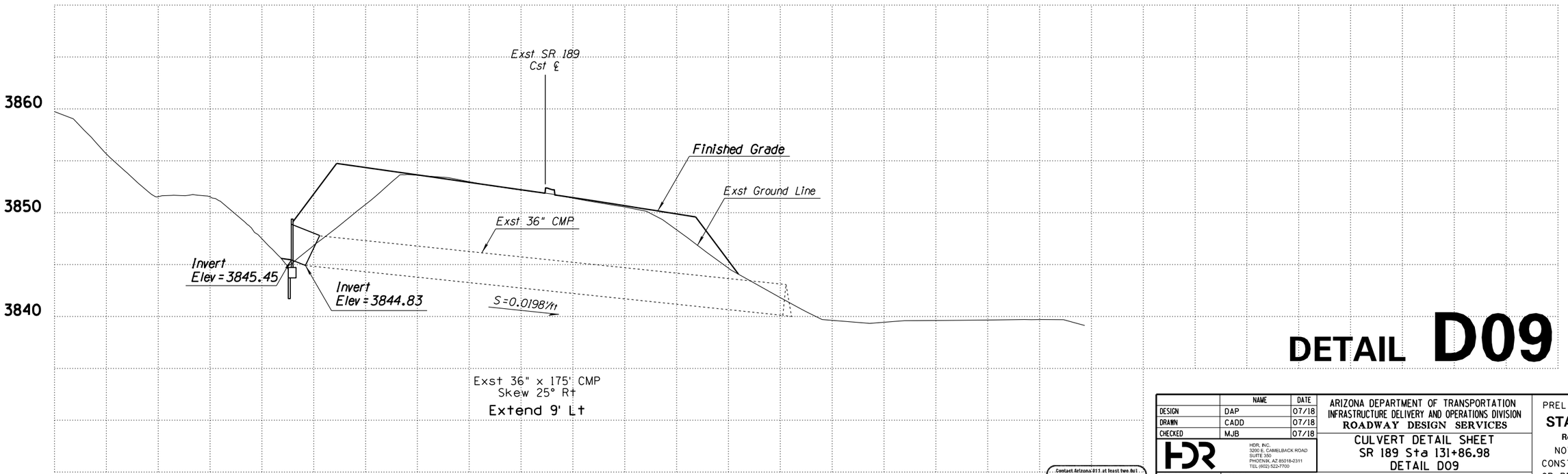
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.08

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	93	163	
		189 SC 000			





DETAIL D09

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 131+86.98
DETAIL D09

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

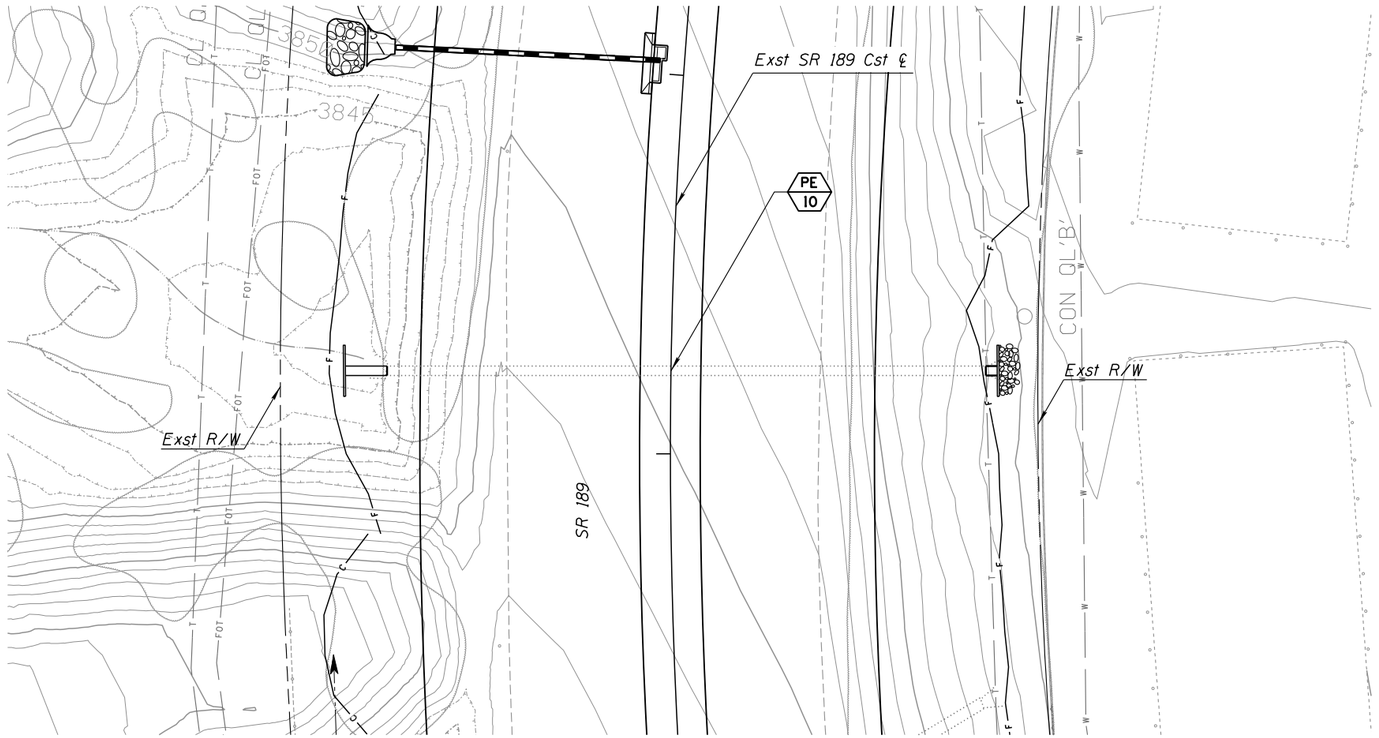
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

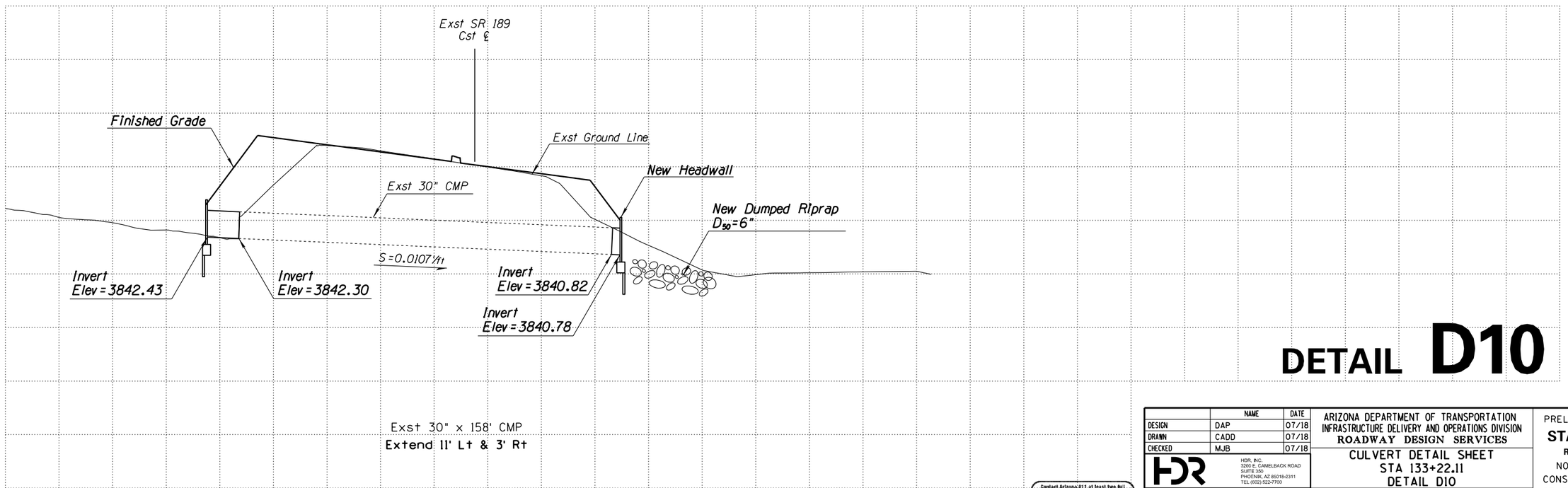
DWG NO. D-03.09

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	94	163	
		189 SC 000			





DETAIL D10

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
STA 133+22.11
DETAIL D10

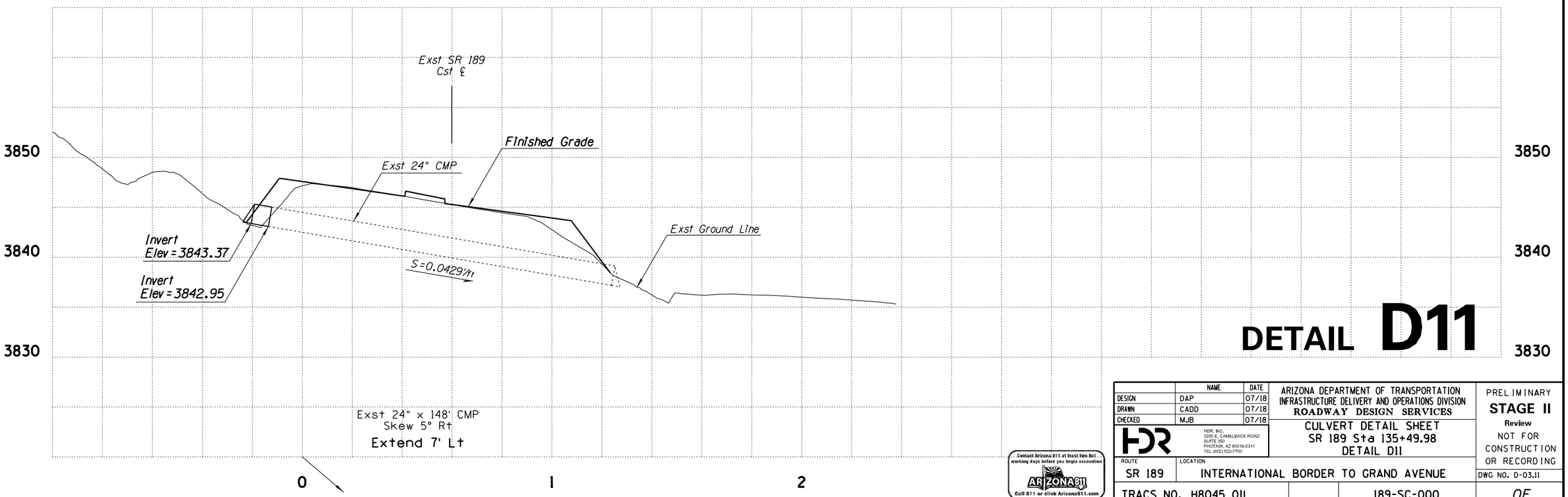
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. D-03.10
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0522167\h8045dd10.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:45:32 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | DATE | LOCATION | DATE | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	95	163	
		189 SC 000			



DETAIL D11

FILE NAME: c:\pwworking\phx\d0522167\h8045dd11.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:45:41 AM PLOT BY: AHOFFMAN PLOT SCALE: 1:40

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 135+49.98
DETAIL D11

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.11

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
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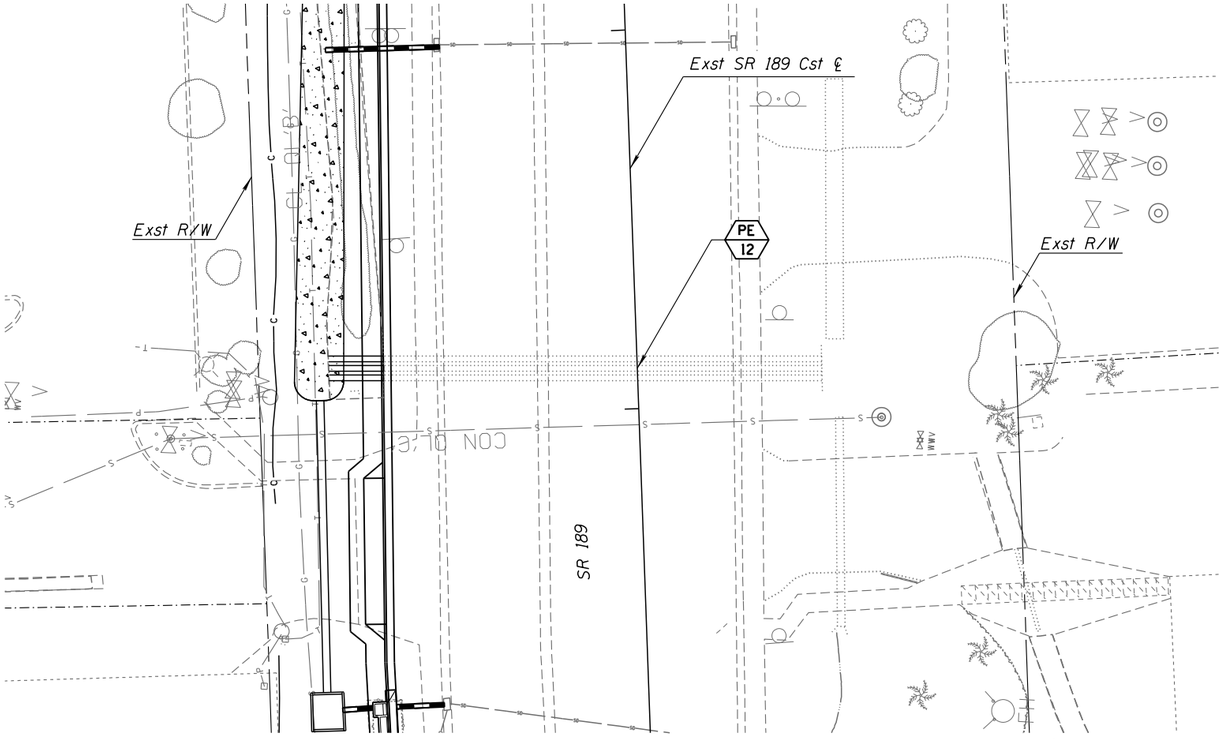
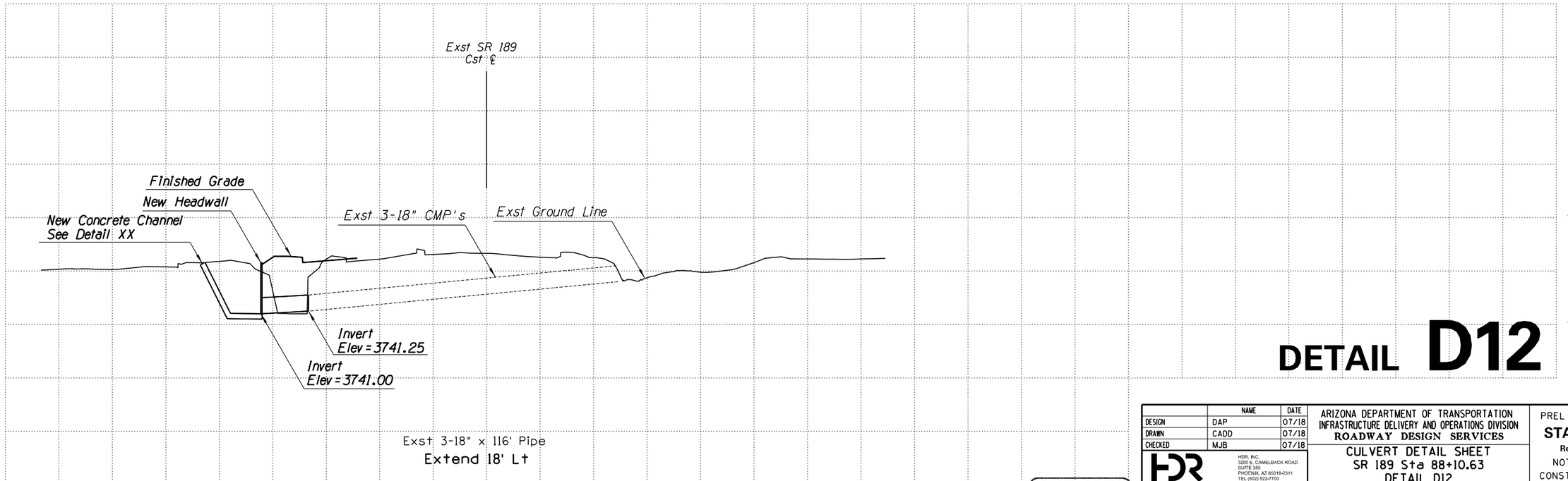
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	96	163	
		189 SC 000			





DETAIL D12

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

CULVERT DETAIL SHEET
SR 189 Sta 88+10.63
DETAIL D12

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.12

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
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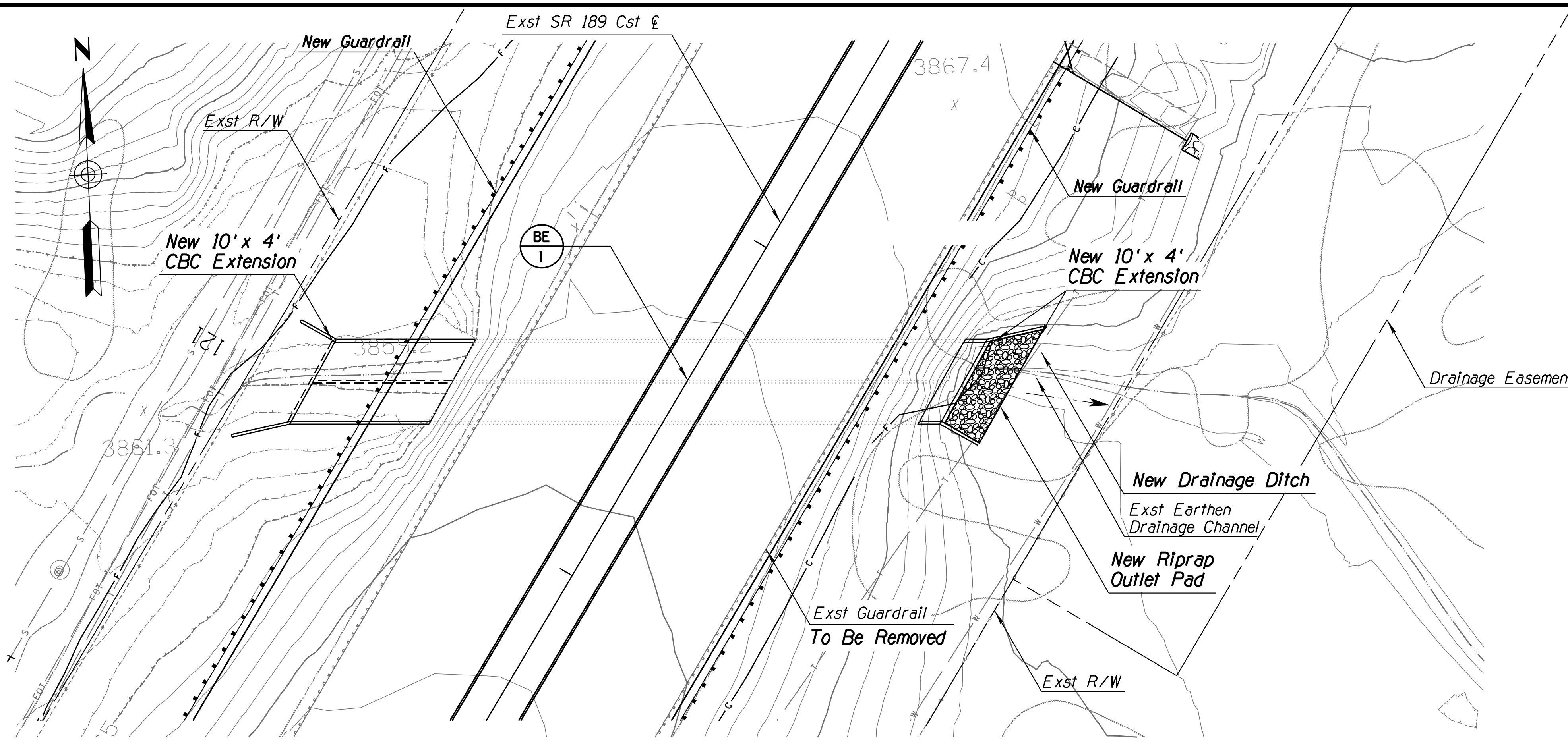
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	97	163	

189 SC 000



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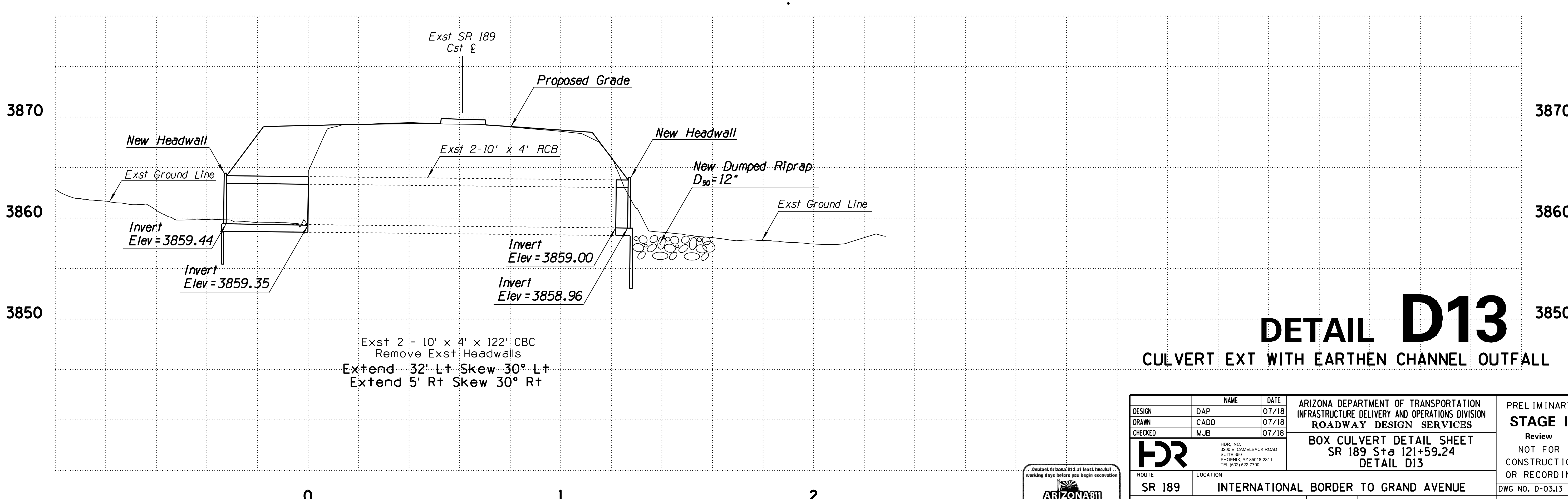


DETAIL D13

CULVERT EXT WITH EARTHEN CHANNEL OUTFALL

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

BOX CULVERT DETAIL SHEET
SR 189 Sta 121+59.24
DETAIL D13

PRELIMINARY
STAGE II
Review
NOT FOR
CONSTRUCTION
OR RECORDING

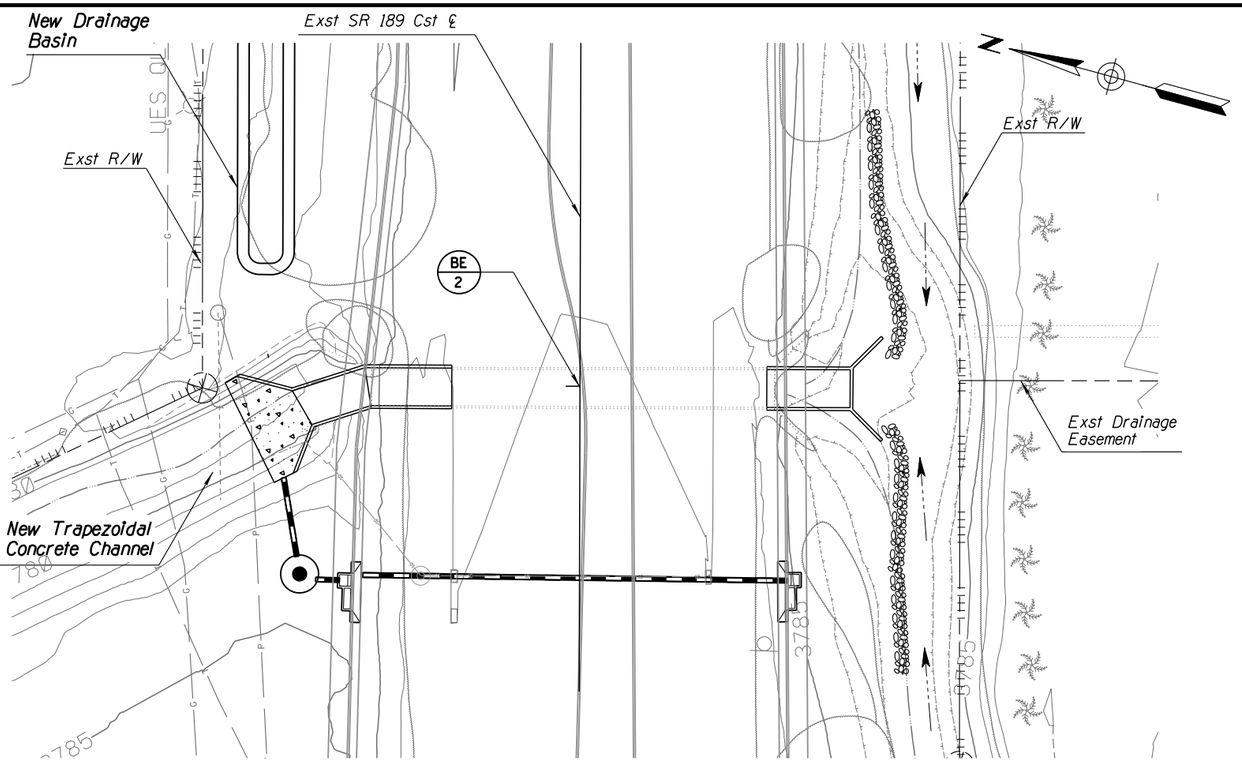
ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE
DWG NO. D-03.13

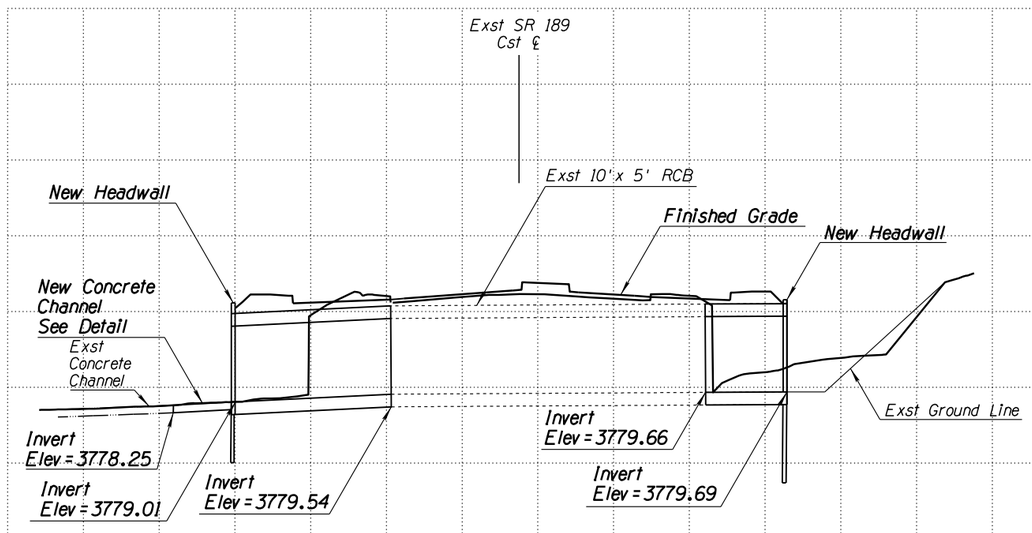
TRACS NO. H8045 01L | 189-SC-000 | ___ OF ___

FILE NAME: c:\pwworking\phx\d0522167\h8045dd13.dgn
PLOT DATE: JUL. 24, 2018 TIME: 10:46:00 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	98	163	
		189 SC 000			





Exst 2 - 10' x 5' x 107' RCB
Remove Exst Headwalls
Extend 41' Lt
Extend 22' Rt

DETAIL D14

CULVERT EXT WITH CONCRETE CHANNEL

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

BOX CULVERT DETAIL SHEET
SR 189 Sta 56+99.85
DETAIL D14

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.14

___ OF ___

Contact Arizona811 at least two full working days before you begin excavation
ARIZONA811
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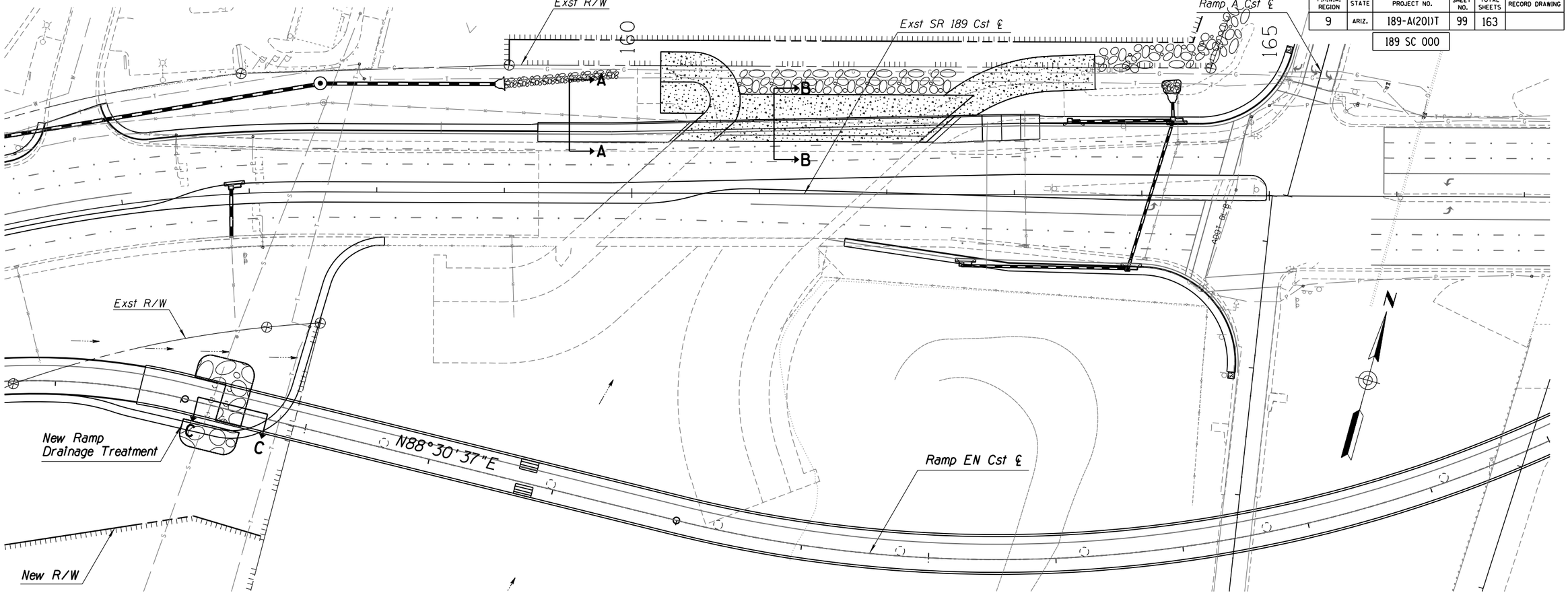

PLAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	99	163	
		189 SC 000			

DETAIL D15

Sheet 1 of 2

MARIPOSA CANYON BRIDGE NO 2

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

DRAINAGE DETAILS
DETAIL D15

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO.		
H8045 01L		189-SC-000

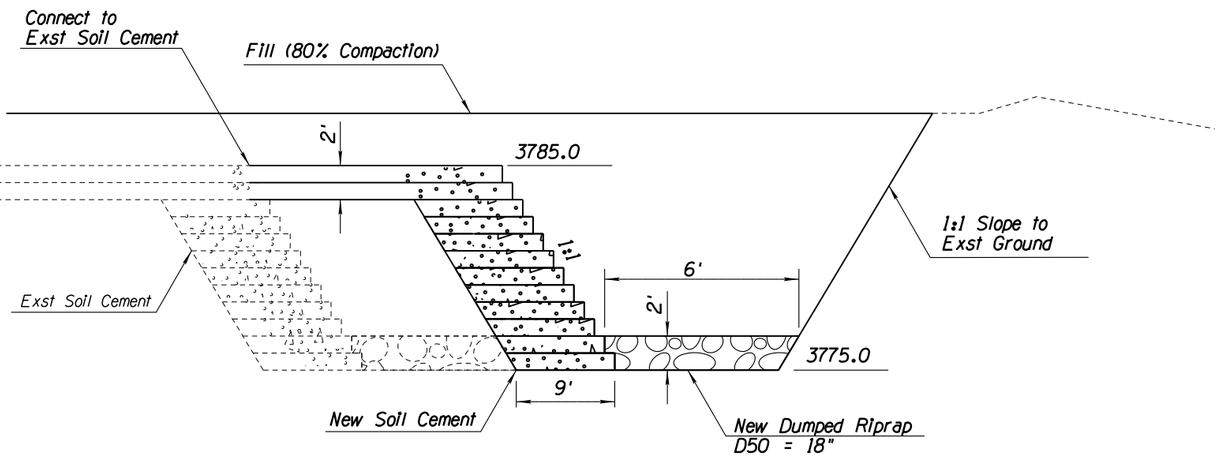
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.15

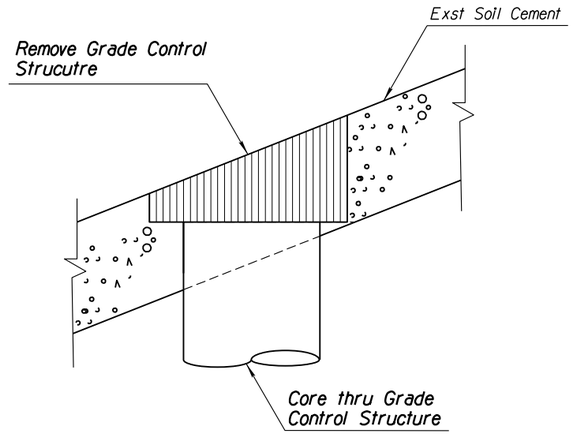
____ OF ____

FILE NAME=c:\pwworking\phx\d0522167\h8045dd15.dgn PLOT DATE=Jul 24, 2018 TIME=10:46:14 AM PLOT SCALE=1:80 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

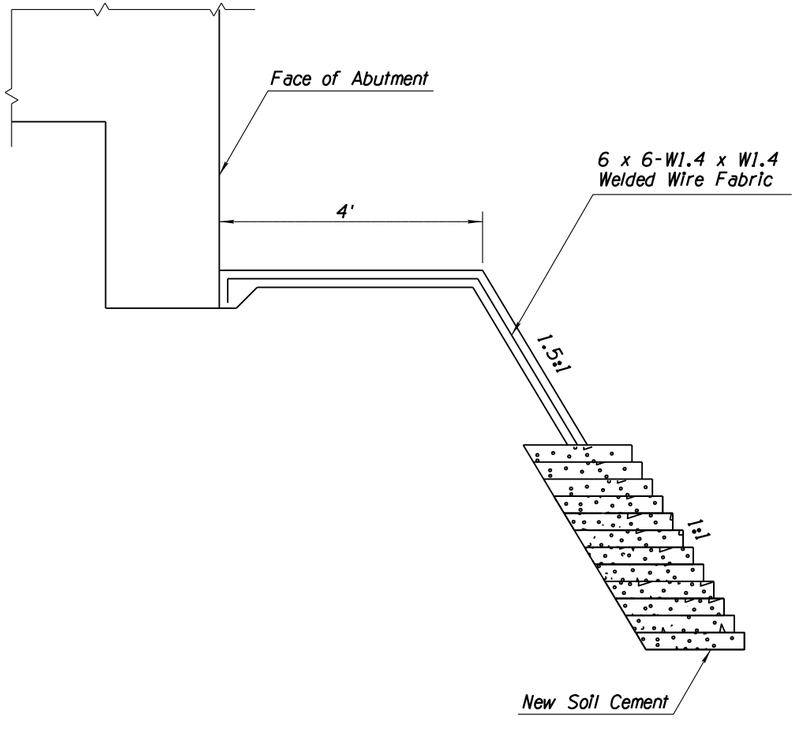
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	100	163	
		189 SC 000			



DETAIL B-B



SOIL CEMENT
PENETRATION DETAIL



DETAIL A-A

DETAIL D15

Sheet 2 of 2

MARIPOSA CANYON BRIDGE NO 2

	NAME	DATE
DESIGN	DP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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TEL (602) 522-7700

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

DRAINAGE DETAILS
DETAIL D15

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. D-03.16
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

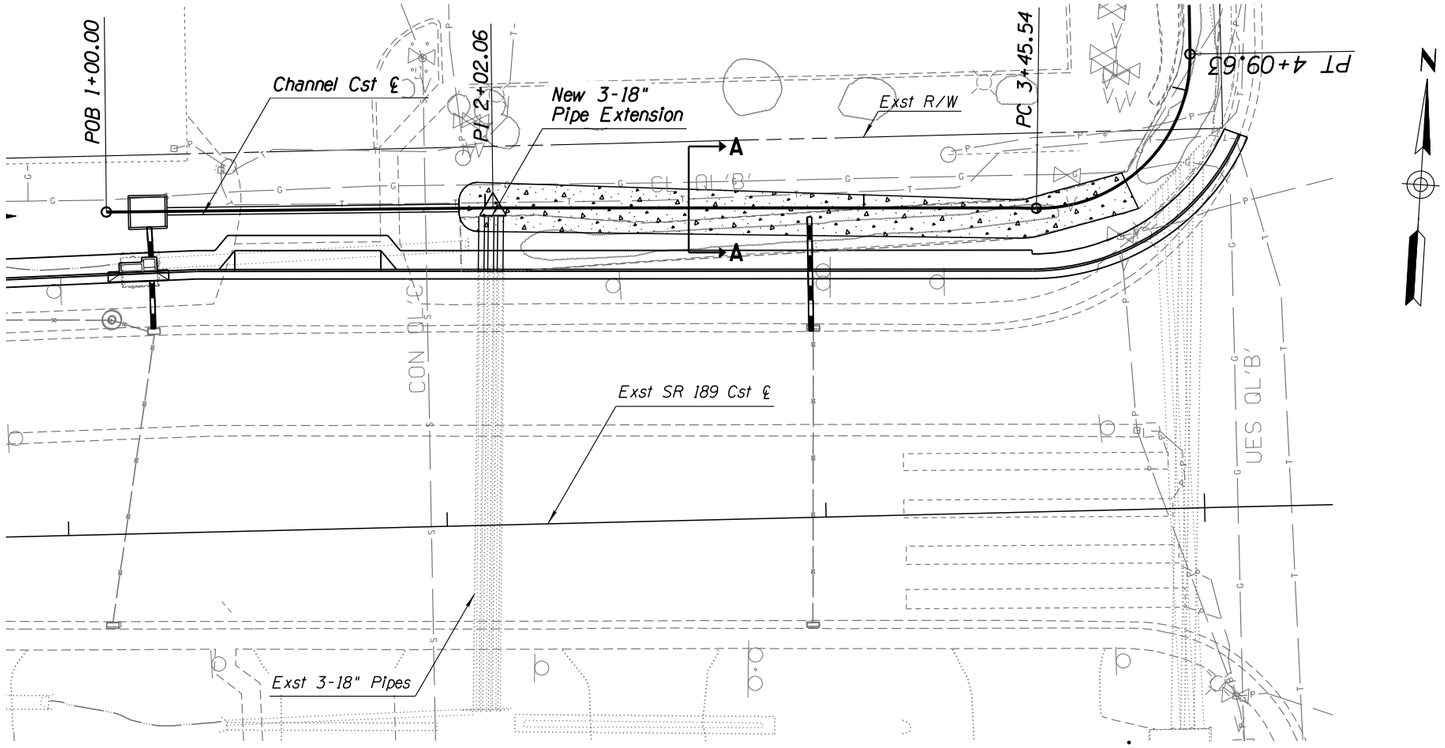
Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

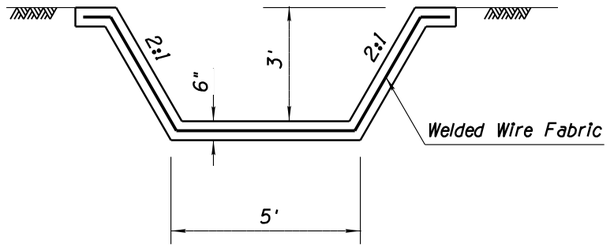
FILE NAME: c:\pwworking\phx\d0522167\h8045dd15A.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:46:20 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

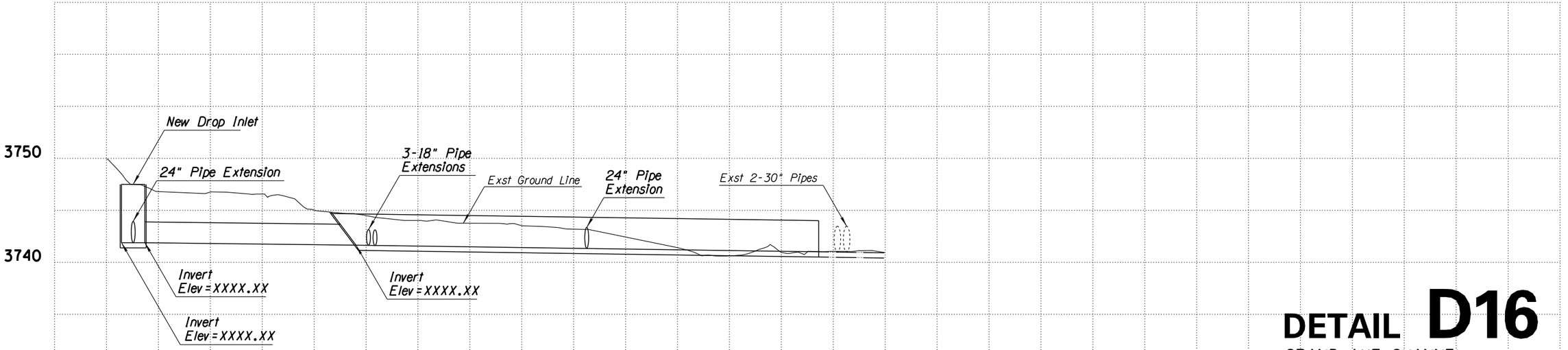
FILE NAME:c:\pwworking\phx\d0522167\h8045dd16.dgn PLOT DATE:Jul, 24, 2018 TIME:10:46:29 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	101	163	
		189 SC 000			





DETAIL A-A
TYPICAL CONCRETE CHANNEL SECTION



DETAIL D16
GRAND AVE CHANNEL

	NAME	DATE
DESIGN	DAP	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY DESIGN SERVICES

DRAINAGE DETAILS
DETAIL D16

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. D-03.17

____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	102	163	
		189 SC 000			

N

STA 45+65.00
BEGIN PROJECT 189 SC 000

Exst SR 189 Cst ℄

Exst R/W

35

40

45

SR 189

MATCH LINE STA 48+00

EPNG OL 'B'

CL OL 'B'

UES OL 'B'

Exst R/W

FILE NAME:c:\pwworking\phx\d0486934\h8045gs01.dgn PLOT SCALE:1:100 PLOT BY:AHOFFMAN
PLOT DATE:Jul, 24, 2018 TIME:10:46:38 AM
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 45+65 to 48+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

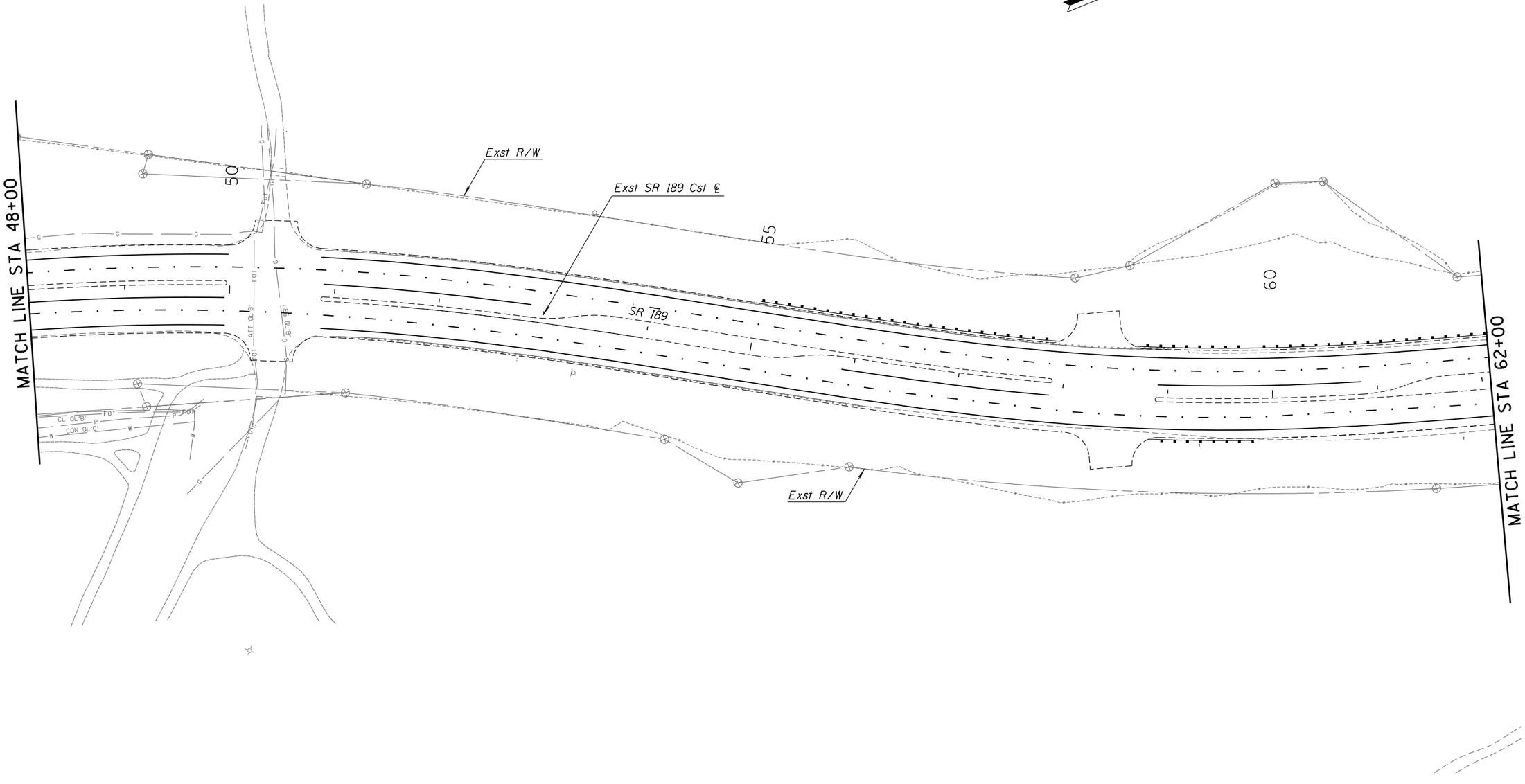
TRACS NO. H8045 01L
189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.01

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	103	163	
		189 SC 000			



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SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION GUIDE SIGN CONCEPT PLAN Sta 48+00 to 62+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.02

____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	104	163	
		189 SC 000			

Exst Target Range Rd Cst ℄

Target Range Road

New Sign and Posts

NORTH 189 SOUTH

E Target Range Rd

New R/W

New R/W

Exst R/W

Exst SR 189 Cst ℄

SR 189

MATCH LINE STA 62+00

I- 20

MATCH LINE STA 75+50

Exst R/W

Exst R/W

New R/W

New Sign and Posts

SOUTH 189 W Target Range Rd

E Target Range Rd

New Sign and Posts

W Target Range Rd

189 SOUTH

189 NORTH

New Sign and Posts

Target Range Road

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 62+00 to 75+50

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.03

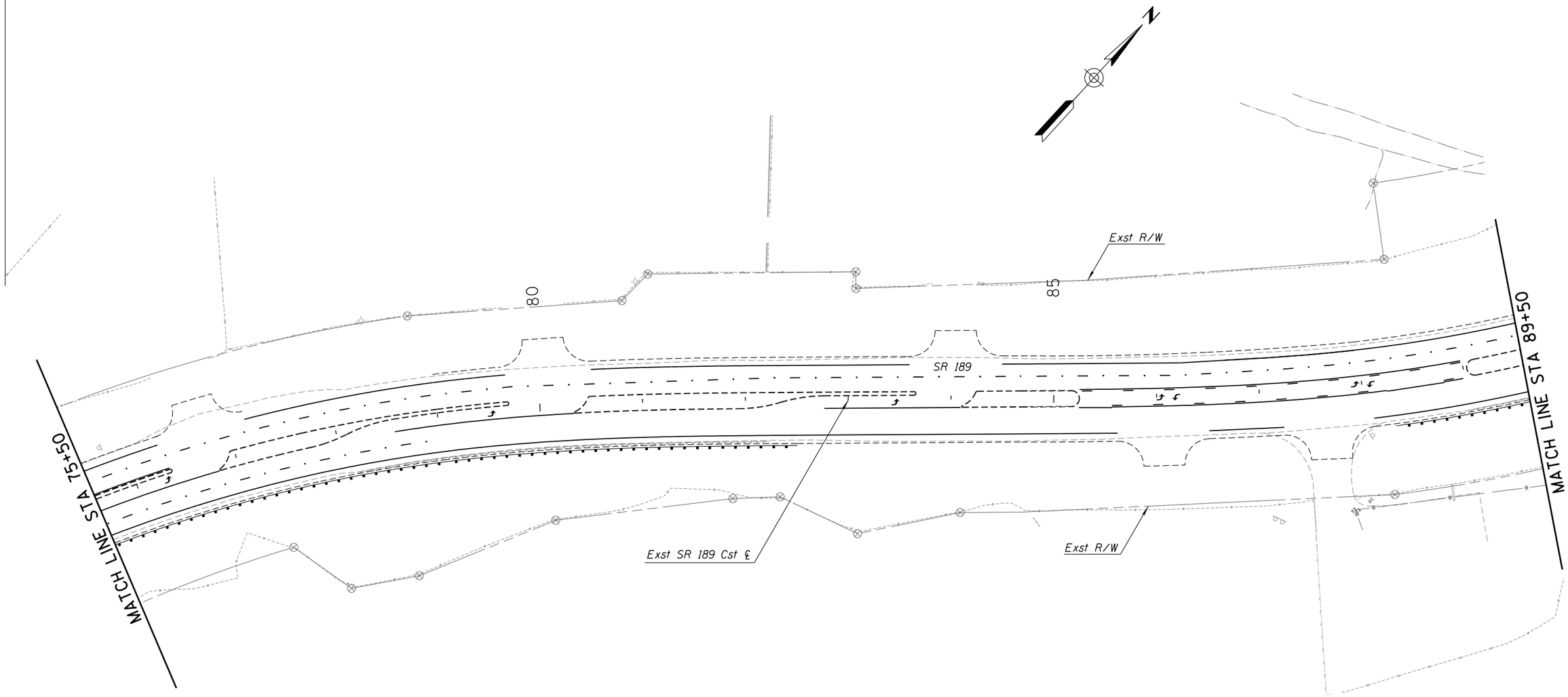
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0486934\h8045gs03.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:46:57 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	105	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-0311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 75+50 to 89+50

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

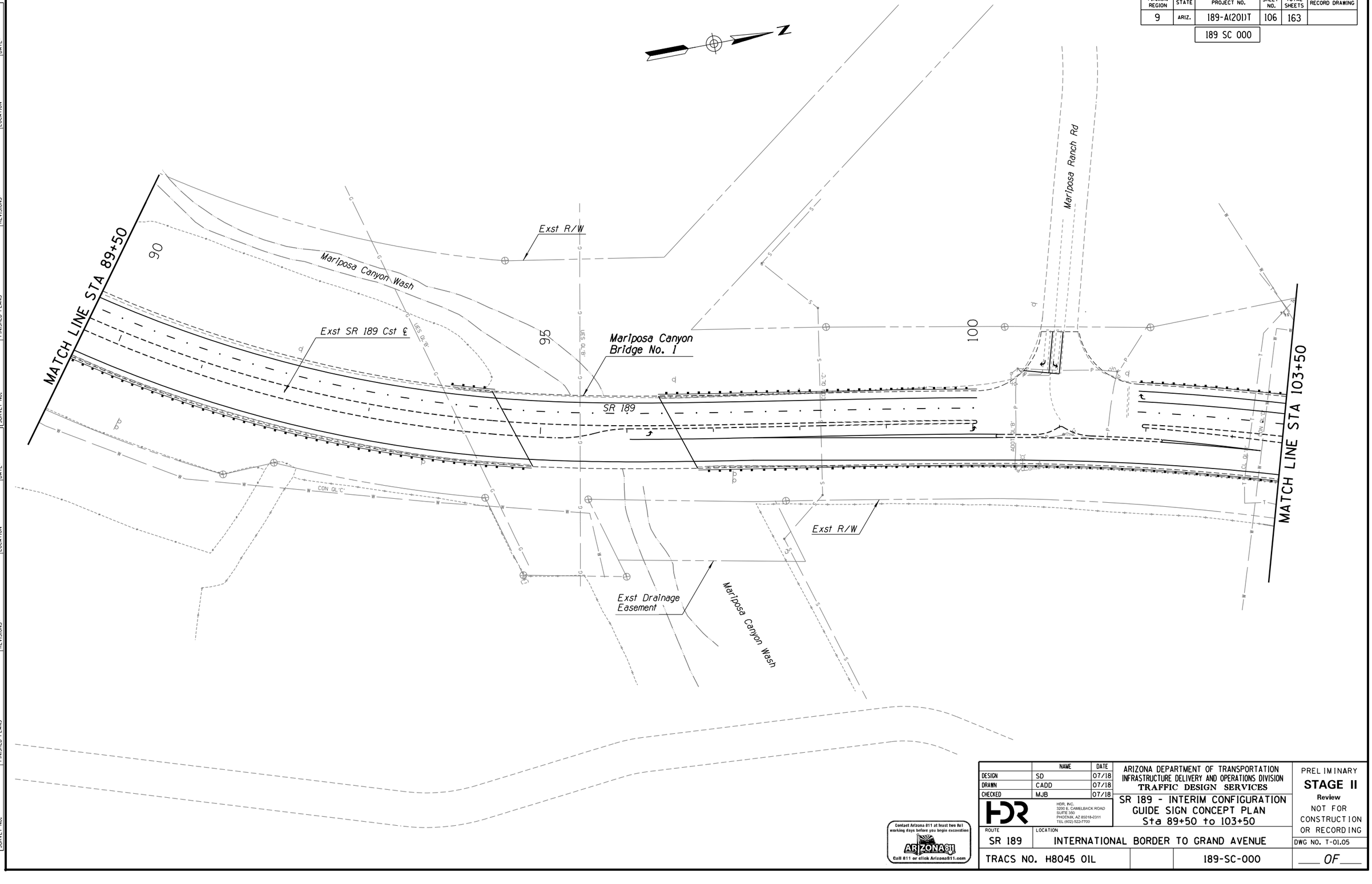
DWG NO. T-01.04

___ OF ___

FILE NAME:c:\pwworking\phx\d0486934\h8045gs04.dgn PLOT DATE:Jul. 24, 2018 TIME:10:47:06 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-
SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	106	163	
		189 SC 000			



FILE NAME:c:\pwworking\phx\d0486934\h8045gs05.dgn PLOT DATE:Jul. 24, 2018 TIME:10:47:17 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 89+50 to 103+50

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. T-01.05
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

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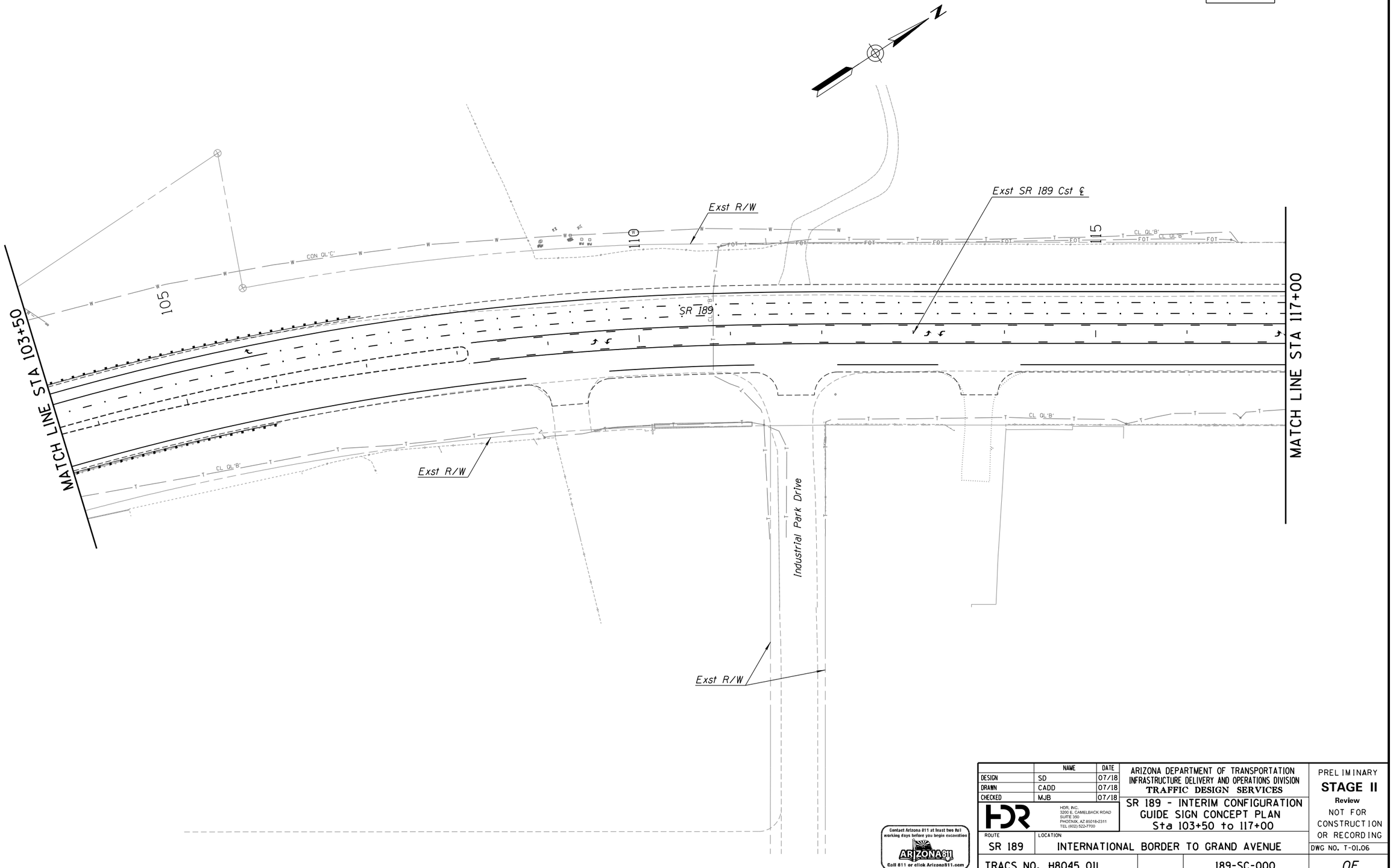
ARIZONA811
Call 811 or click ArizonaBlue811.com

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	107	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION GUIDE SIGN CONCEPT PLAN Sta 103+50 to 117+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

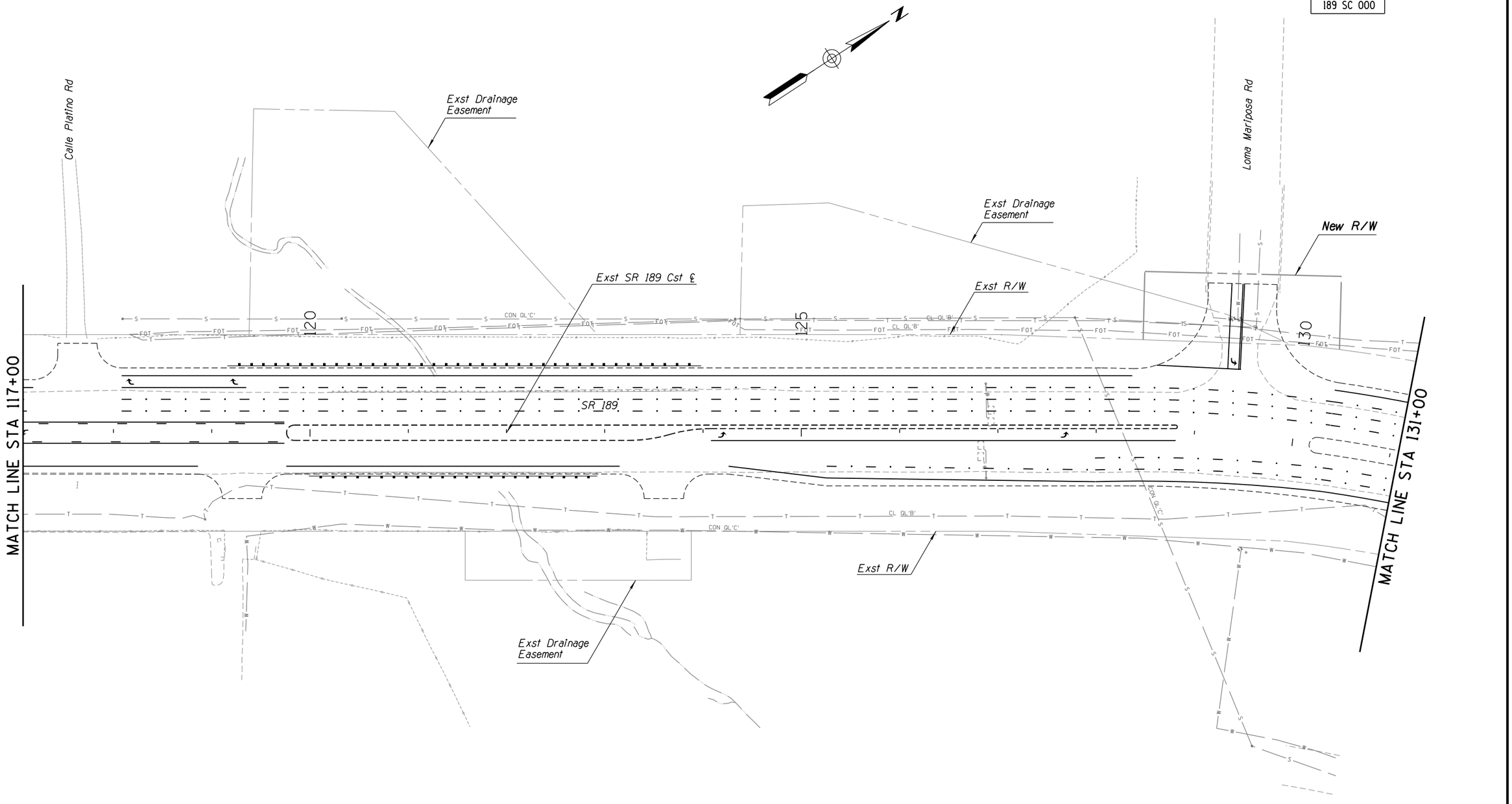
DWG NO. T-01.06

____ OF ____

FILE NAME: c:\pwworking\phx\d0486934\h8045gs06.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:47:28 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	108	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.07

____ OF ____

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ARIZONA811
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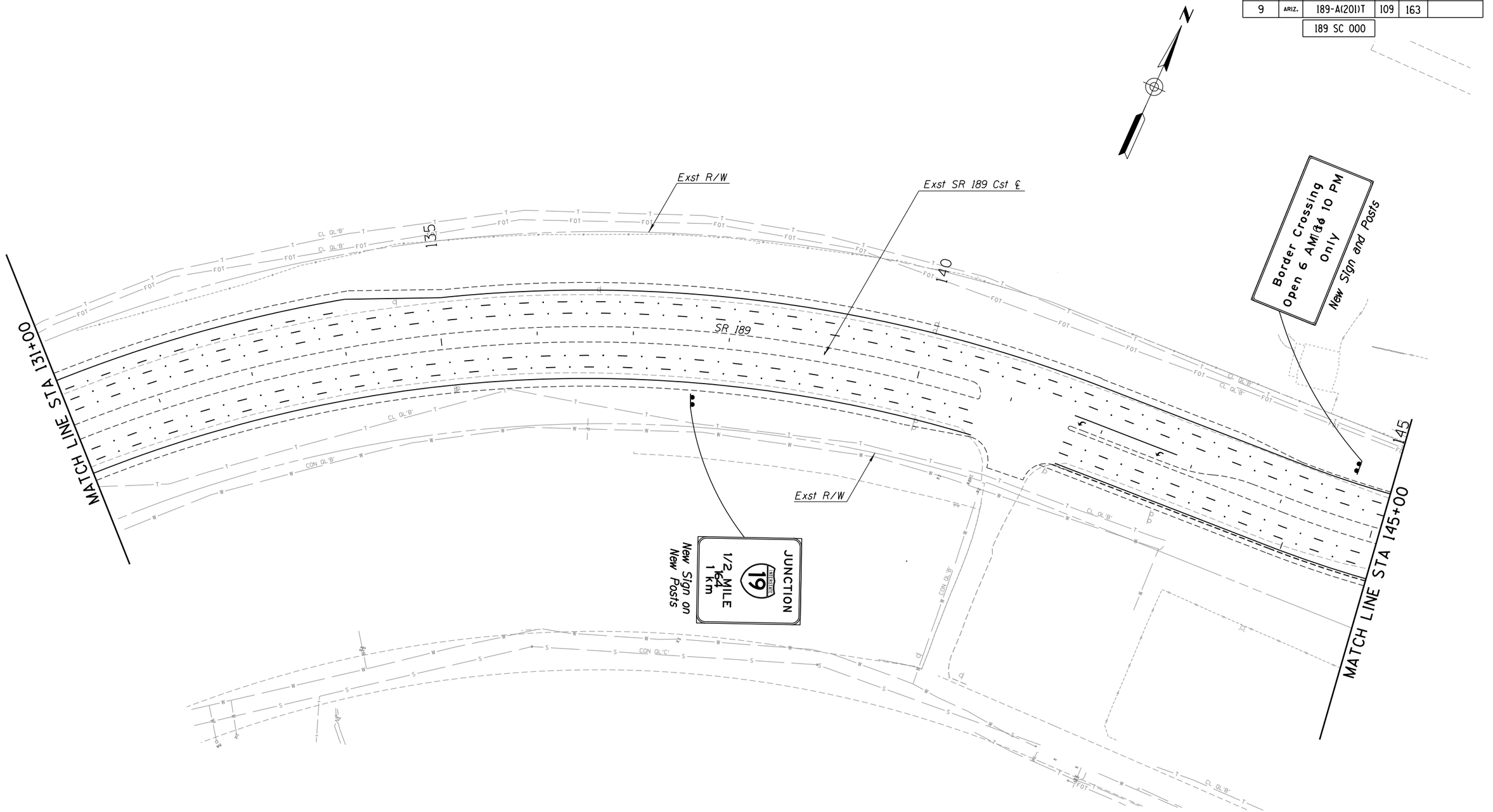
FILE NAME: c:\pwworking\phx\d0486934\h8045gs07.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:47:38 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	109	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 131+00 to 145+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. T-01.08
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

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ARIZONA811
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FILE NAME: c:\pwworking\phx\d0486934\h8045gs08.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:47:50 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	110	163	
		189 SC 000			

W Paul Bond Dr

Frank Reed Rd

Exst R/W

Exst R/W

W Shell Dr

Border Crossing Open 6AM 10PM Only

Exst Remove

W Carls Jr Rd

New R/W

Exst R/W

145

150

155

Exst SR 189 Cst ℄

SR 189

SR 189

PI 102+92.56

MATCH LINE STA 145+00

MATCH LINE STA 159+00

Ramp EN Cst ℄

Exst R/W

Exst R/W

100

105

Industrial Park Dr

INTERSTATE 19 NORTH Tucson

New Sign and Structure

INTERSTATE 19 NORTH Tucson

New Sign and Posts

New R/W

Exst Remove

1/4 MILE 1/2 MILE JUNCTION 19

Exst R/W

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 145+00 to 159+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.09

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0486934\h8045gs09.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:48:02 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	111	163	
		189 SC 000			

MATCH LINE STA 254+00
SEE DWG NO. T-01.15

MATCH LINE STA 159+00

MATCH LINE STA 55+00

Exst I-19 Ramp A Cst ℄

Exst R/W

I-19 Ramp A

Exst I-19 SB Cst ℄

Exst I-19 Cst ℄

I-19 SB

I-19 NB

Exst I-19 NB Cst ℄

Exst I-19 Ramp B Cst ℄

I-10 Ramp B

New R/W

Exst R/W

Exst SR 189 Cst ℄

SR 189

ADOT QL 'B'

ADOT QL 'B'

New Sign and Structure

19 NORTH Tucson

19 SOUTH Intl Border

Remove and Salvage Sign Structure
Remove Sign Panels

Exst

19 NORTH Tucson

19 SOUTH Intl Border

I-19 Ramp D

I-19 Ramp C

Ramp EN Cst ℄

Exst I-19 Ramp C Cst ℄

Exst R/W

Exst I-19 Ramp D Cst ℄

I-19 SB

I-19 NB

160

165

120

250

110

115

15

15

245

N

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 159+00 to 55+00

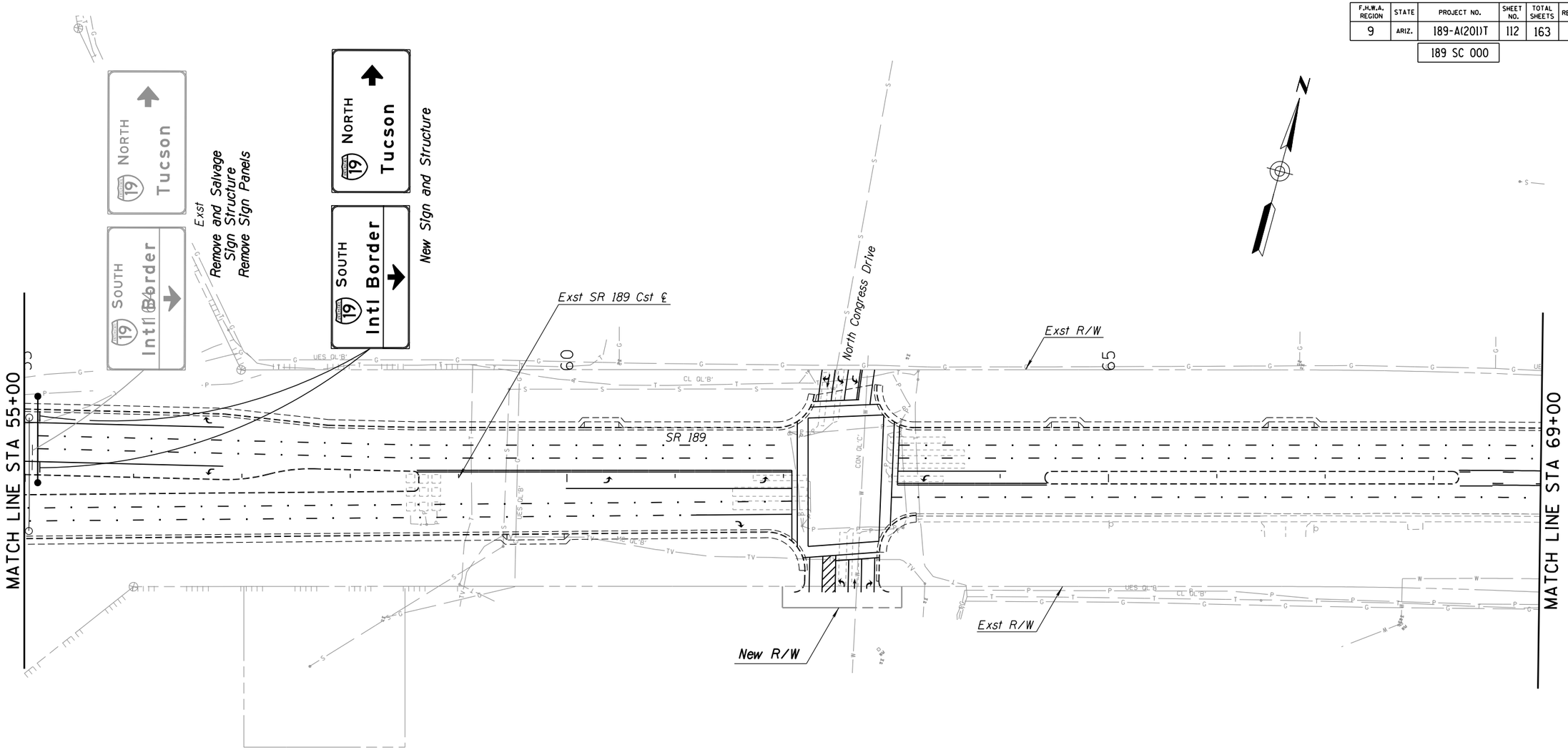
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. T-01.10
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

FILE NAME: c:\pwworking\phx\d0486934\h8045gs10.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:48:12 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	112	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION GUIDE SIGN CONCEPT PLAN Sta 55+00 to 69+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.11

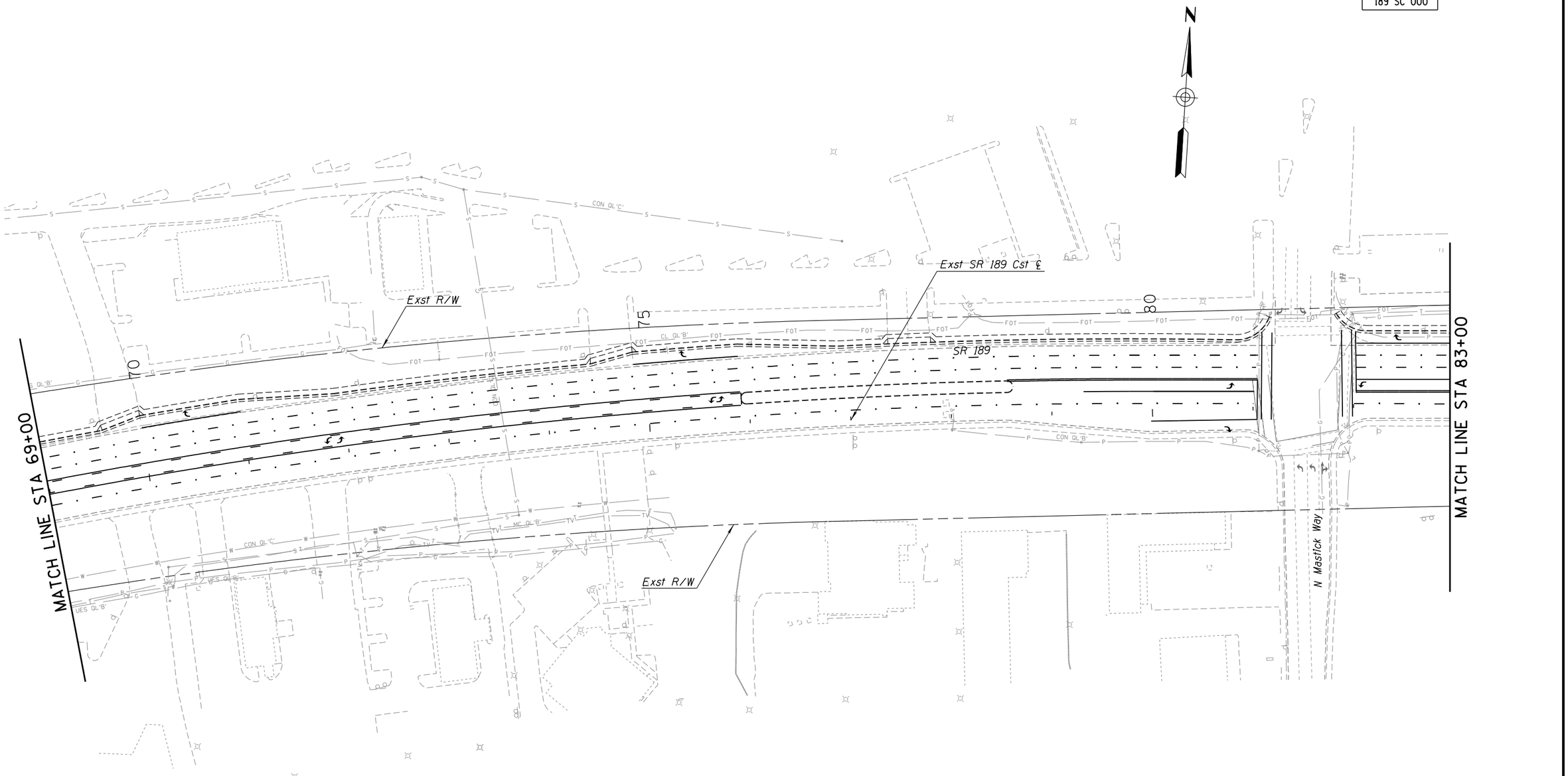
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME=c:\pwworking\phx\d0486934\h8045gs11.dgn PLOT DATE=Jul. 24, 2018 TIME=10:48:25 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	DATE	LOCATION	DATE	SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	113	163	
		189 SC 000			



FILE NAME:c:\pwworking\phx\d0486934\h8045gs12.dgn PLOT DATE:Jul. 24, 2018 TIME:10:48:35 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

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ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 69+00 to 83+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

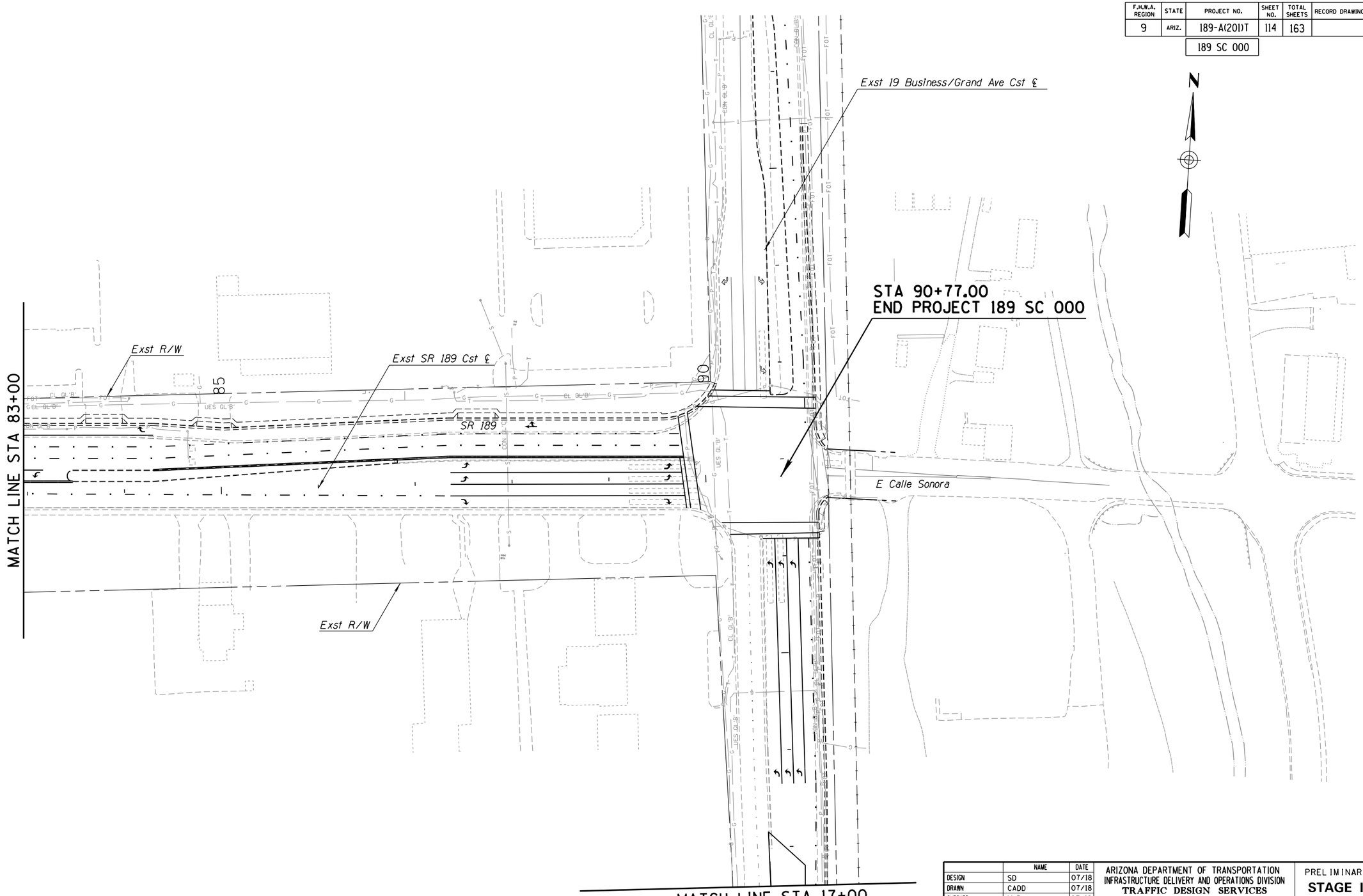
TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.12

____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	114	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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SUITE 350
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 83+00 to 90+77

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

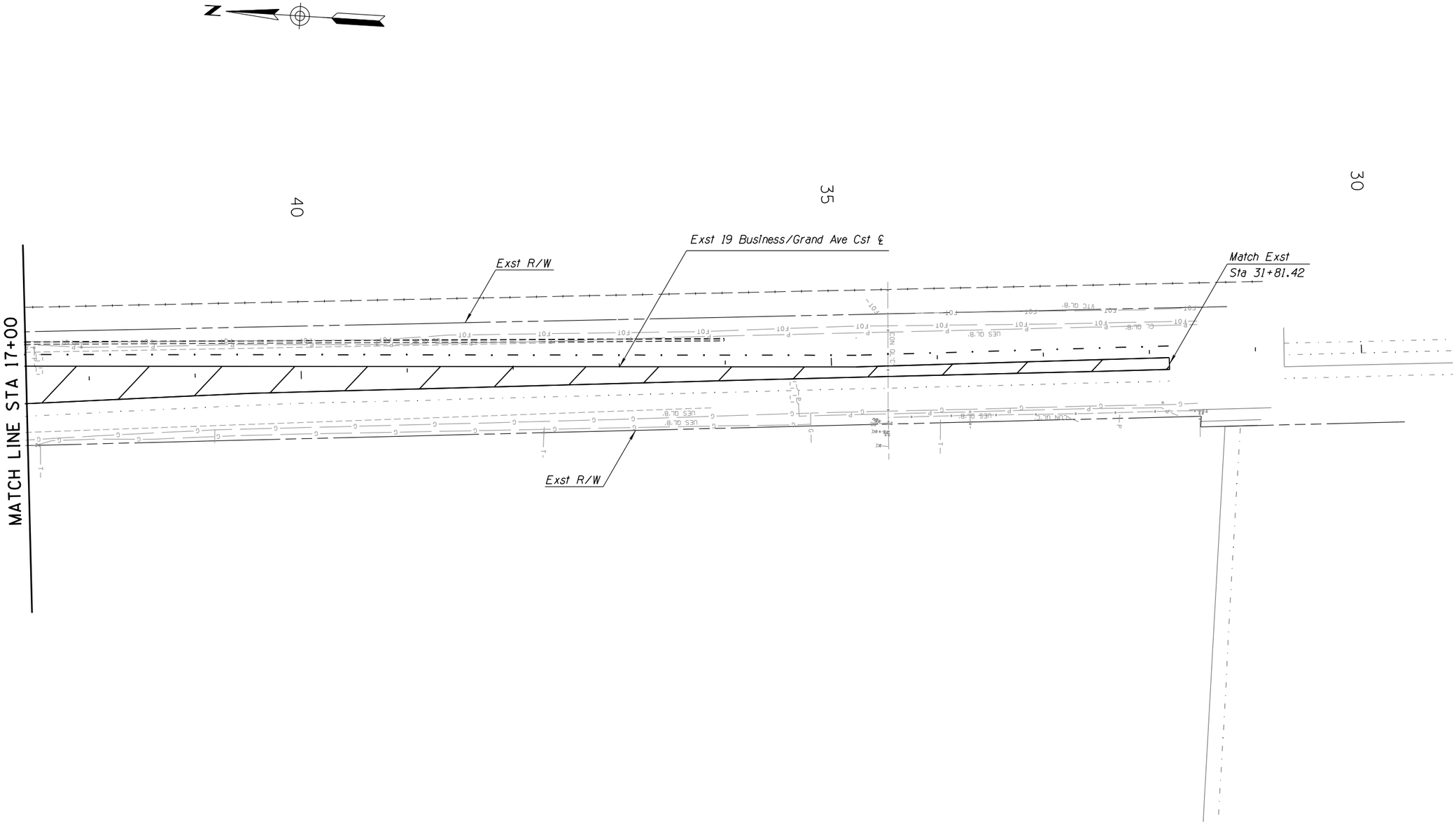
DWG NO. T-01.13

____ OF ____

FILE NAME=c:\pwworking\phx\d0486934\h8045gs13.dgn PLOT DATE=Jul 24, 2018 TIME=10:48:45 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	115	163	
		189 SC 000			



Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 17+00 to 28+00

ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L		189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-01.14

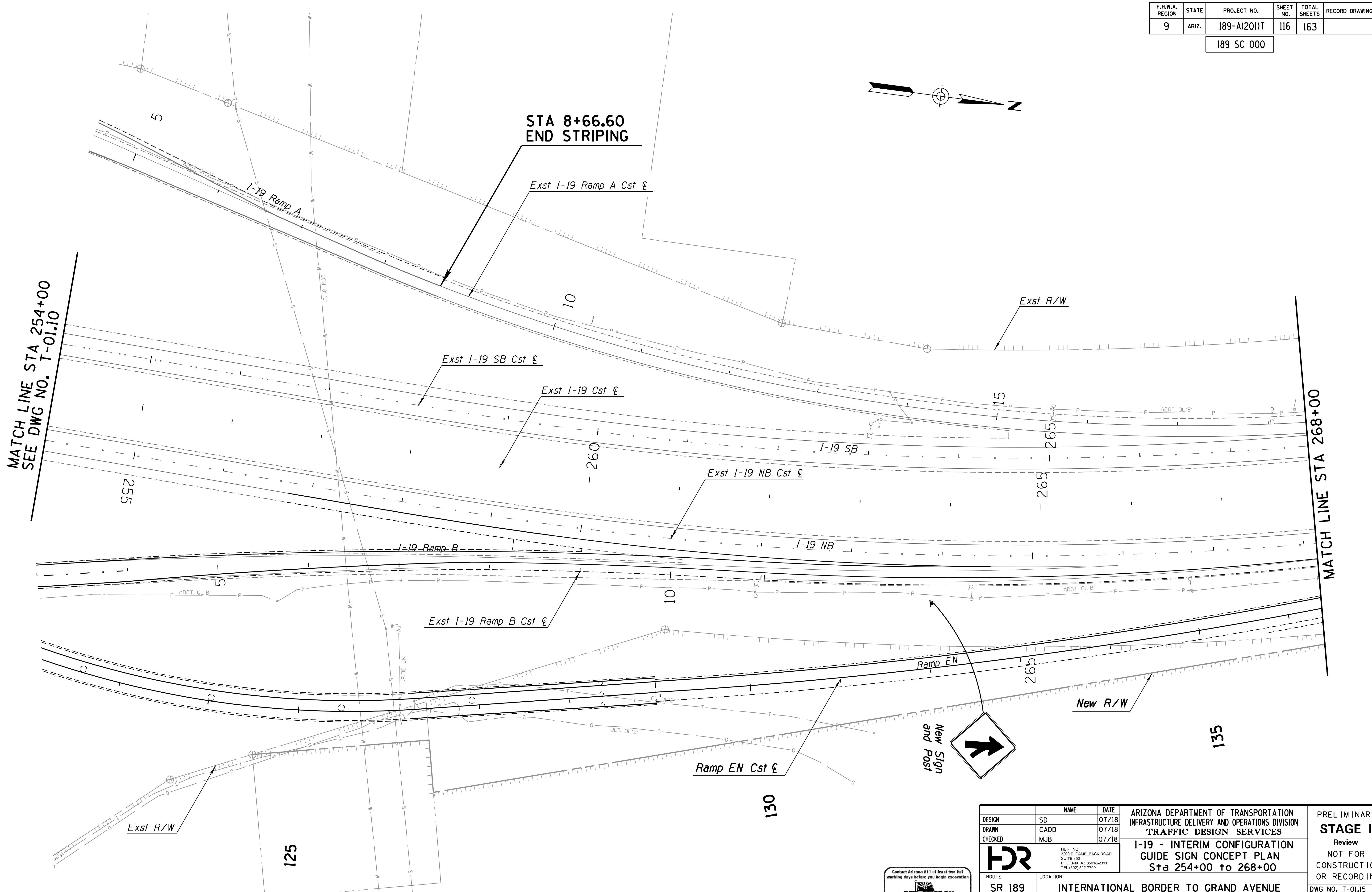
___ OF ___

FILE NAME=c:\pwworking\phx\d0486934\h8045gs14.dgn PLOT DATE=Jul. 24, 2018 TIME=10:48:54 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	116	163	

189 SC 000



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC. 3200 E. CAMELBACK ROAD SUITE 350 PHOENIX, AZ 85018-2311 TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

I-19 - INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 254+00 to 268+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

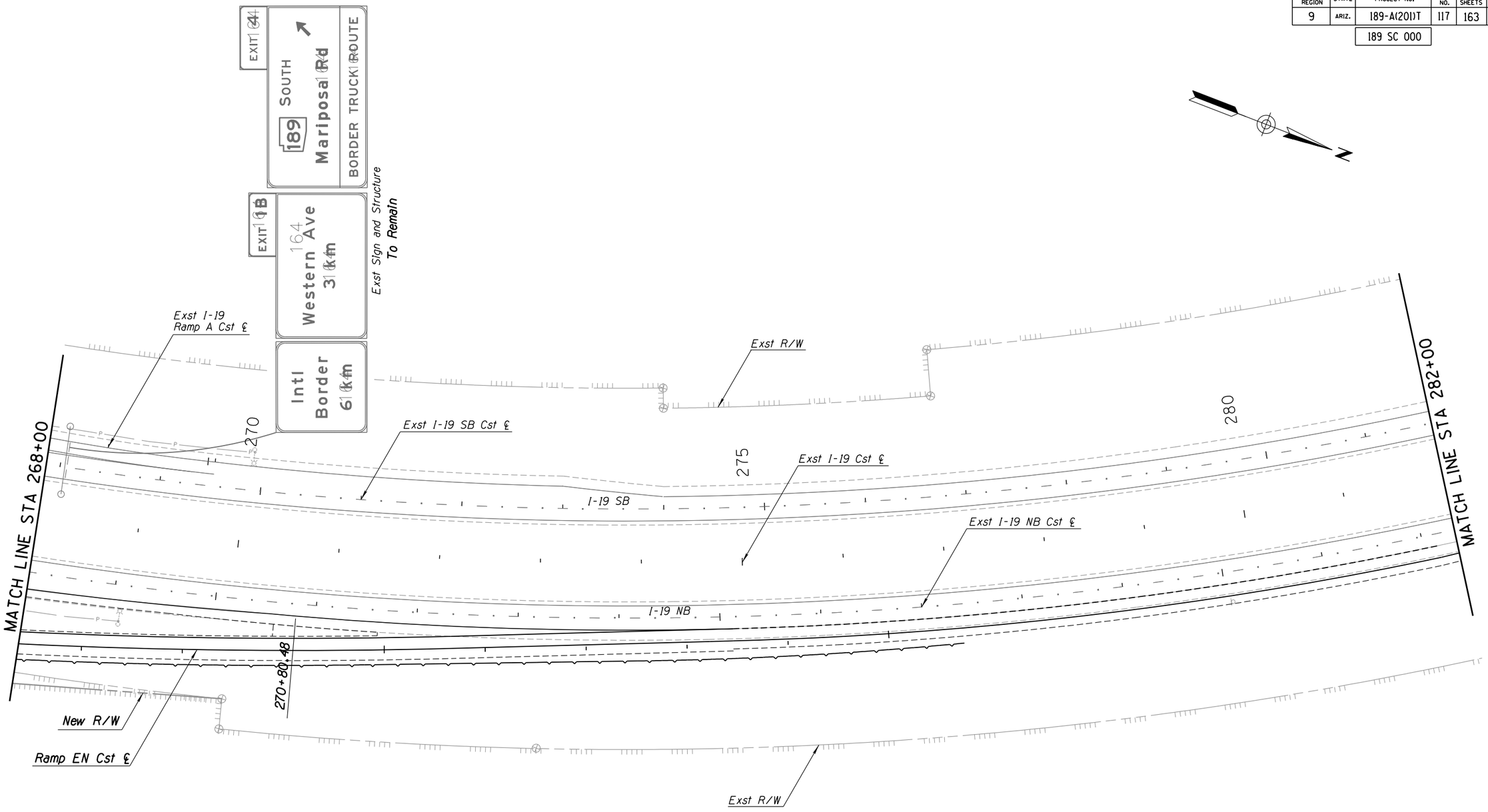
ROUTE: SR 189 | LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE | DWG NO. T-01.15

TRACS NO. H8045 01L | 189-SC-000 | ___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0486934\h8045gs15.dgn
PLOT DATE: Jul. 24, 2018 TIME: 10:49:05 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	117	163	
		189 SC 000			



FILE NAME: c:\pwworking\phx\d0486934\h8045gs16.dgn PLOT DATE: Jul 24, 2018 TIME: 10:49:15 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

I-19 INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 268+00 to 282+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. T-01.16
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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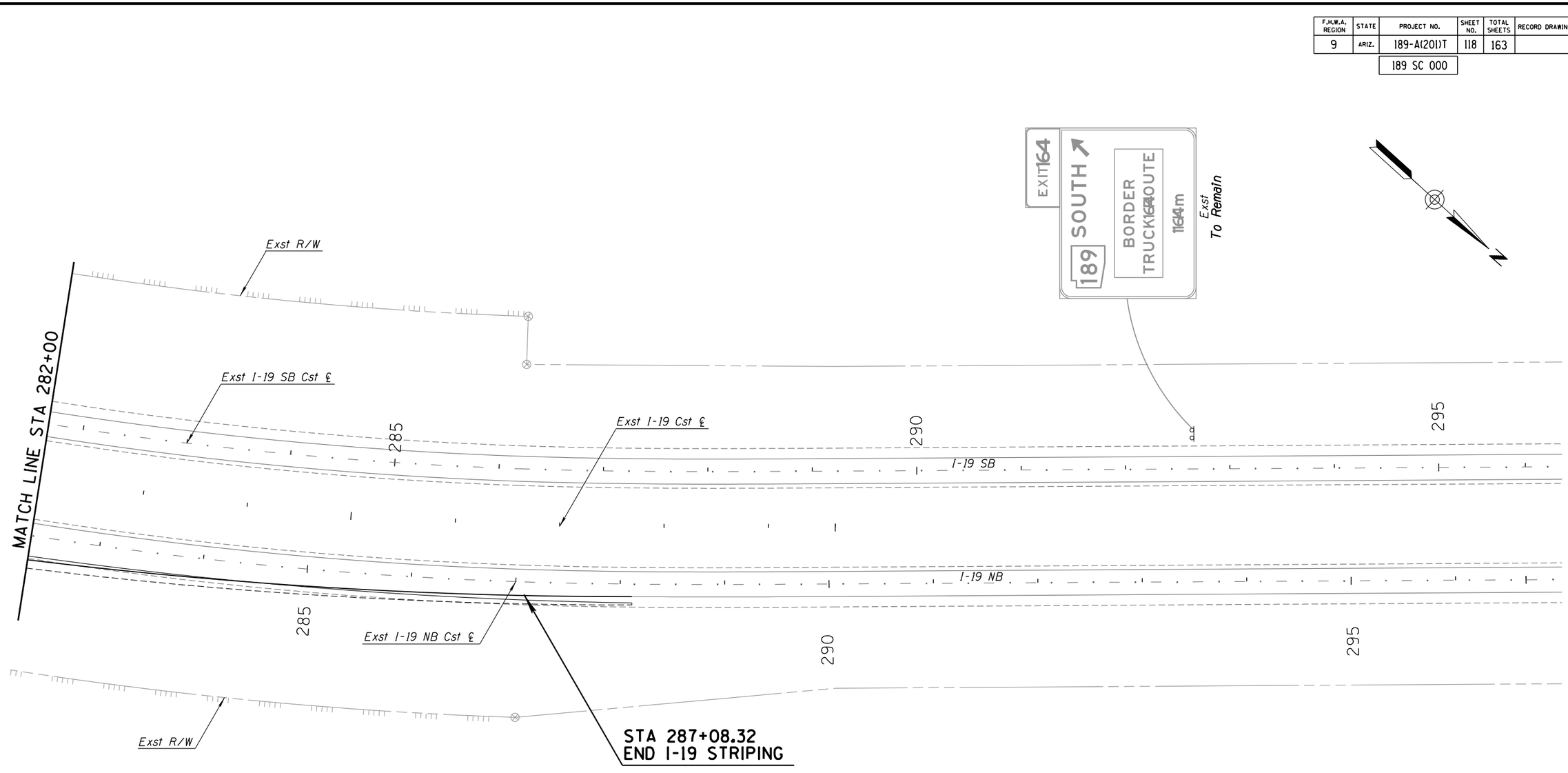
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	118	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

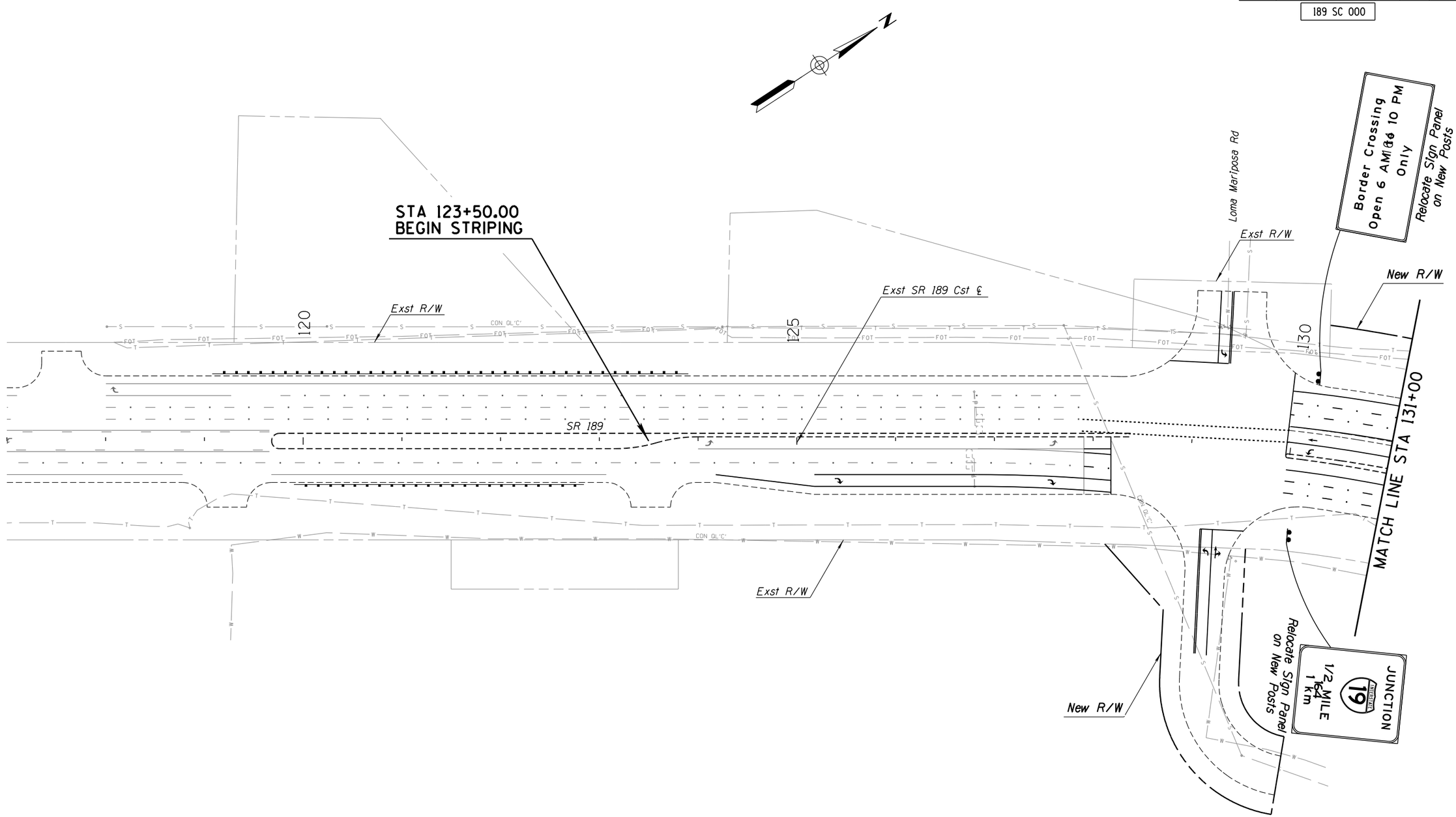
I-19 INTERIM CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 282+00 to 295+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	DWG NO. T-01.17
TRACS NO. H8045 01L		189-SC-000 ___ OF ___

FILE NAME: c:\pwworking\phx\d0486934\h8045gs17.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:49:26 AM PLOT BY: AHOFFMAN PLOT SCALE: 1:100
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	119	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 117+00 to 131+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-02.01

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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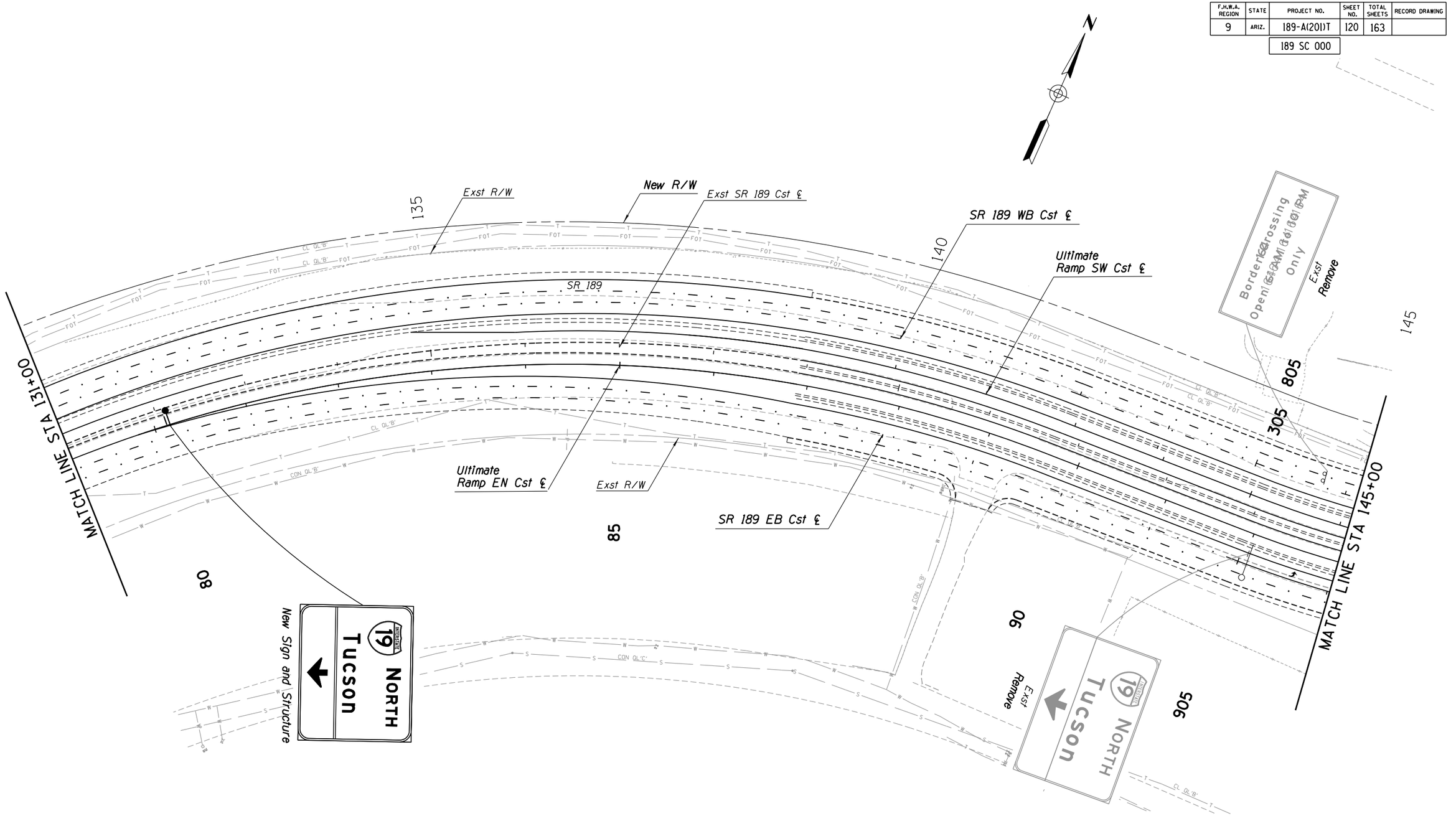
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	120	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - ULTIMATE I4 CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 131+00 to 145+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-02.02

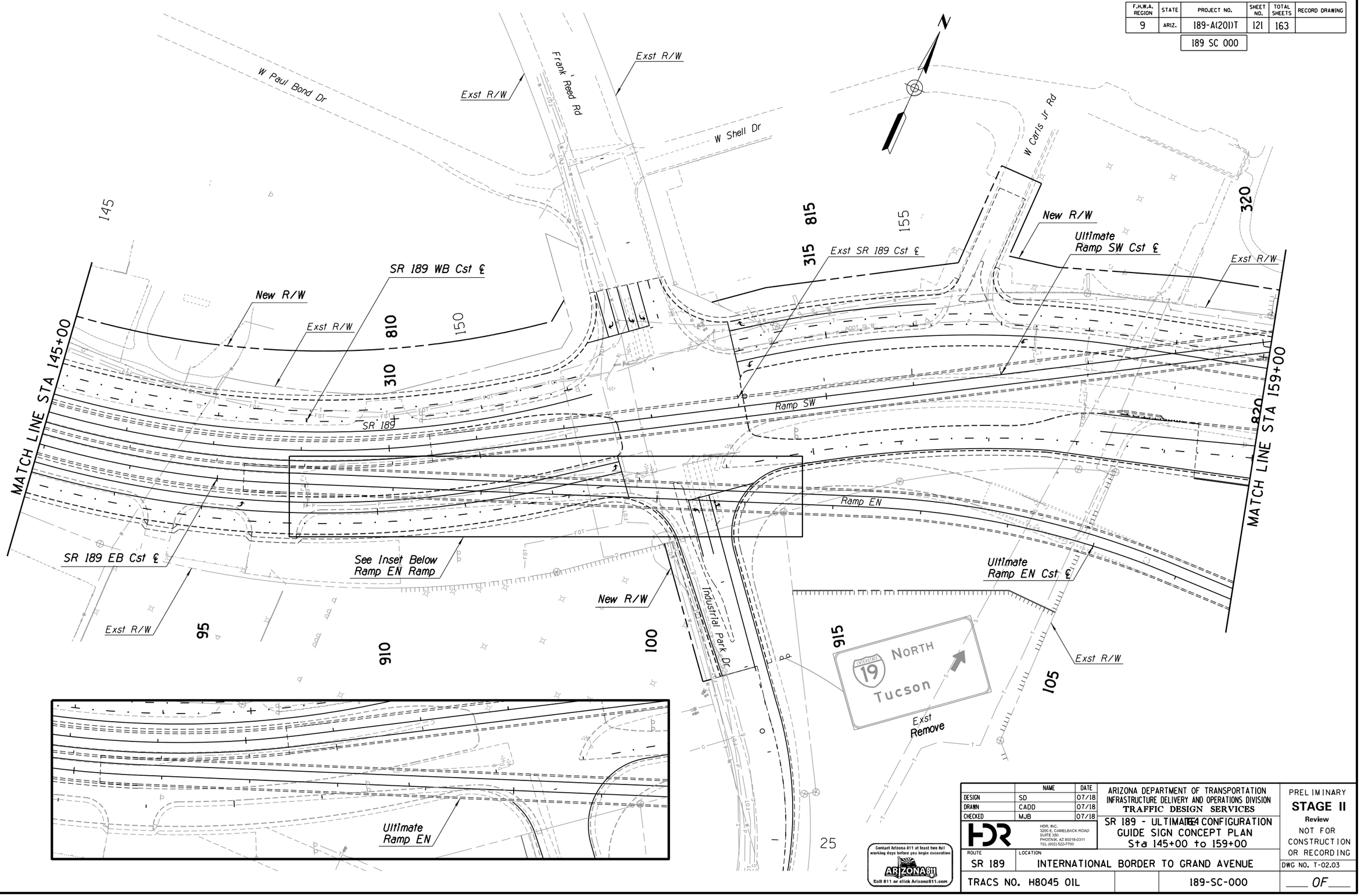
____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME: c:\pwworking\phx\d0487473\h8045gs08ul1.dgn PLOT DATE: Jul. 24, 2018 TIME: 10:49:48 AM PLOT SCALE: 1:100 PLOT BY: AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	121	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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SUITE 350
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - ULTIMATE I-19 INTERCHANGE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 145+00 to 159+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-02.03

____ OF ____

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
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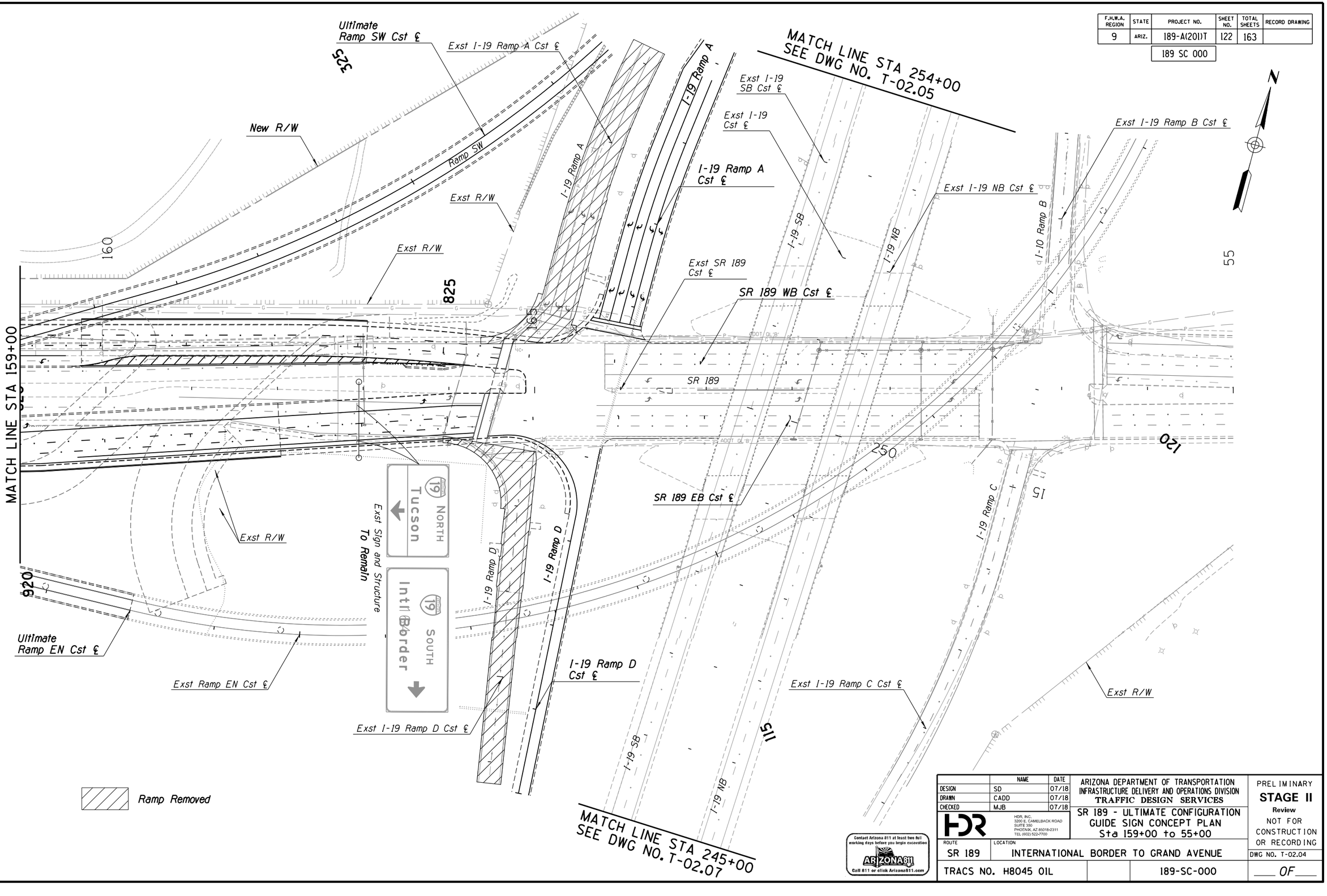
FILE NAME: c:\pwworking\phx\d0487473\h8045gs09ult.dgn | PLOT DATE: Jul. 24, 2018 | TIME: 10:49:57 AM | PLOT SCALE: 1:100 | PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	122	163	
		189 SC 000			



Ramp Removed

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

SR 189 - ULTIMATE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 159+00 to 55+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BOUNDARY TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

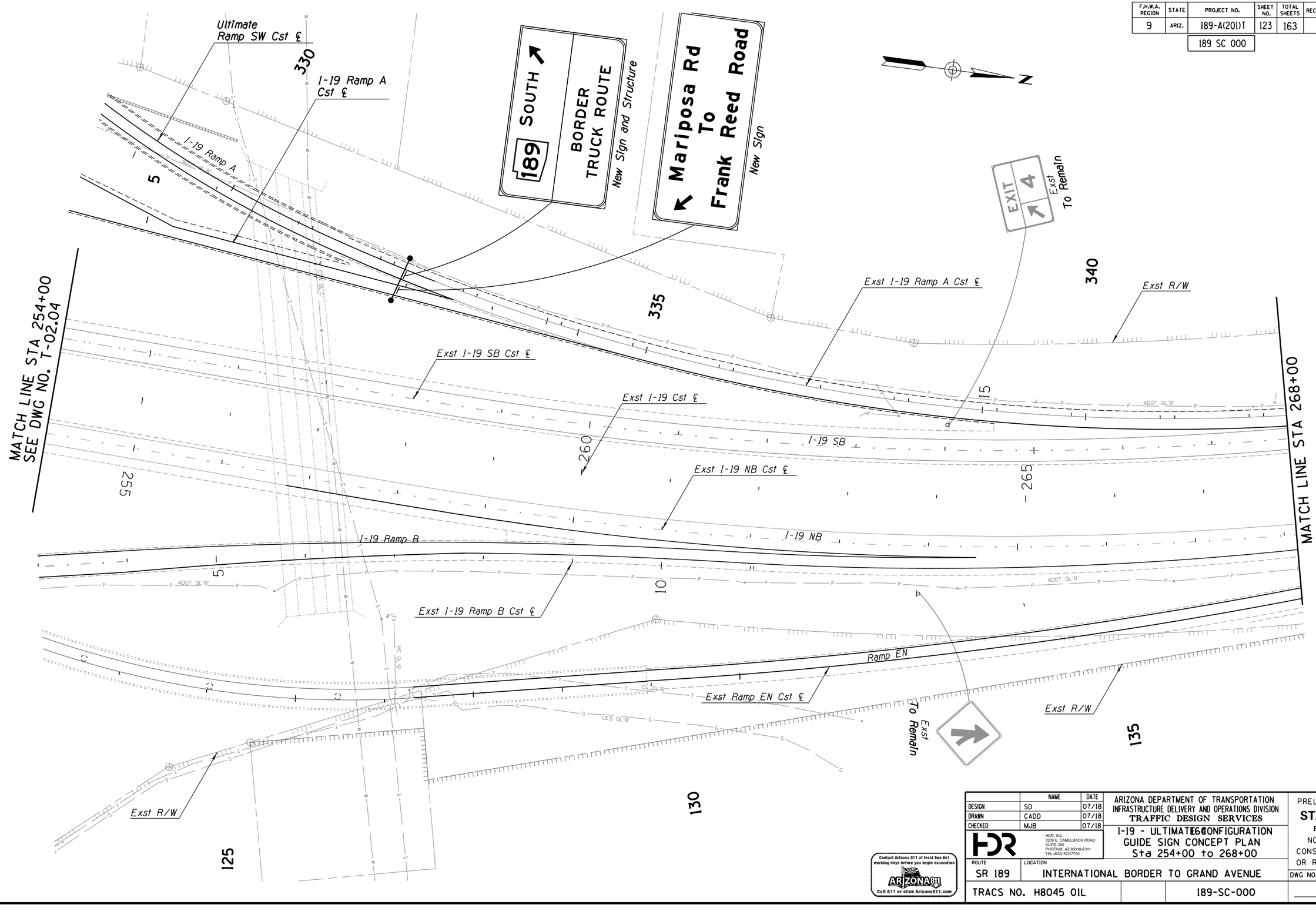
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-02.04

____ OF ____

FILE NAME: c:\pwworking\phx\d0487473\h8045gs10ult.dgn
PLOT DATE: Jul. 24, 2018 TIME: 10:50:07 AM
PLOT SCALE: 1:100
PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	123	163	
		189 SC 000			



	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

HDR, INC.
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 254+00 to 268+00

ROUTE: SR 189
LOCATION: INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-02.05

___ OF ___

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ARIZONA811
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FILE NAME: E:\pwworking\phx\d0487473\h8045gs14ult.dgn
PLOT DATE: Jul. 24, 2018 TIME: 10:50:17 AM
PLOT SCALE: 1:100
PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	124	163	
		189 SC 000			

EXIT 4
SOUTH
189
Mariposa Rd
BORDER TRUCK ROUTE

EXIT 1B
Western Ave
Int'l Border

Exst To Remain

Exst R/W

Exst I-19 SB Cst ℄

Exst I-19 NB Cst ℄

Exst I-19 Cst ℄

I-19 SB

I-19 NB

MATCH LINE STA 268+00

MATCH LINE STA 282+00

STA 269+52.41
END STRIPING

Exst Ramp EN Cst ℄

Exst R/W

270

275

280

N

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ARIZONA811
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	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 268+00 to 282+00

ROUTE	LOCATION
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE

TRACS NO. H8045 01L | 189-SC-000

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

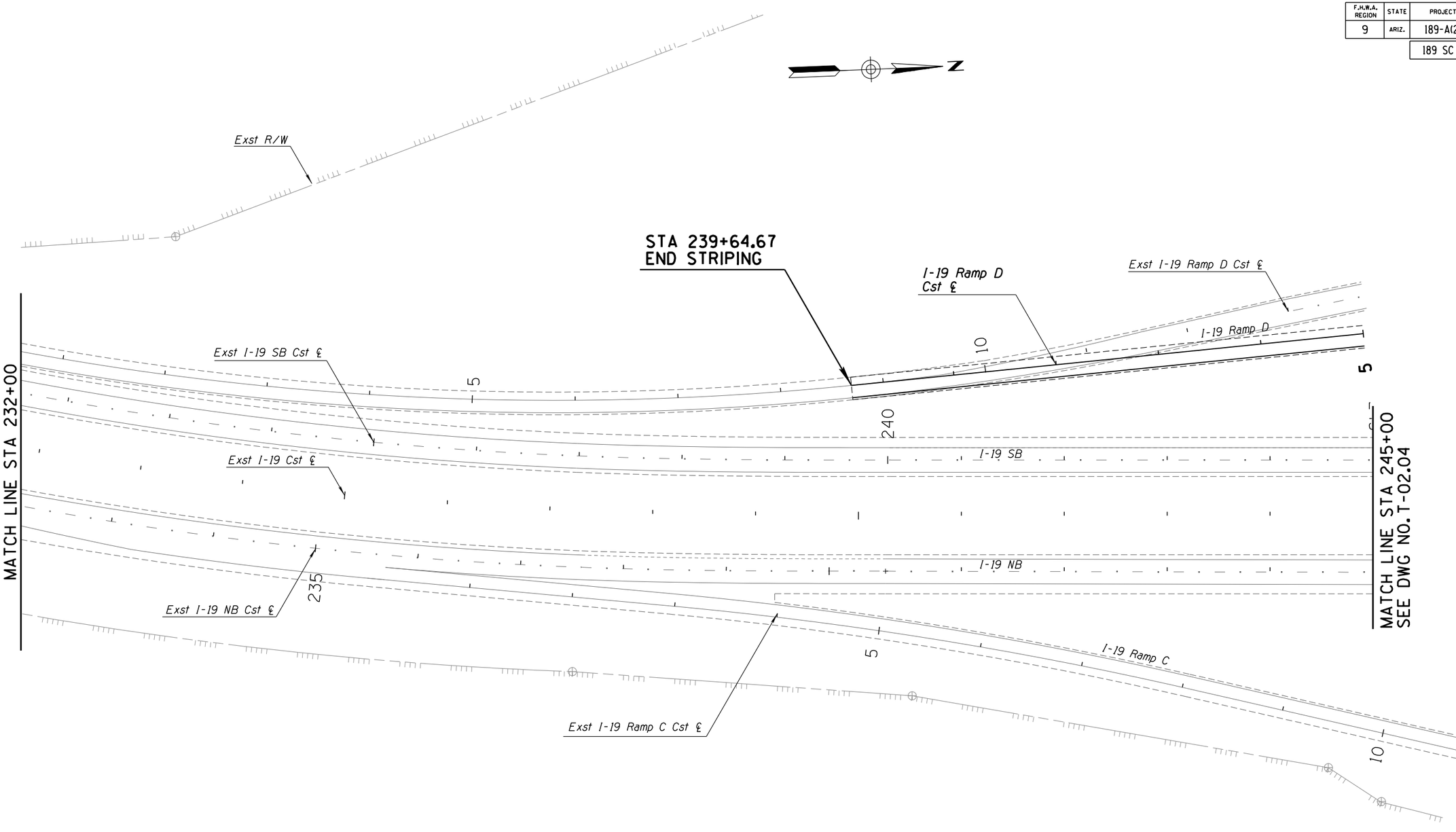
DWG NO. T-02.06

___ OF ___

FILE NAME=c:\pwworking\phx\d0487473\h8045gs15ul1.dgn PLOT DATE=Jul. 24, 2018 TIME=10:50:26 AM PLOT SCALE=1:100 PLOT BY=AHOFFMAN

SURVEY NO.	FINISHED PLANS-	REVISIONS-	LOCATION-	DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	125	163	
		189 SC 000			



FILE NAME:c:\pwworking\phx\d0487473\h8045gs17jlt.dgn PLOT DATE:Jul. 24, 2018 TIME:10:50:36 AM PLOT SCALE:1:100 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

	NAME	DATE
DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

I-19 - ULTIMATE CONFIGURATION
GUIDE SIGN CONCEPT PLAN
Sta 232+00 to 245+00

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	DWG NO. T-02.07
SR 189	INTERNATIONAL BORDER TO GRAND AVENUE	
TRACS NO. H8045 01L	189-SC-000	___ OF ___

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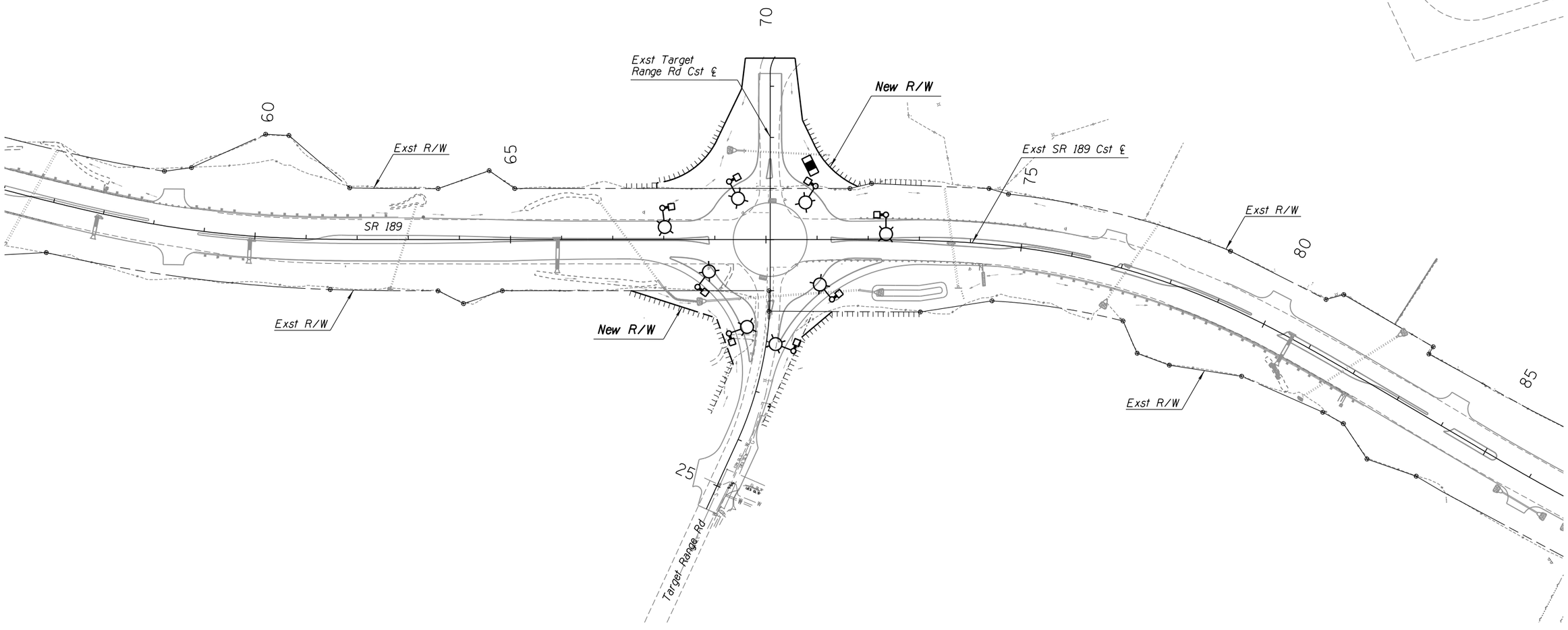
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	126	163	
		189 SC 000			

LEGEND	
SYMBOL	DESCRIPTION
	New Type "I" pole with mast arm
	New Type IV load center cabinet



DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

HDR, INC.
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR_189 - INTERIM CONFIGURATION
LIGHTING PLAN SHEET
ROUNDABOUT

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-03.01

___ OF ___

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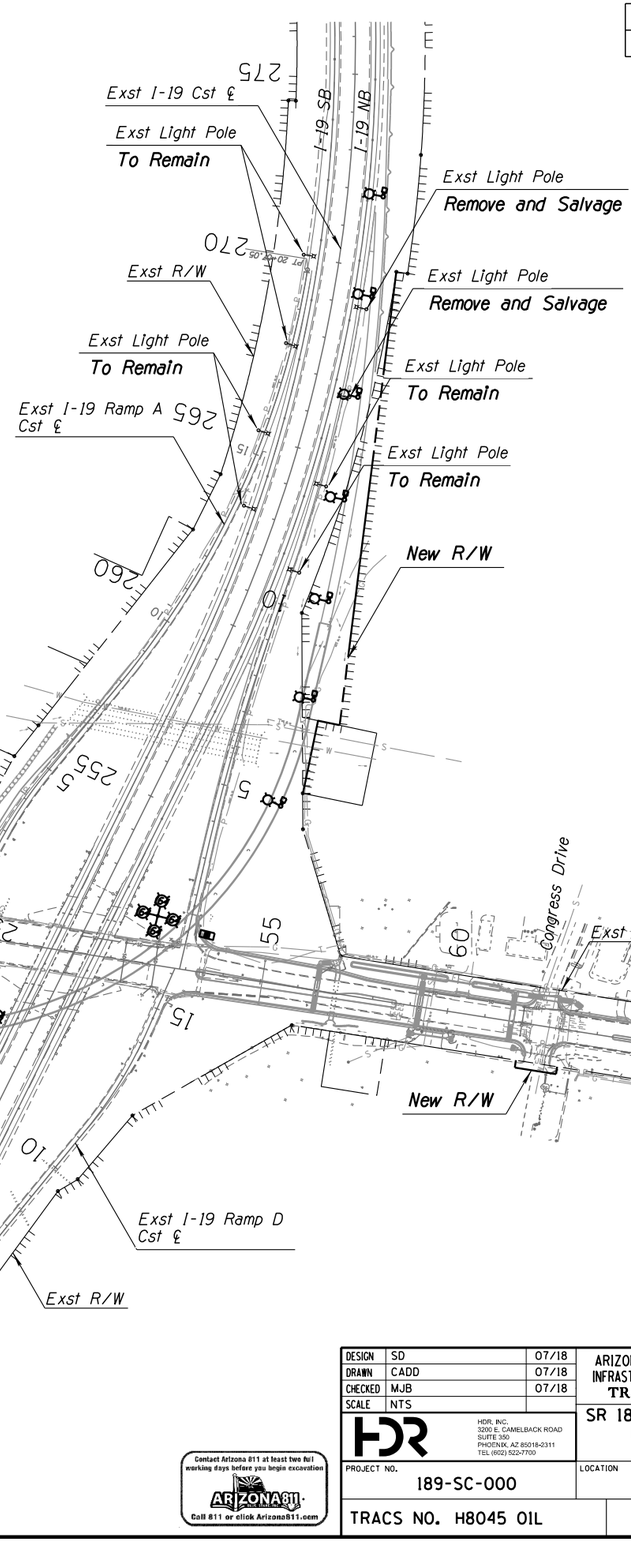
NO.1 | DESCRIPTION OF REVISION | MADE BY | DATE

FILE NAME=c:\pwworking\phx\d0486934\h80451pln01.dgn PLOT DATE=Jul 24, 2018 TIME=10:50:48 AM PLOT SCALE=1:200 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	127	163	
		189 SC 000			

LEGEND	
SYMBOL	DESCRIPTION
	Exst light poles to remain or as noted
	New Type "1" pole with mast arm
	New High mast pole
	New Type IV load center cabinet



NOTE:

The existing light poles on Grand Ave on the east side impacted with the roadway widening will be relocated.

DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
LIGHTING PLAN SHEET
RAMP EN

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L

189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-03.02

___ OF ___

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ARIZONA811
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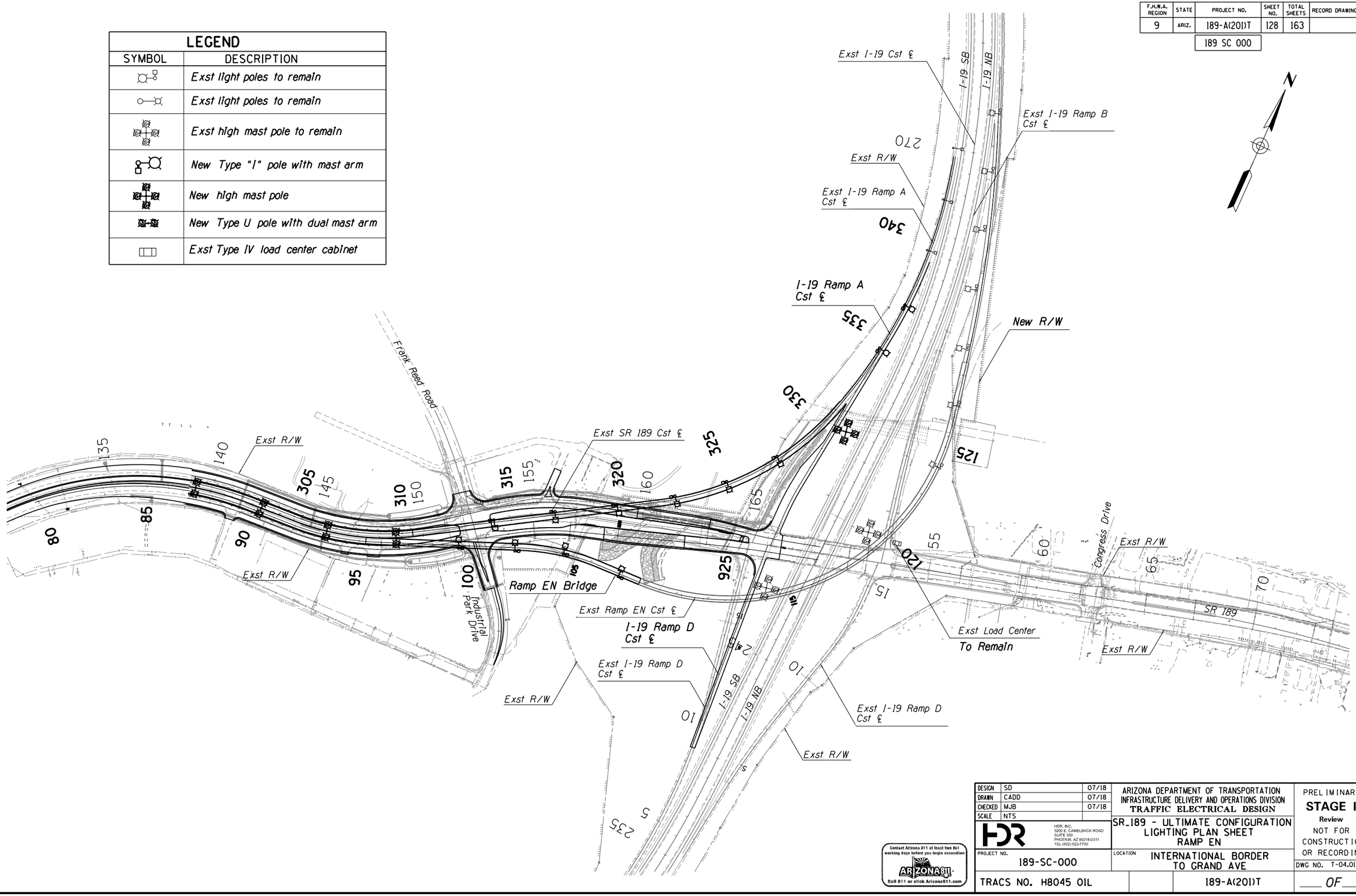
FILE NAME:c:\pwworking\phx\d0486934\h8045lpln02.dgn PLOT DATE:Jul. 24, 2018 TIME:10:51:00 AM PLOT SCALE:1:400 PLOT BY:AHOFFMAN
NO.1 DESCRIPTION OF REVISION MADE BY DATE NO.2 MADE BY DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	128	163	
		189 SC 000			

LEGEND	
SYMBOL	DESCRIPTION
	Exst light poles to remain
	Exst light poles to remain
	Exst high mast pole to remain
	New Type "1" pole with mast arm
	New high mast pole
	New Type U pole with dual mast arm
	Exst Type IV load center cabinet



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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR_189 - ULTIMATE CONFIGURATION
LIGHTING PLAN SHEET
RAMP EN

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

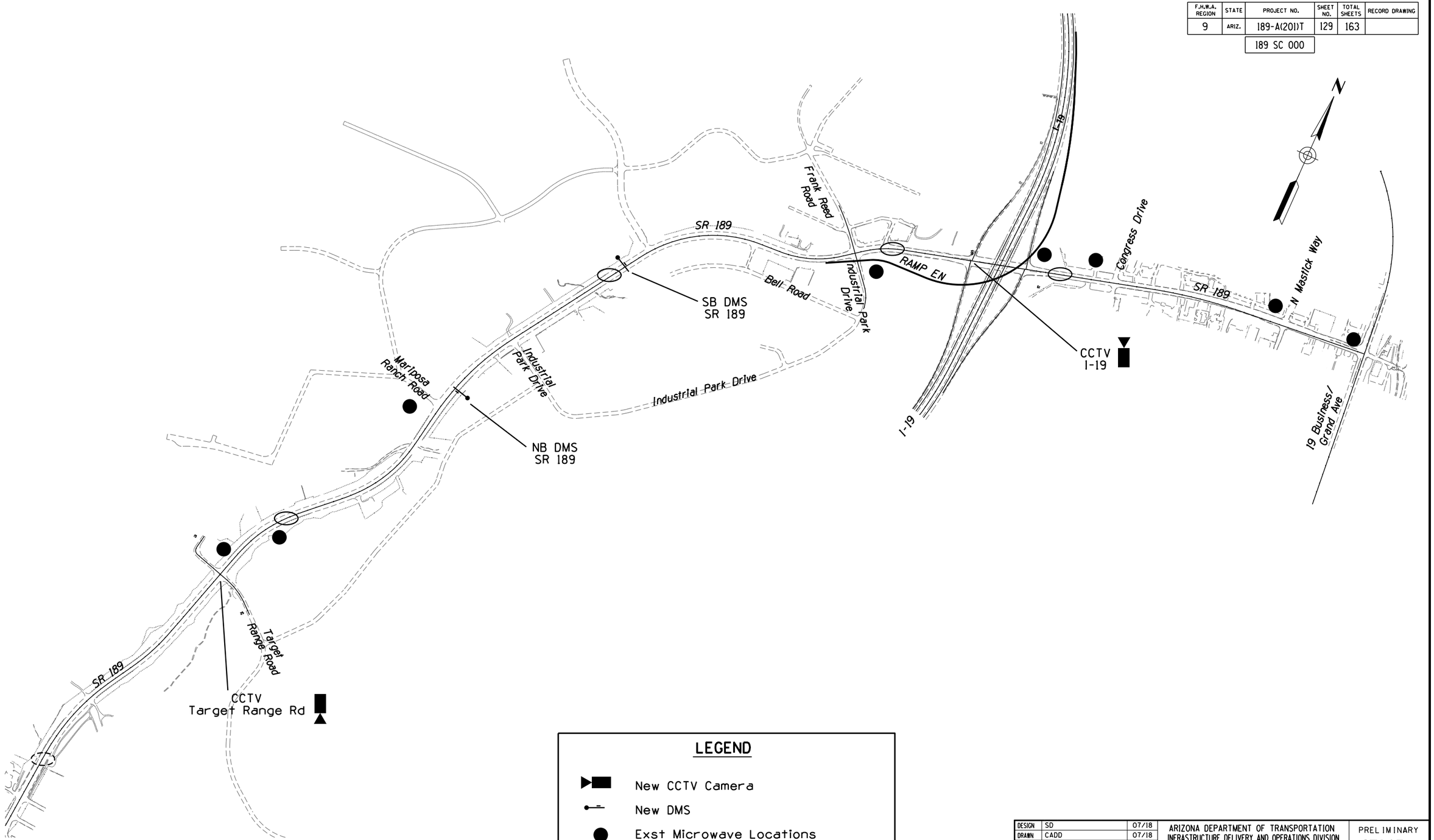
DWG NO. T-04.01

____ OF ____

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
1			
2			

FILE NAME: c:\pwworking\phx\d0487473\h8045plnr01ult.dgn PLOT DATE: Jul 24, 2018 TIME: 10:51:13 AM PLOT SCALE: 1:400 PLOT BY: AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	129	163	
		189 SC 000			



LEGEND

- New CCTV Camera
- New DMS
- Exst Microwave Locations
- Loop Count Station - Replace
- Exst Loop Count Station - Remain

Contact Arizona 811 at least two full working days before you begin excavation
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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	1"=500'	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
FMS/ITS COMPONENT MAP

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L

189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

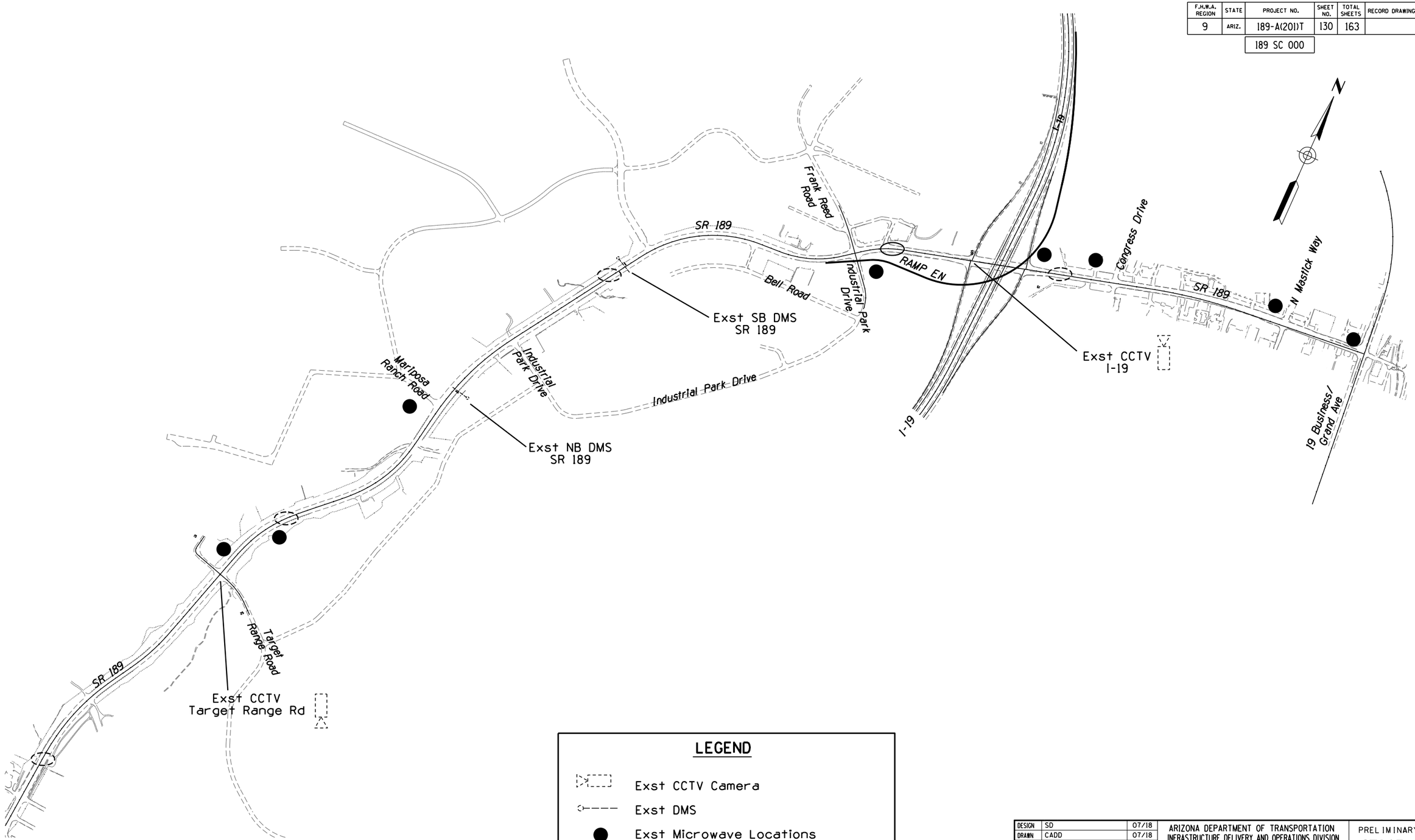
DWG NO. T-05.01

___ OF ___

FILE NAME=c:\pwworking\phx\d0486934\h8045fms01.dgn PLOT DATE=Jul. 24, 2018 TIME=10:51:26 AM PLOT SCALE=1:1000 PLOT BY=AHOFFMAN

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
NO.1			
NO.2			

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	130	163	
		189 SC 000			



LEGEND

- Exst CCTV Camera
- Exst DMS
- Exst Microwave Locations
- Loop Count Station - Replace
- Exst Loop Count Station - Remain

Contact Arizona 811 at least two full working days before you begin excavation
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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	1"=500'	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - ULTIMATE CONFIGURATION
FMS/ITS COMPONENT MAP

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

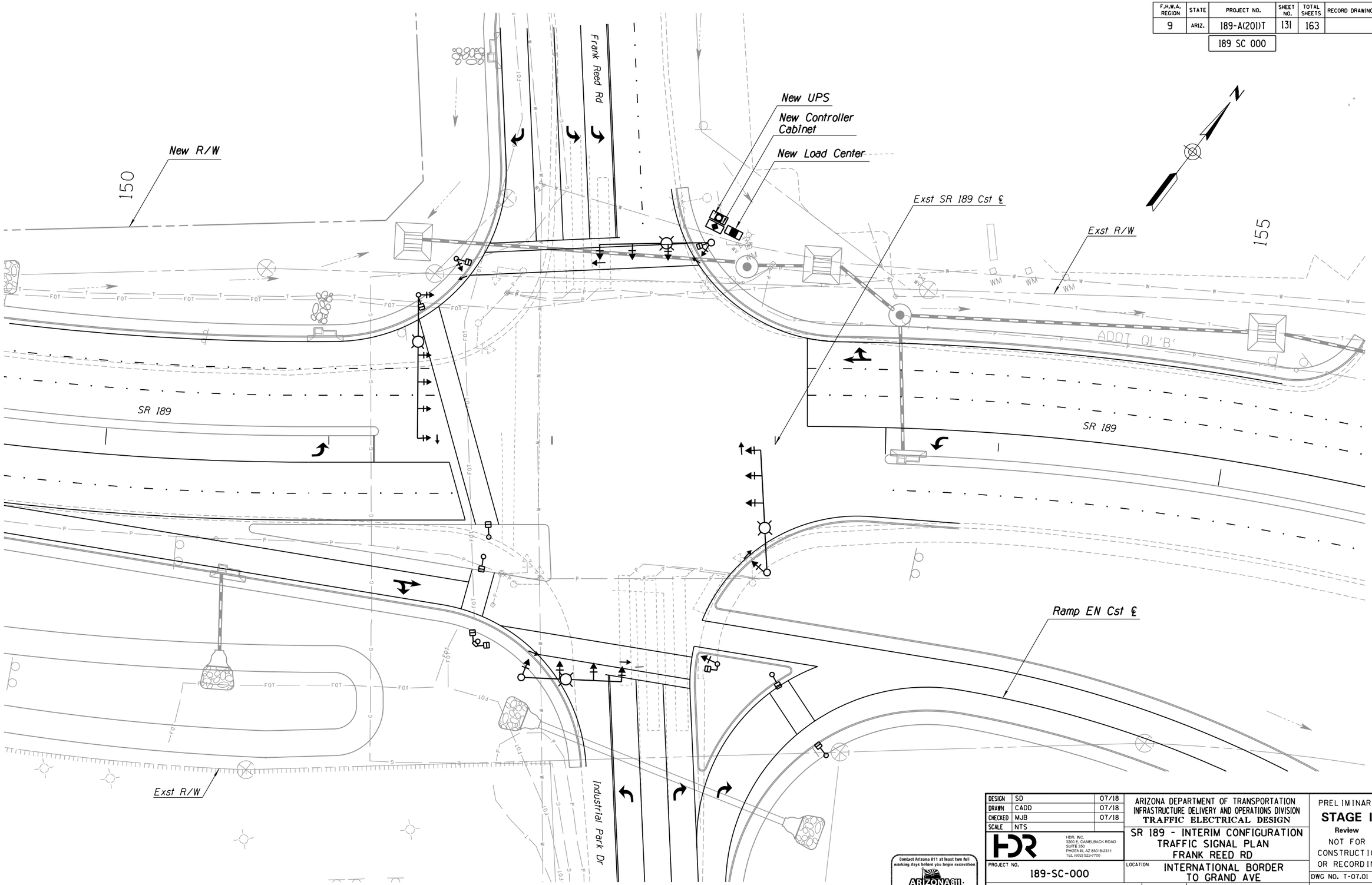
DWG NO. T-06.01

___ OF ___

NO.	DESCRIPTION OF REVISION	MADE BY	DATE
NO.2			
NO.1			

FILE NAME=c:\pwworking\phx\d0487473\h8045fms01ult.dgn PLOT DATE=Jul. 24, 2018 TIME=10:51:38 AM PLOT SCALE=1:1000 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	131	163	
		189 SC 000			



DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
FRANK REED RD

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-07.01

___ OF ___

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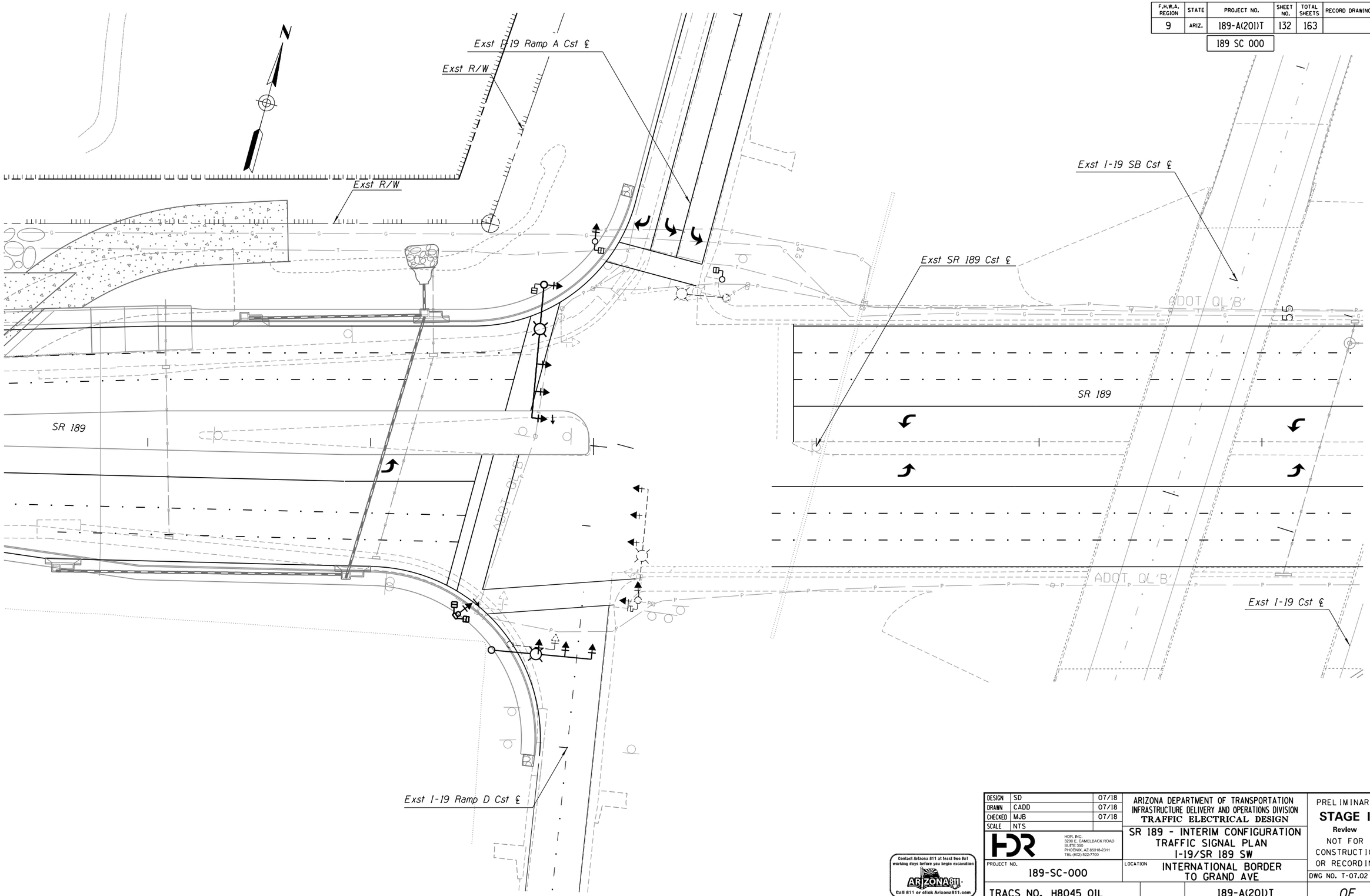
NO. | DESCRIPTION OF REVISION | MADE BY | DATE

FILE NAME=c:\pwworking\phx\d0486934\h8045ts101.dgn PLOT DATE=Jul, 24, 2018 TIME=10:51:49 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	132	163	
		189 SC 000			



DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
I-19/SR 189 SW

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L

189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-07.02

___ OF ___

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NO.	DESCRIPTION OF REVISION	MADE BY	DATE

FILE NAME=c:\pwworking\phx\d0486934\h8045ts201.dgn PLOT DATE=Jul 24, 2018 TIME=10:51:59 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	133	163	
		189 SC 000			

Exst I-19 SB Cst ℄

Exst I-19 NB Cst ℄

Exst I-19 Ramp B Cst ℄

New Load Center

New UPS

New Controller Cabinet

Exst SR 189 Cst ℄

Exst I-19 Ramp D Cst ℄

Ramp EN Cst ℄

50 51 52 54 55

N

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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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PROJECT NO. 189-SC-000

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
I-19/SR 189 SE

LOCATION: INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

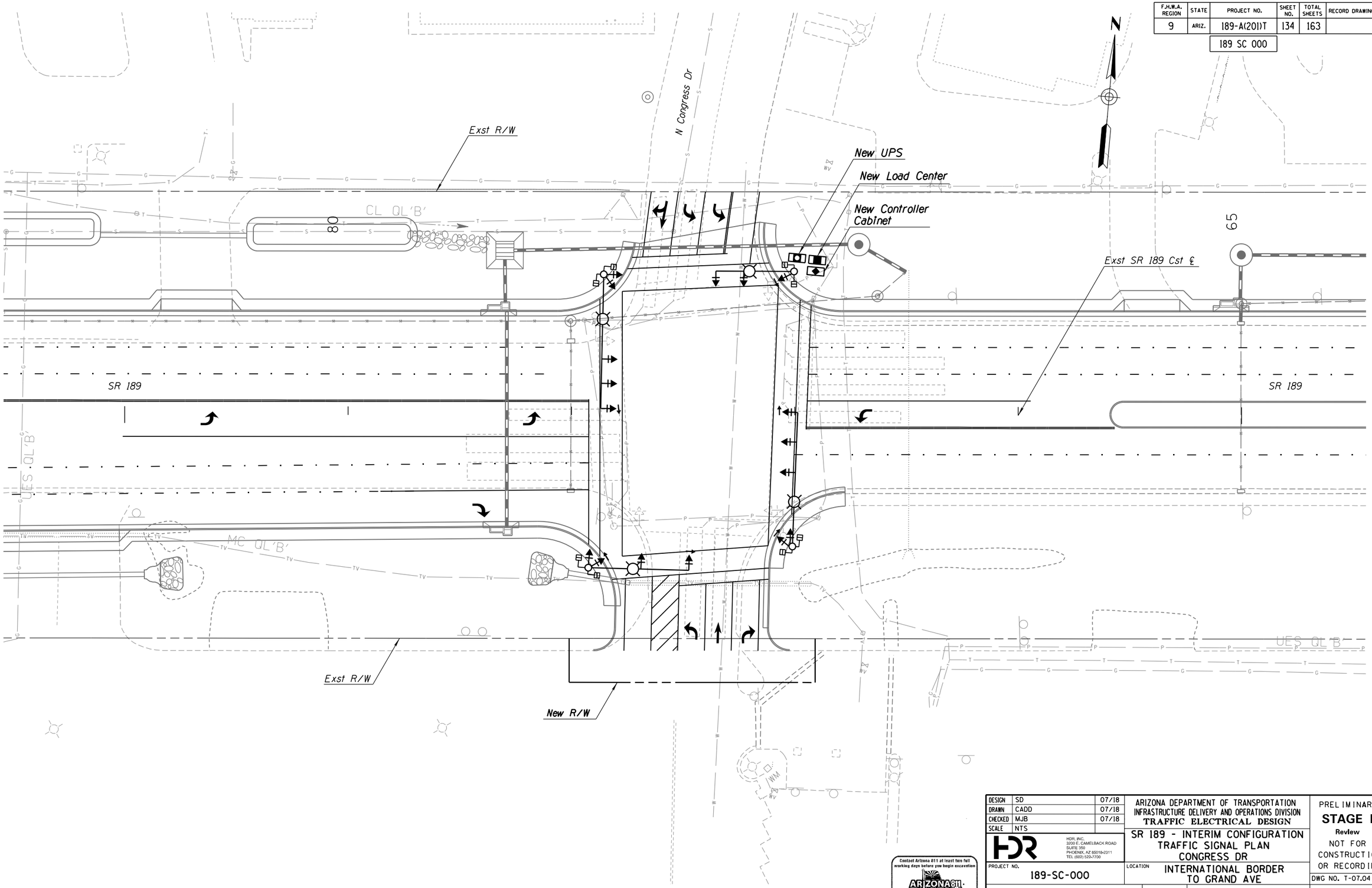
DWG NO. T-07.03

___ OF ___

FILE NAME:c:\pwworking\phx\d0486934\h8045ts301.dgn PLOT DATE:Jul, 24, 2018 TIME:10:52:10 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN

NO.1 | DESCRIPTION OF REVISION | MADE BY | DATE | NO.2 | MADE BY | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	134	163	
		189 SC 000			



DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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SUITE 350
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
CONGRESS DR

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-07.04

___ OF ___

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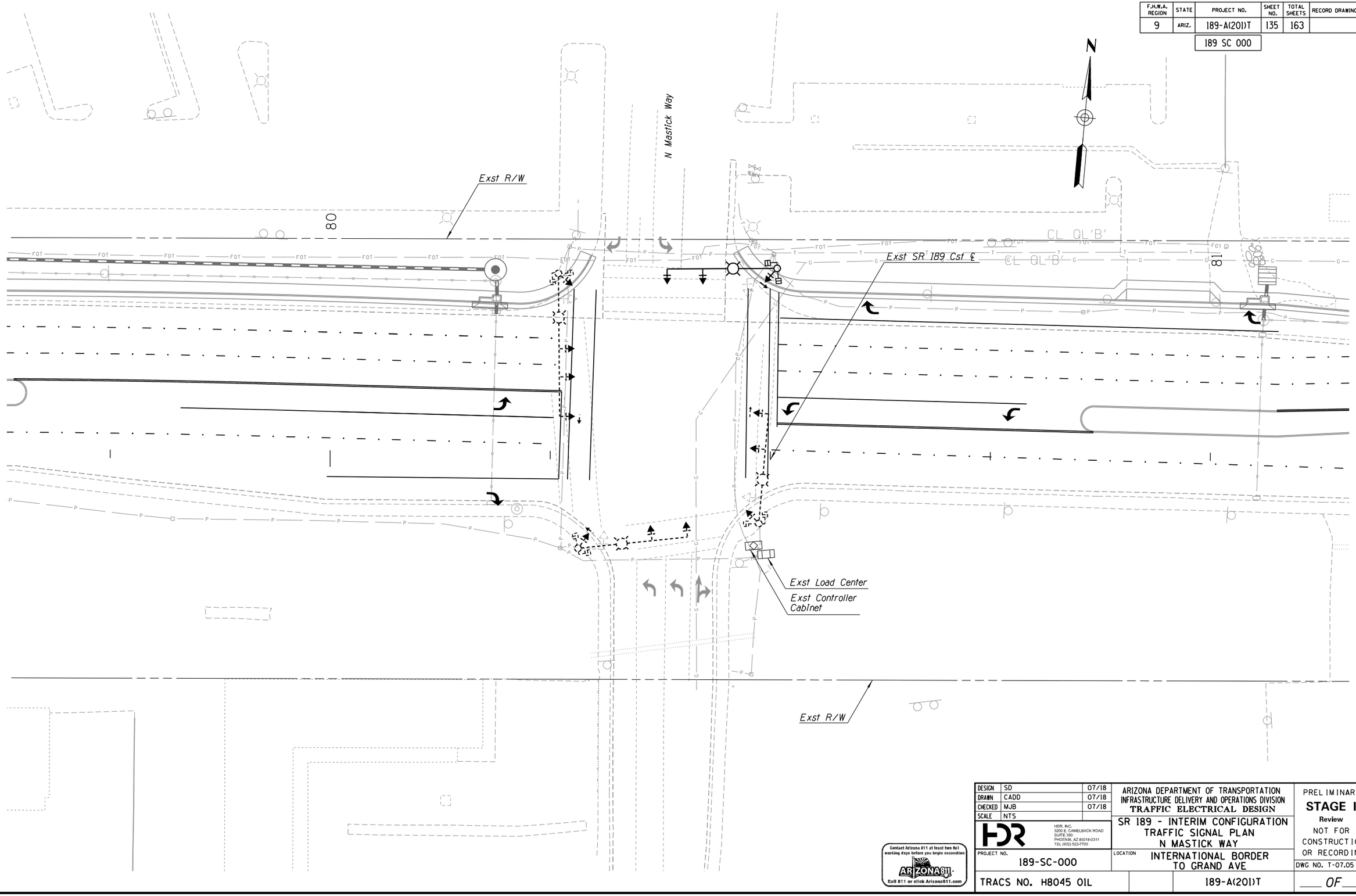
FILE NAME=c:\pwworking\phx\d0486934\h8045ts401.dgn PLOT DATE=Jul 24, 2018 TIME=10:52:20 AM PLOT SCALE=1:40.0448 PLOT BY=AHOFFMAN

NO.	DESCRIPTION OF REVISION	DATE	MADE BY
NO.1			
NO.2			

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	135	163	

189 SC 000



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ARIZONA811
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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
N MASTICK WAY

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-07.05

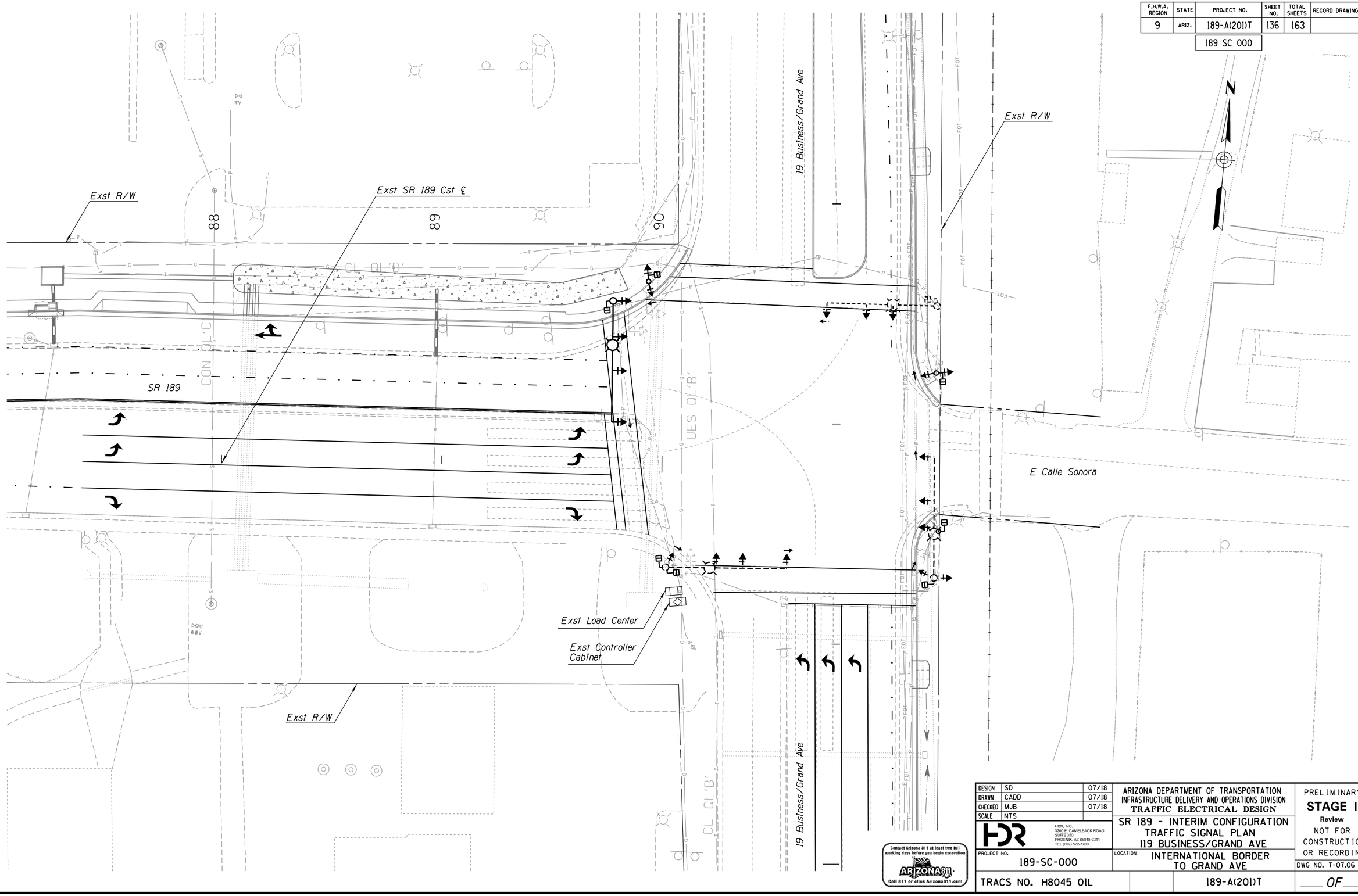
___ OF ___

NO.| DESCRIPTION OF REVISION | MADE BY | DATE

FILE NAME=c:\pwworking\phx\d0486934\h8045ts501.dgn PLOT DATE=Jul. 24, 2018 TIME=10:52:32 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	136	163	

189 SC 000



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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - INTERIM CONFIGURATION
TRAFFIC SIGNAL PLAN
119 BUSINESS/GRAND AVE

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

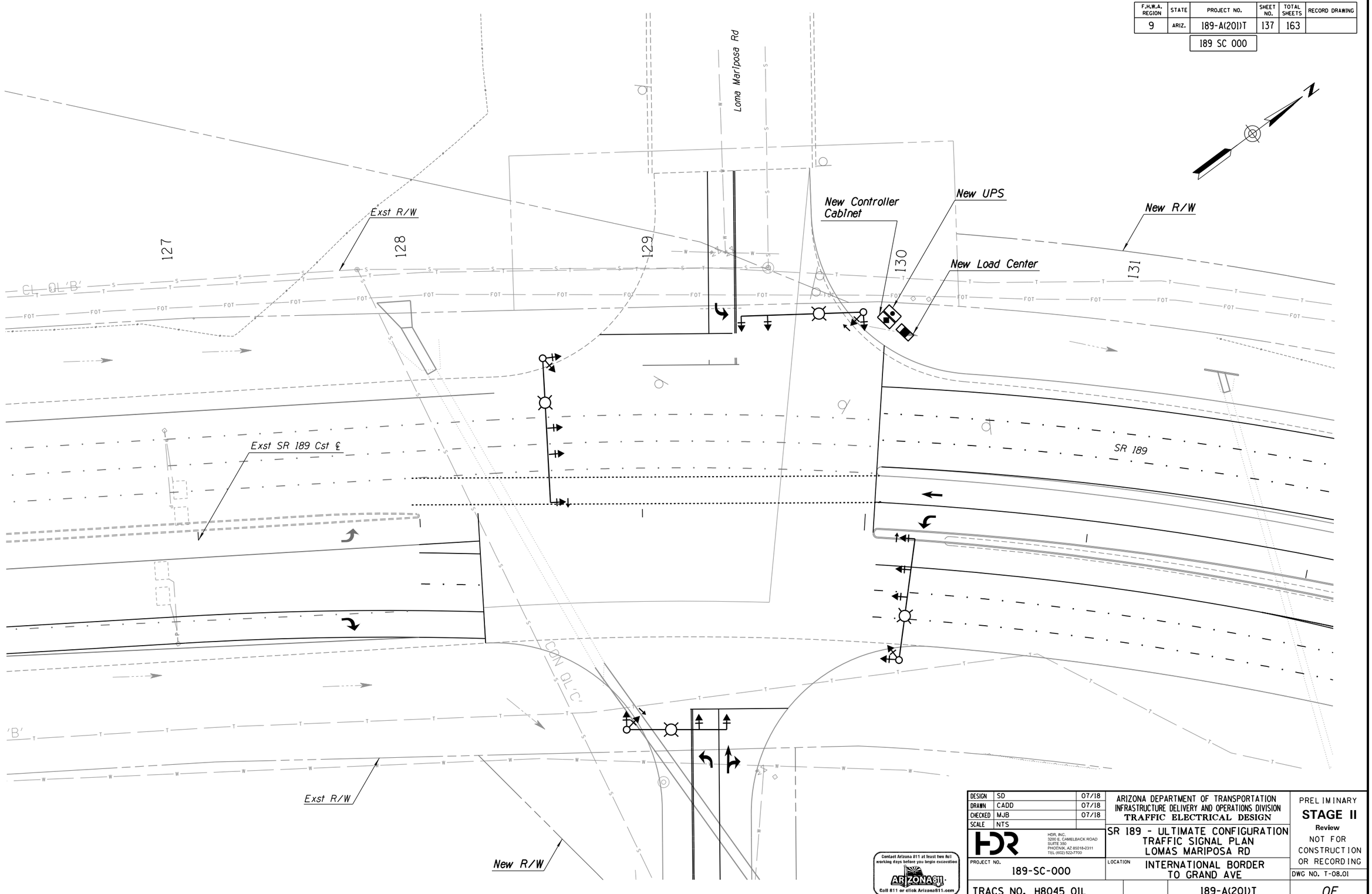
DWG NO. T-07.06

___ OF ___

NO.| DESCRIPTION OF REVISION | DATE | MADE BY

FILE NAME=c:\pwworking\phx\d0486934\h8045ts601.dgn PLOT DATE=Jul. 24, 2018 TIME=10:52:42 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	137	163	
		189 SC 000			



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ARIZONA811
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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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PROJECT NO. 189-SC-000

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - ULTIMATE CONFIGURATION
TRAFFIC SIGNAL PLAN
LOMAS MARIPOSA RD

LOCATION: INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

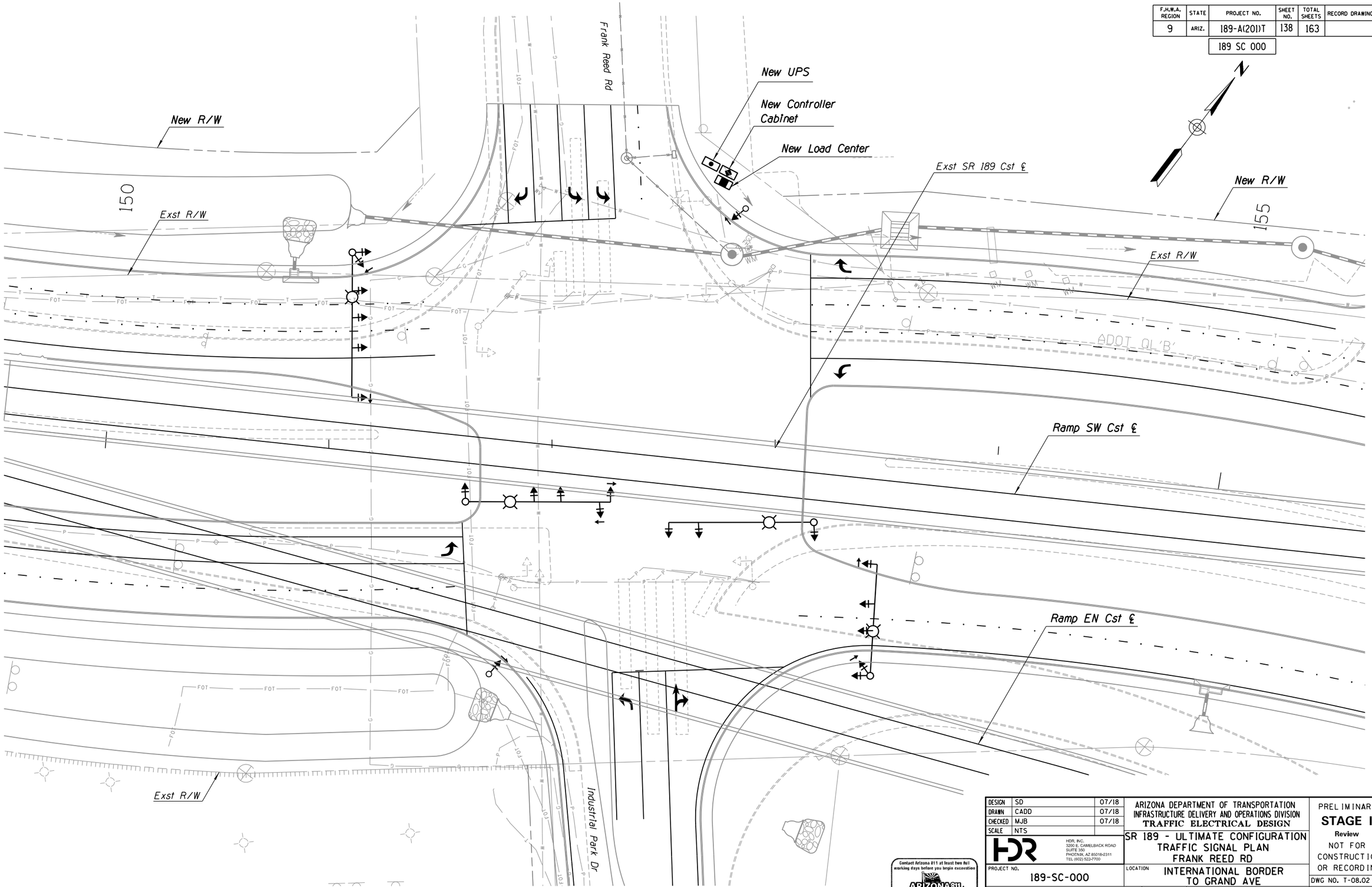
DWG NO. T-08.01

___ OF ___

NO. | DESCRIPTION OF REVISION | DATE | MADE BY

FILE NAME=c:\pwworking\phx\d0487473\h8045tsult01.dgn PLOT DATE=Jul. 24, 2018 TIME=10:52:53 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	138	163	
		189 SC 000			



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ARIZONA811
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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - ULTIMATE CONFIGURATION
TRAFFIC SIGNAL PLAN
FRANK REED RD

PROJECT NO. 189-SC-000

LOCATION INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-08.02

___ OF ___

NO.1 | DESCRIPTION OF REVISION | DATE | MADE BY | NO.2 | DATE | MADE BY

PLOT BY:AHOFFMAN PLOT SCALE:1:40 TIME:10:53:04 AM PLOT DATE:Jul, 24, 2018

FILE NAME:c:\pwworking\phx\d0487473\h8045tsu1t201.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	139	163	

189 SC 000

N

Exst I-19 Ramp A Cst ℄

Exst R/W

Exst R/W

Exst I-19 SB Cst ℄

Exst SR 189 Cst ℄

ADOT QL'B'

ADOT QL'B'

Exst I-19 Cst ℄

Exst I-19 Ramp D Cst ℄

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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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PROJECT NO. 189-SC-000

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - ULTIMATE CONFIGURATION
TRAFFIC SIGNAL PLAN
I-19/SR 189 SW

LOCATION: INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-08.03

___ OF ___

NO.| DESCRIPTION OF REVISION | MADE BY | DATE

FILE NAME:c:\pwworking\phx\d0487473\h8045sult301.dgn PLOT DATE:Jul. 24, 2018 TIME:10:53:14 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	140	163	
		189 SC 000			

Exst I-19 SB Cst ℄

Exst I-19 NB Cst ℄

Exst I-19 Ramp B Cst ℄

Exst Load Center

Exst UPS

Exst Controller Cabinet

Exst SR 189 Cst ℄

Exst I-19 Ramp D Cst ℄

Ramp EN Cst ℄

50 51 52 54 55

N

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DESIGN	SD	07/18
DRAWN	CADD	07/18
CHECKED	MJB	07/18
SCALE	NTS	

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PROJECT NO. 189-SC-000

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC ELECTRICAL DESIGN

SR 189 - ULTIMATE CONFIGURATION
TRAFFIC SIGNAL PLAN
I-19/SR 189 SE

LOCATION: INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. T-08.04

___ OF ___

NO.| DESCRIPTION OF REVISION | DATE | MADE BY

FILE NAME:c:\pwworking\phx\d0487473\h8045sult401.dgn PLOT DATE:Jul. 24, 2018 TIME:10:53:25 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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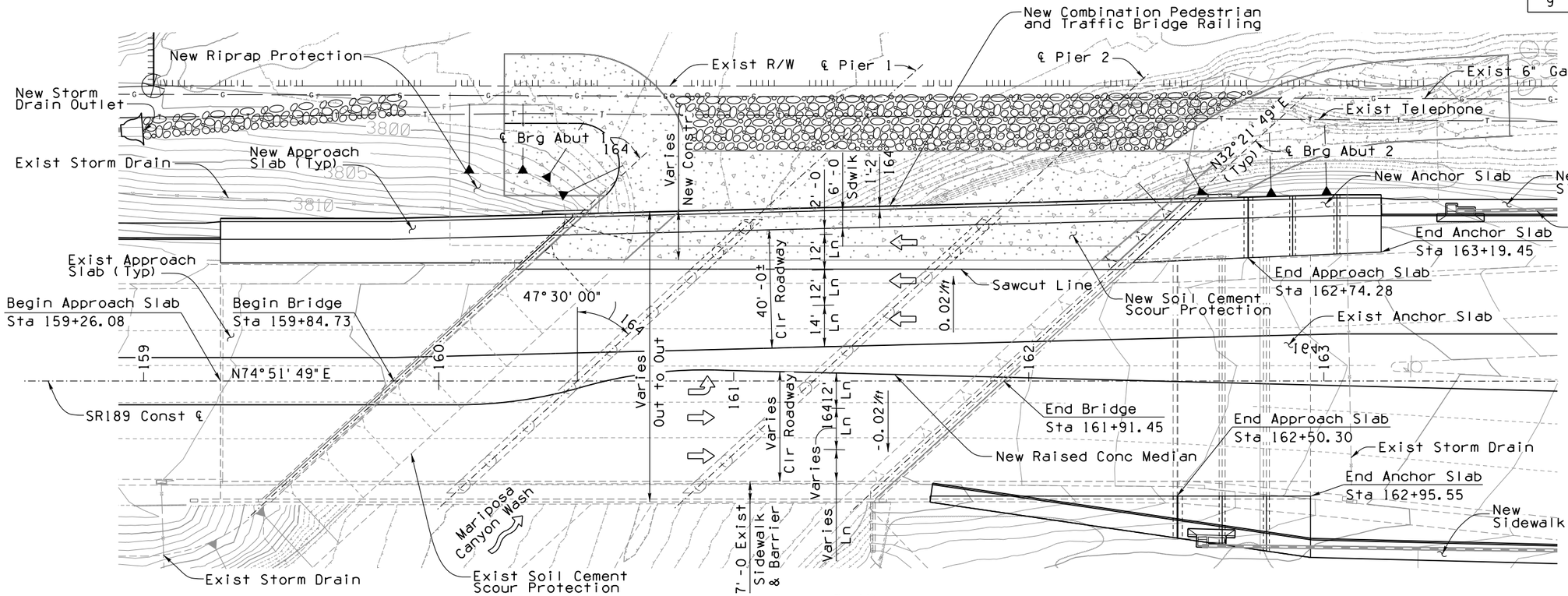
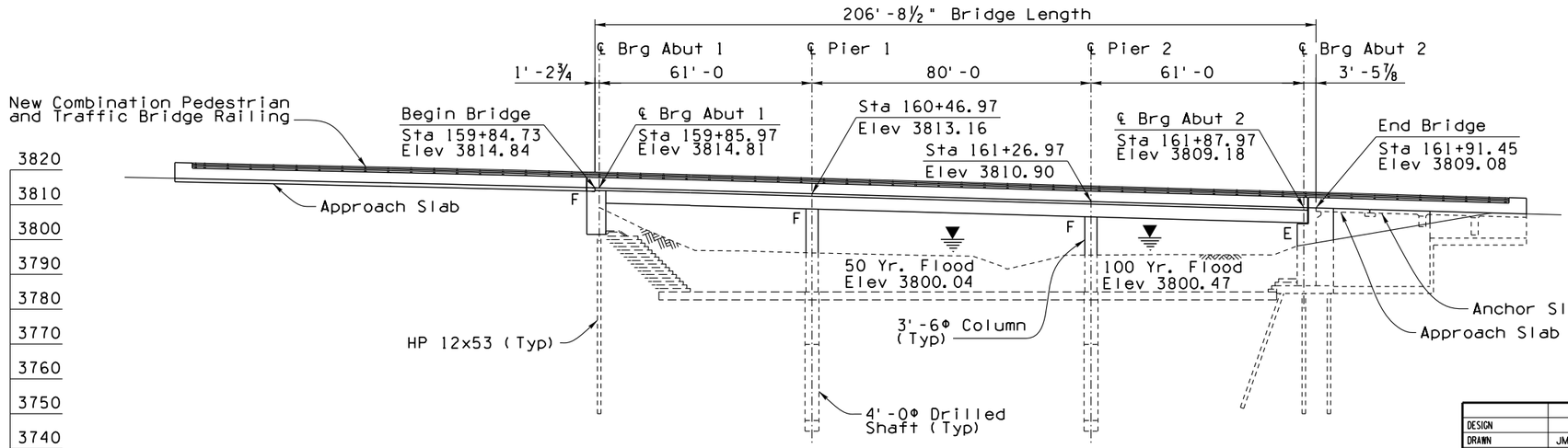
		189 SC 000			



PLAN

Widen 3 Span Concrete Box Girder Bridge
Skew 47°30'00" Rt
Scale: 1"=20'-0



SECTION THROUGH NEW CONSTRUCTION

Scale: 1"=20'-0
Stations and elevations are measured at construction centerline

NOTE:

1. The existing bridge was built in 1977 by the Arizona Highway department under Project No. FF-032-1(3) and widened in 1994 by the Arizona Department of Transportation under Project No. DE-032-1(5), Tracs No. H2974 01C.

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	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 159+
MARIPOSA CANYON BRIDGE NO 2
INTERIM PLAN & SECTION

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 189			INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L — 189-A(201)T

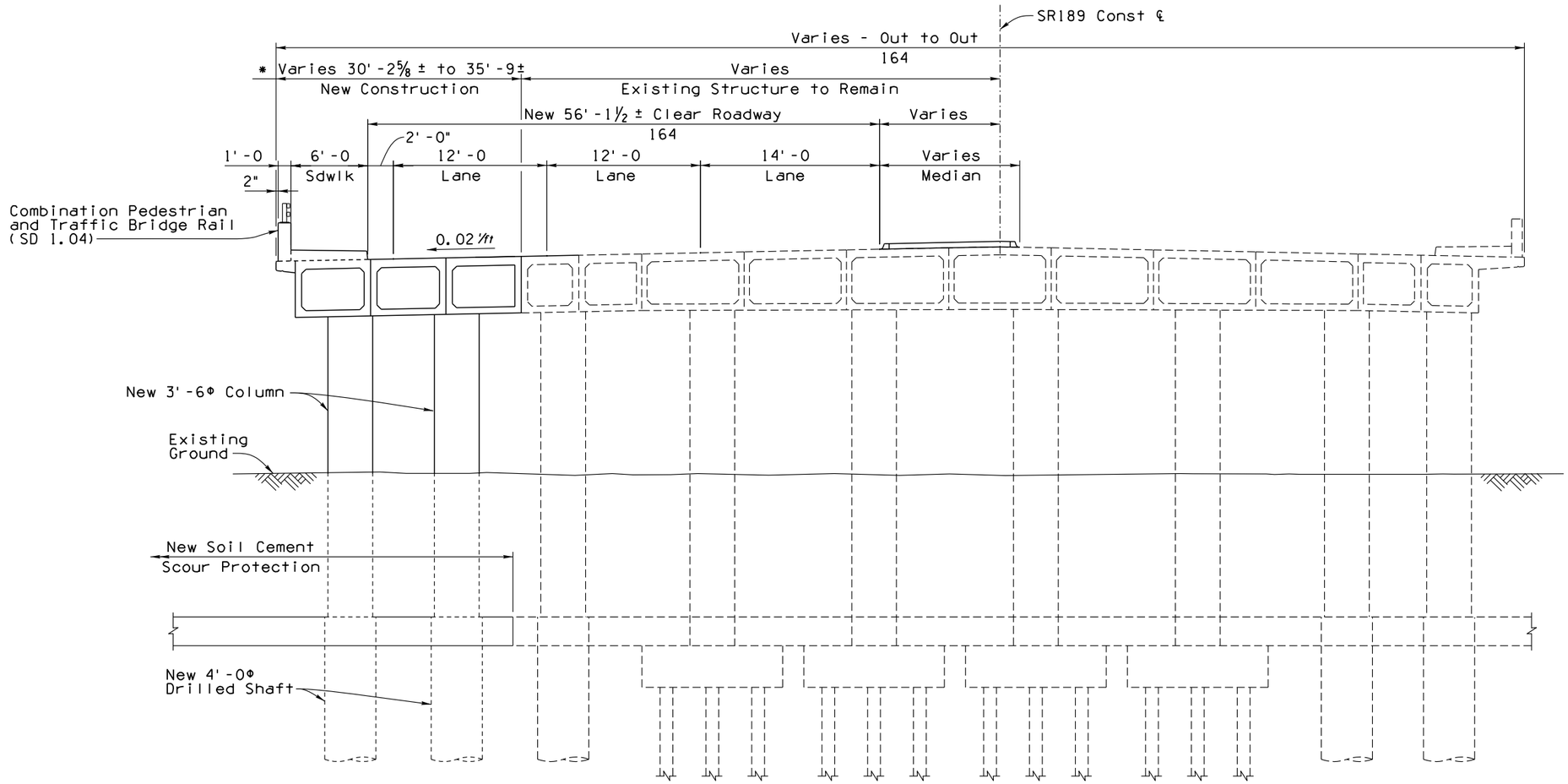
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-MGP1

___ OF ___

FILE NAME=c:\pwworking\phx\d0522164\s10mgp1.dgn PLOT DATE=Jul, 24, 2018 TIME=10:53:36 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

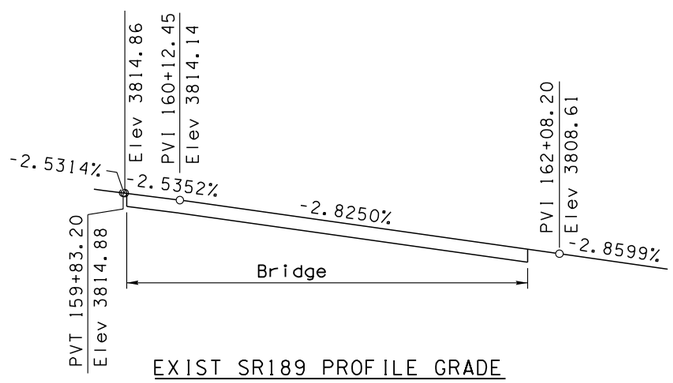
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	142	163	
		189 SC 000			



INTERIM MARIPOSA BRIDGE SECTION

Scale: 1"=5'-0

*Dimensions measured along the abutment centerline.



EXIST SR189 PROFILE GRADE

No Scale

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	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 159+
MARIPOSA CANYON BRIDGE NO 2
INTERIM TYPICAL SECTION

SR 189 (ROUTE) | MILEPOST | STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

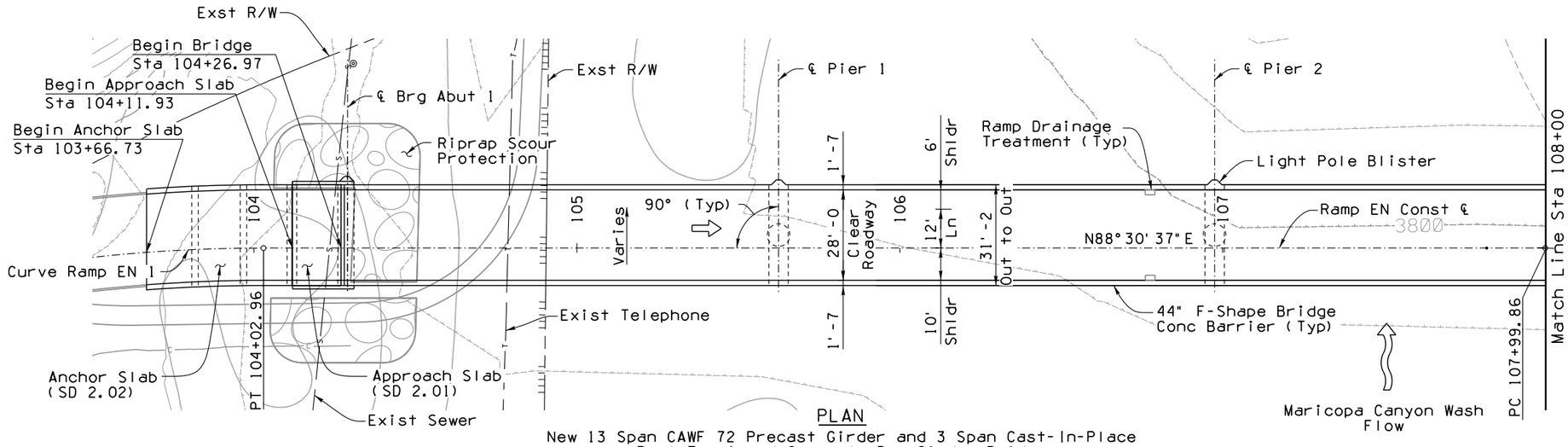
DWG NO. S-01.02

___ OF ___

FILE NAME:c:\pwwork\ng\phx\d0522164\s10mxs1.dgn PLOT DATE:Jul. 24, 2018 TIME:10:53:43 AM PLOT SCALE:1:10 PLOT BY:AHOFFMAN

SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE
SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	143	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place
Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'

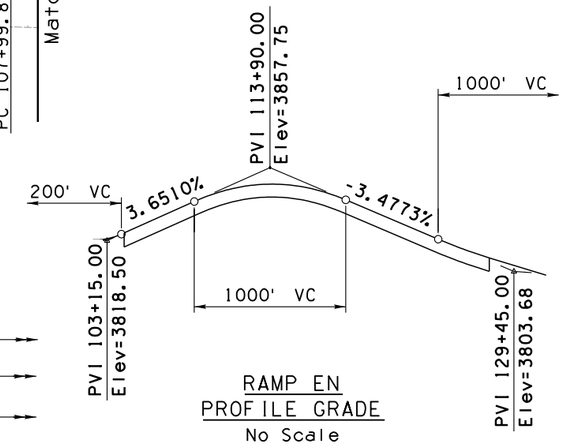
N

CURVE DATA
RAMP EN 1

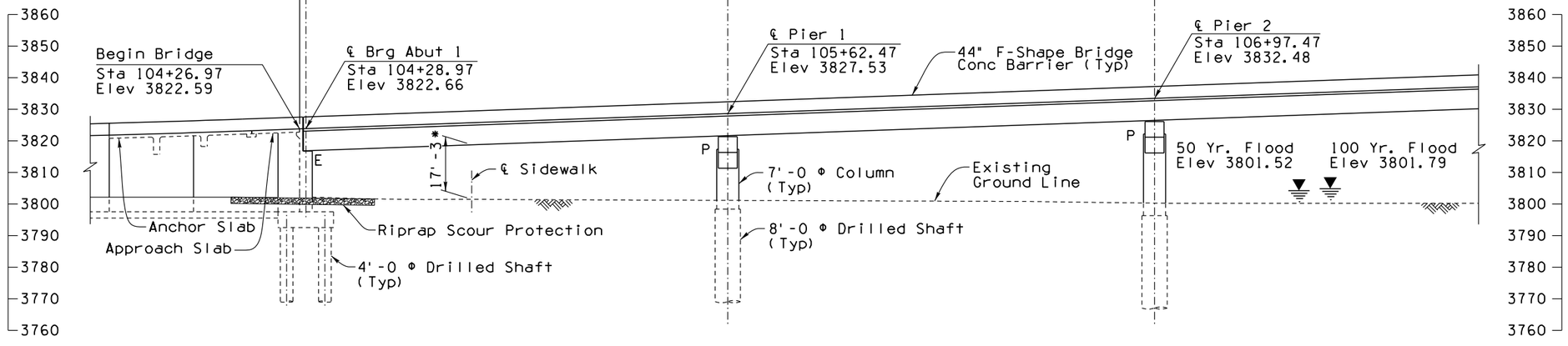
PC STA=101+78.13
PI STA=102+92.56
PT STA=104+02.96
Δ=26°17'22" R
D=11°41'35"
R=490.00'
T=114.43'
L=224.83'

CURVE DATA
RAMP EN 2

PC STA=107+99.86
PI STA=121+62.72
PT STA=127+19.98
Δ=104°46'33"Lt
D=5°27'24"
R=1050.00'
T=1362.86'
L=1920.12'



RAMP EN
PROFILE GRADE
No Scale



ELEVATION

Scale: 1"=20'
* Proposed Vertical Clearance

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	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN AND ELEV 1 OF 6

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

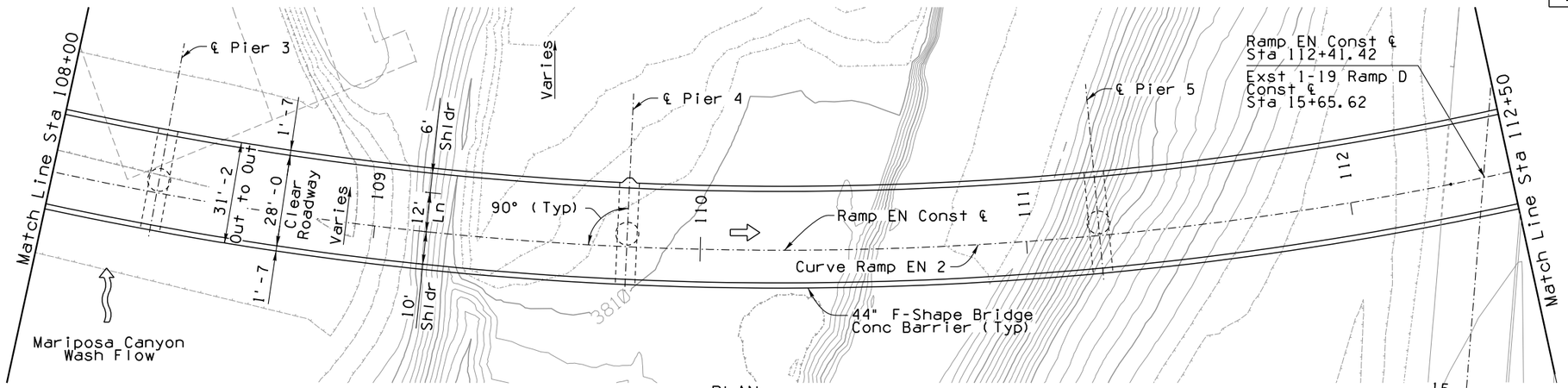
DWG NO. S-02.01

___ OF ___

FILE NAME=c:\pwworking\phx\d0522164\s10engpl.dgn PLOT DATE=Jul 24, 2018 TIME=10:53:55 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN

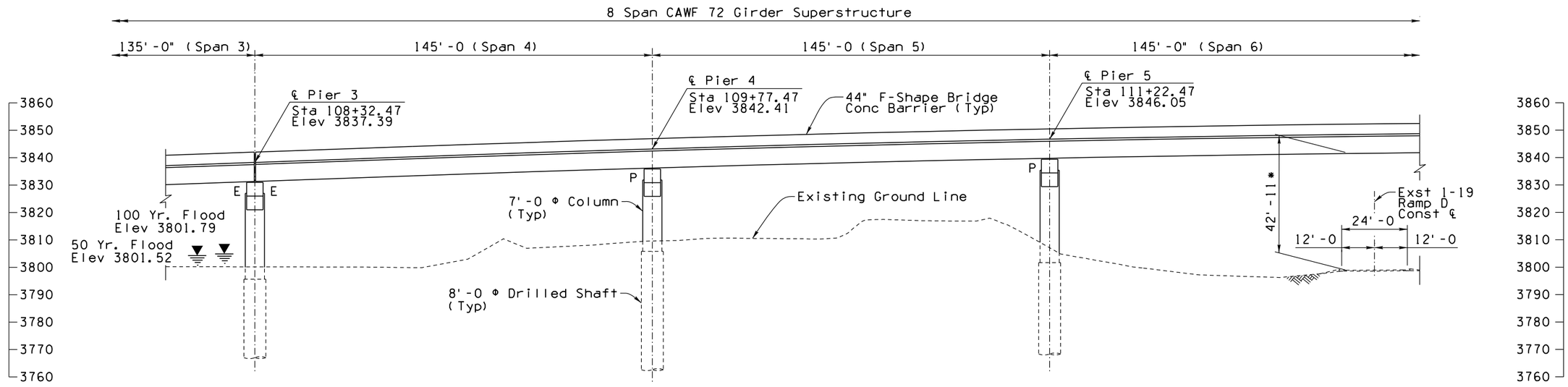
SURVEY NO.	FINISHED PLANS	REVISIONS	LOCATION	DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	144	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place
Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

* Proposed Vertical Clearance

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN AND ELEV 2 OF 6

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

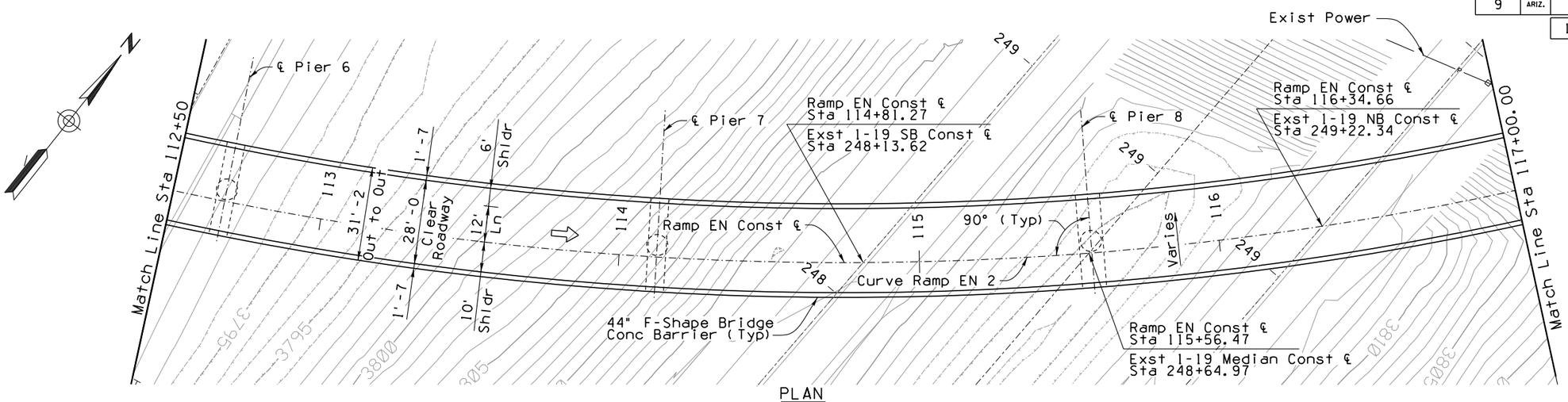
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02.02

___ OF ___

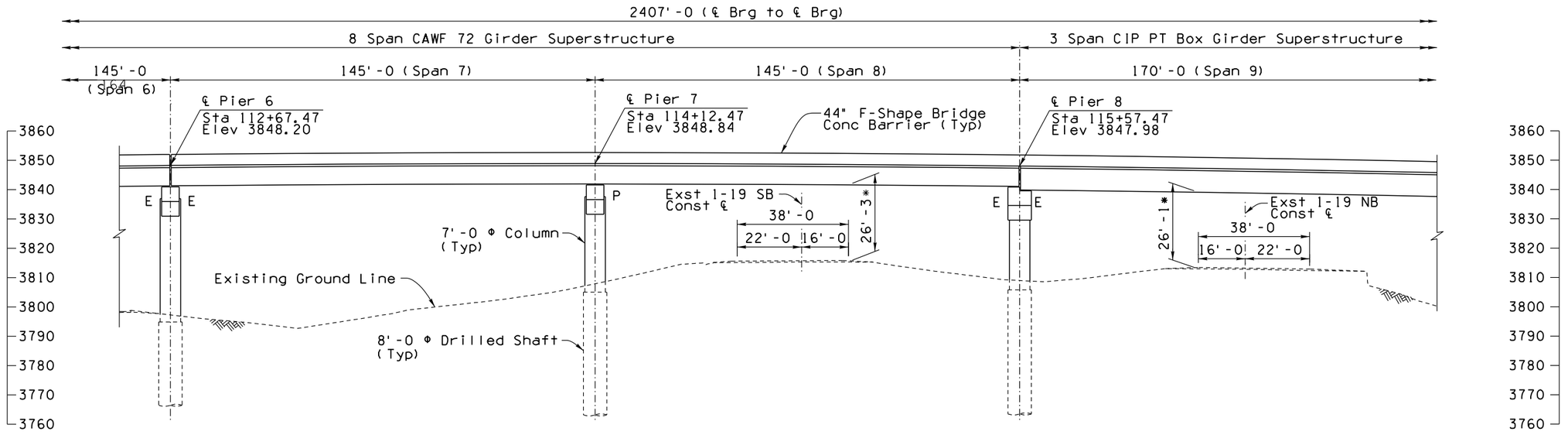
FILE NAME:c:\pwworking\phx\d0522164\s10ergp2.dgn PLOT DATE:Jul, 24, 2018 TIME:10:54:04 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	145	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

* Proposed Vertical Clearance

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN AND ELEV 3 OF 6

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

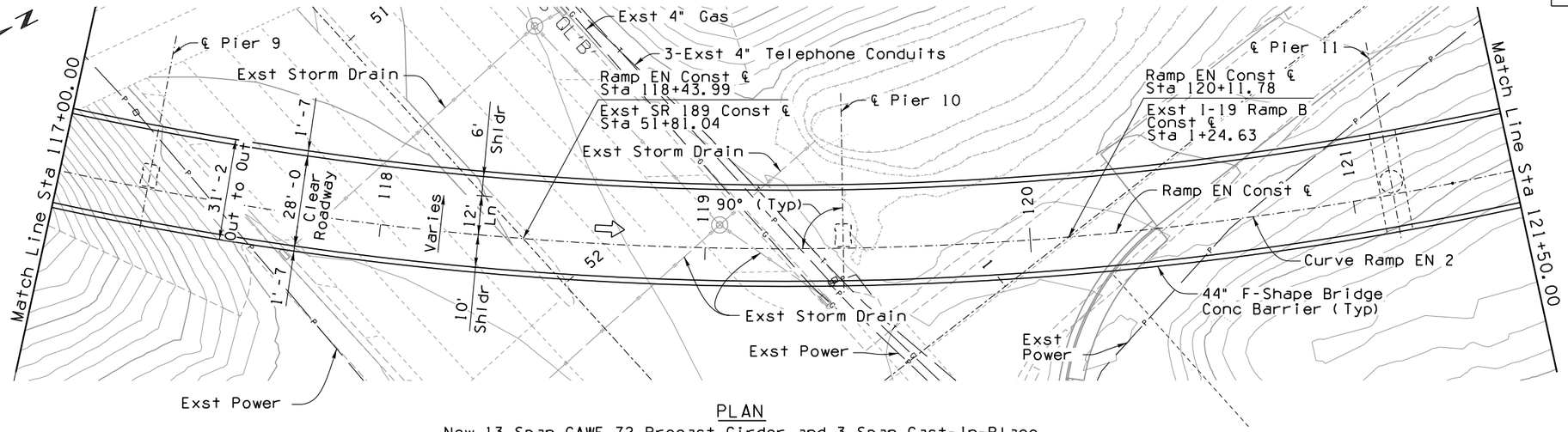
TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02.03

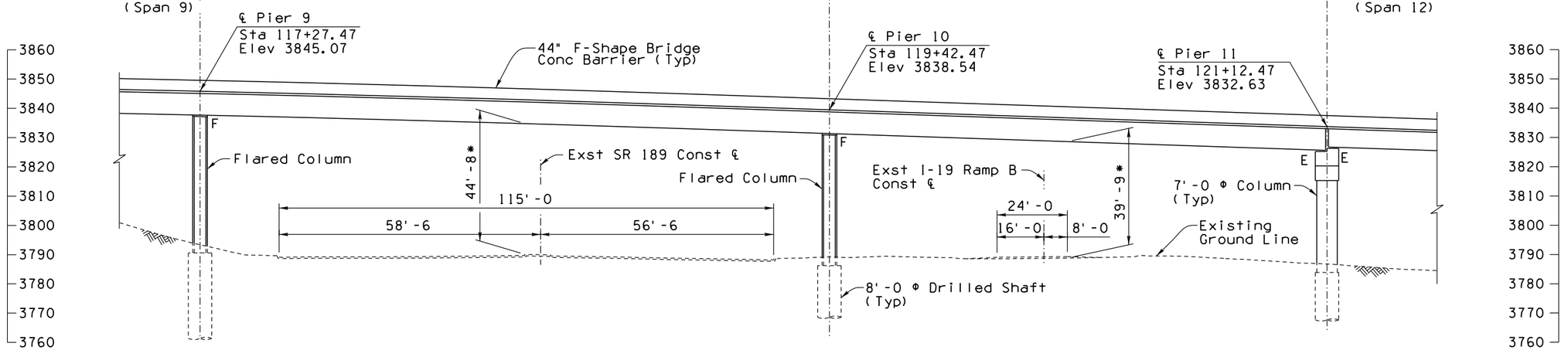
___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	146	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

* Proposed Vertical Clearance

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN AND ELEV 4 OF 6

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 189			INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L — 189-A(201)T

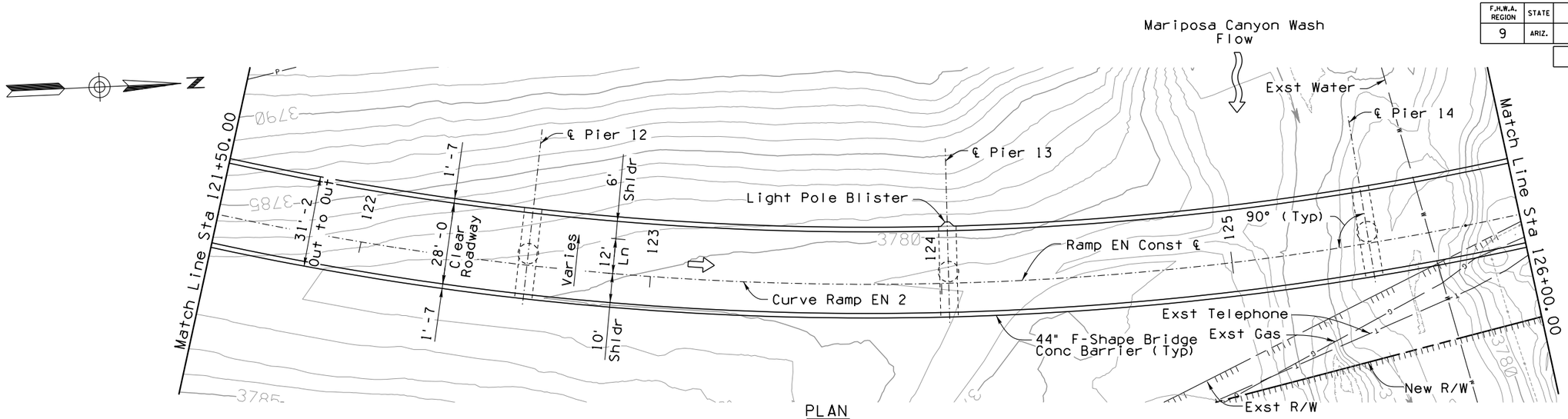
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02.04

___ OF ___

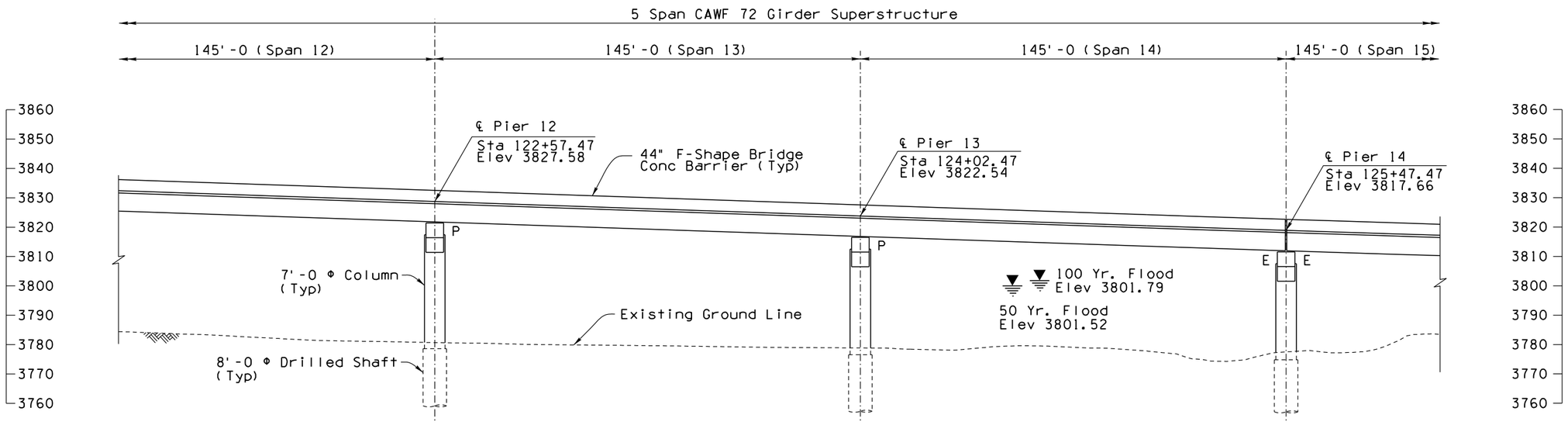
FILE NAME=c:\pwworking\phx\d0522164\s10engg4.dgn PLOT DATE=Jul. 24, 2018 TIME=10:54:24 AM PLOT SCALE=40.0163 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	147	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN & ELEV 5 OF 6

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L — 189-A(201)T

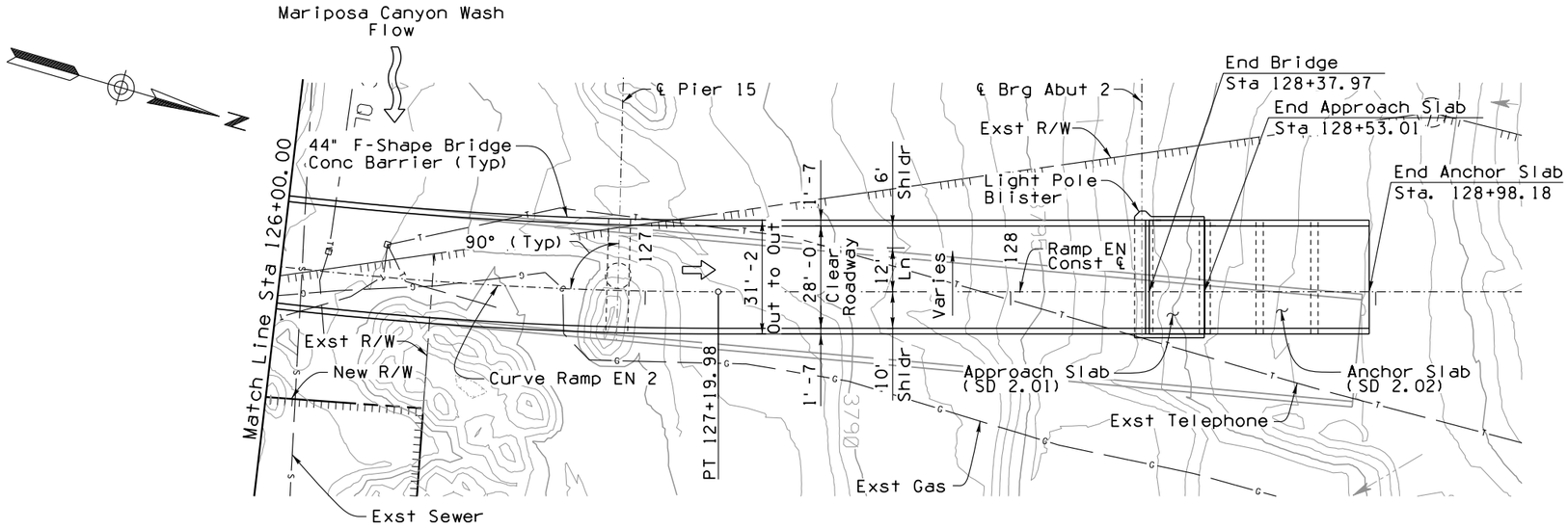
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02.05

____ OF ____

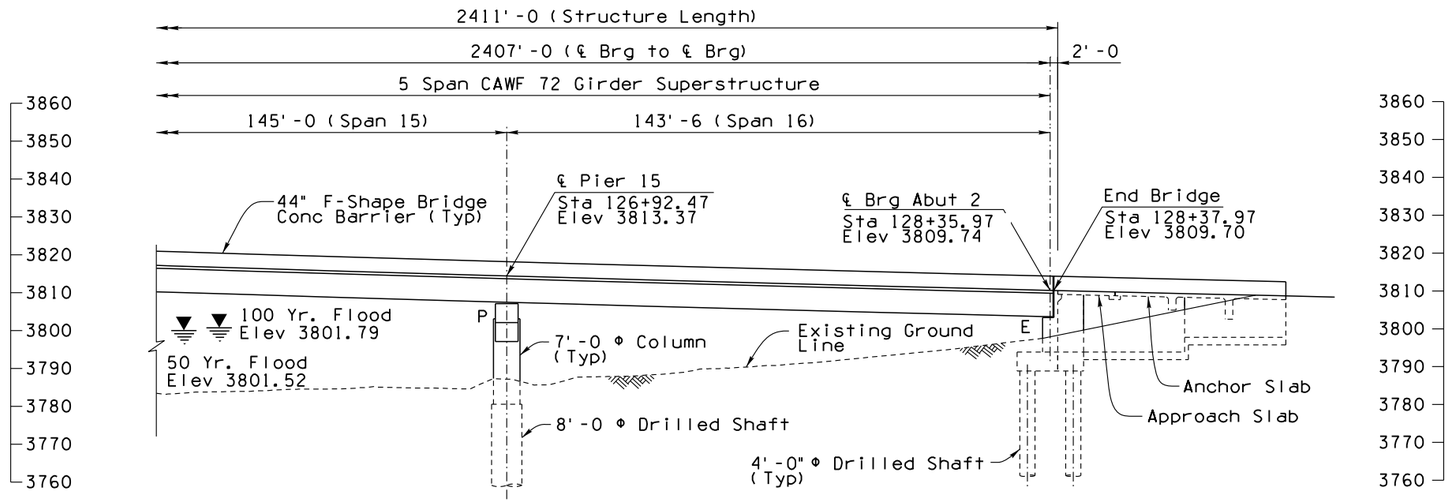
FILE NAME=c:\pworking\phx\d0522164\s10engp5.dgn PLOT DATE=Jul, 24, 2018 TIME=10:54:34 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	148	163	
		189 SC 000			



PLAN

New 13 Span CAWF 72 Precast Girder and 3 Span Cast-In-Place
Post-Tensioned Concrete Box Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
GENERAL PLAN AND ELEV 6 OF 6

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

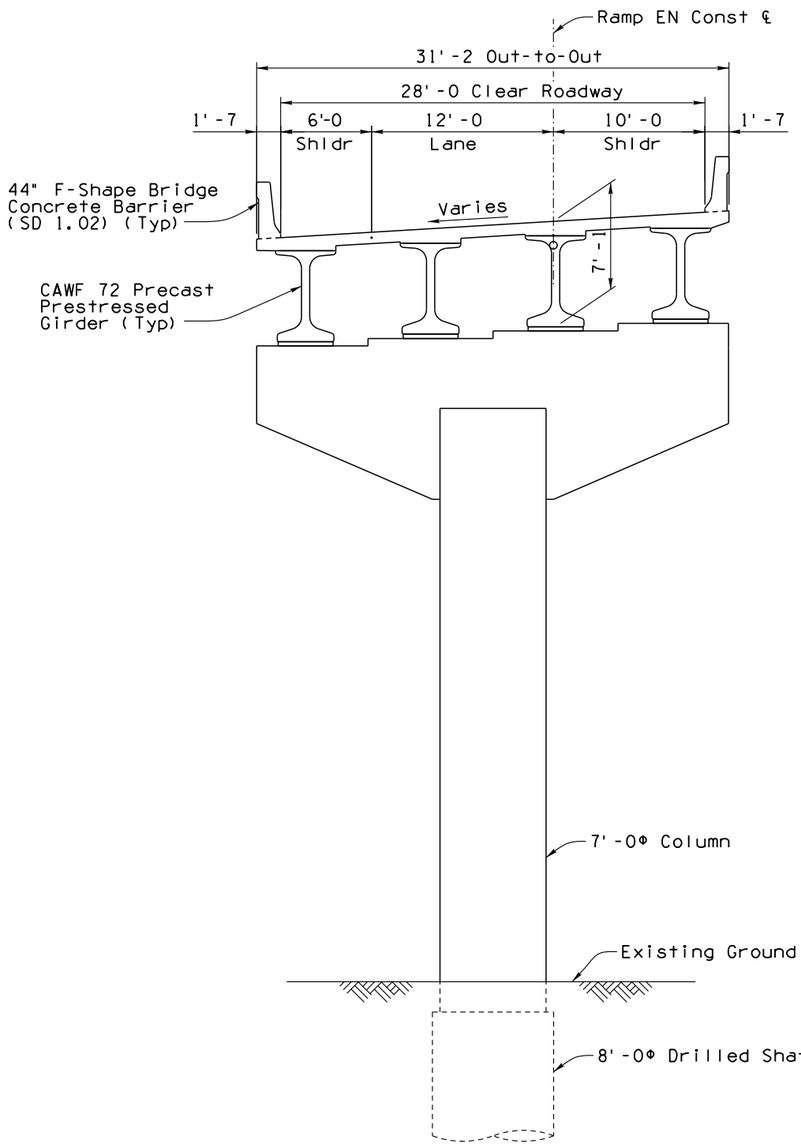
TRACS NO. H8045 01L | 189-A(201)T | ___ OF ___

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

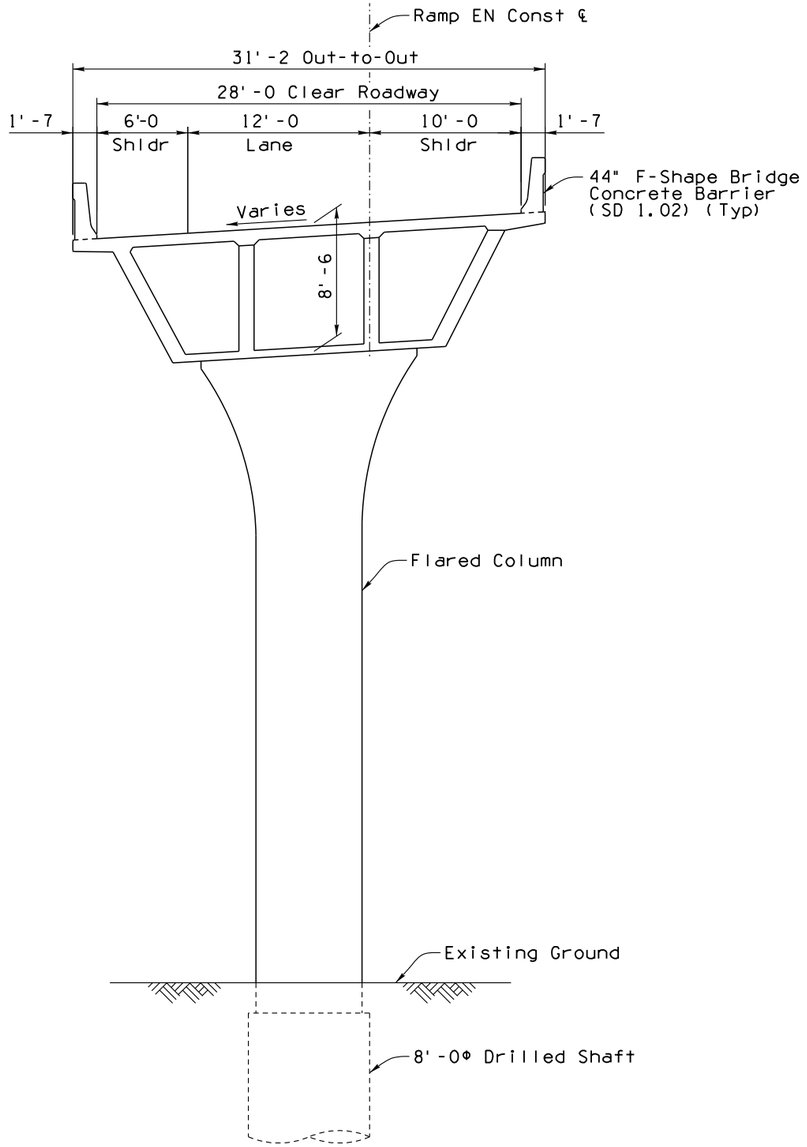
DWG NO. S-02.06

FILE NAME=c:\pworking\phx\d0522164\s10engp6.dgn PLOT DATE:Jul. 24, 2018 TIME:10:54:43 AM PLOT SCALE=1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

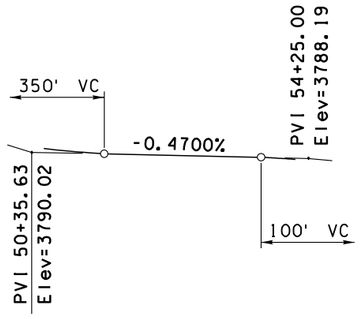
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	149	163	
		189 SC 000			



TYPICAL SECTION
SPANS 1-8 AND SPANS 12-16
Scale: 1"=5'-0



TYPICAL SECTION
SPANS 9-11
Scale: 1"=5'-0



EXST SR 189 CONST ℄
PROFILE GRADE
No Scale

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN	JXH, JPH	07/18
DRAWN	JMC, CG	07/18
CHECKED	JAP, JXH	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 104+
RAMP EN INTERIM
TYPICAL SECTION

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02-08

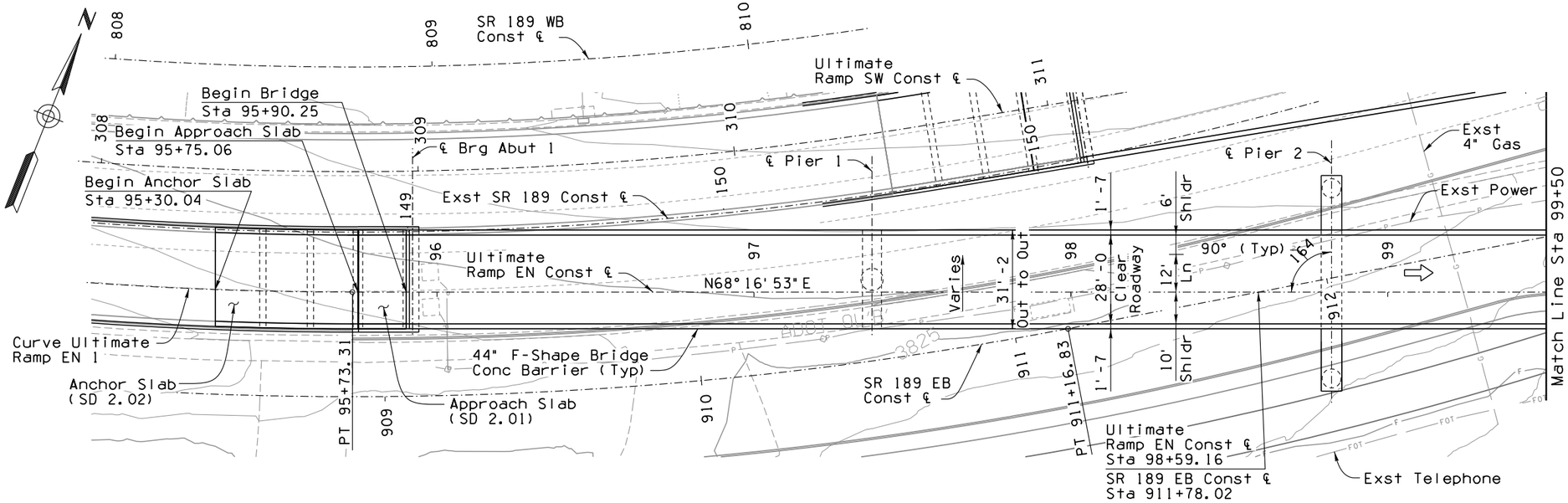
___ OF ___

FILE NAME:c:\pwworking\phx\d0522164\s10enxs1.dgn PLOT DATE:Jul, 24, 2018 TIME:10:54:50 AM PLOT SCALE:1:10 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

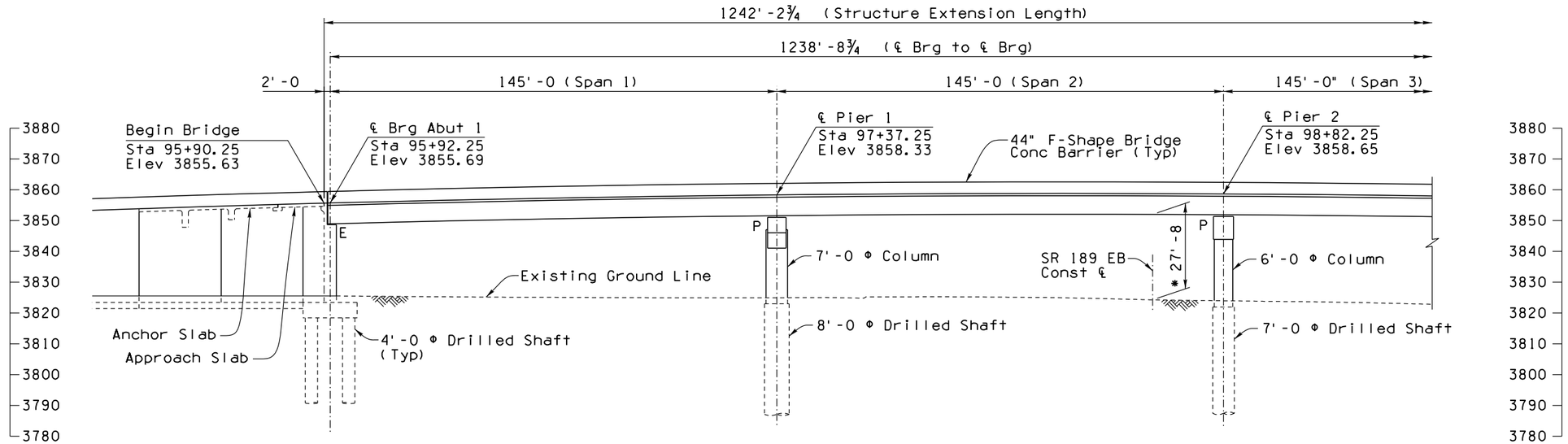
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	150	163	
		189 SC 000			

CURVE DATA
RAMP EN 1

PC STA=91+90.53
PI STA=93+83.66
PT STA=95+73.30
Δ=18°49'33" L
D=4°55'06"
R=1164.92'
T=193.12'
L=382.76'



PLAN
New 9 Span CAWF Precast Girder Bridge Extension
Skew = 0°
Scale: 1"=20'



ELEVATION
Scale: 1"=20'
* Proposed Vertical Clearance

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 95+
RAMP EN ULTIMATE
PLAN & ELEVATION 1 OF 3

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

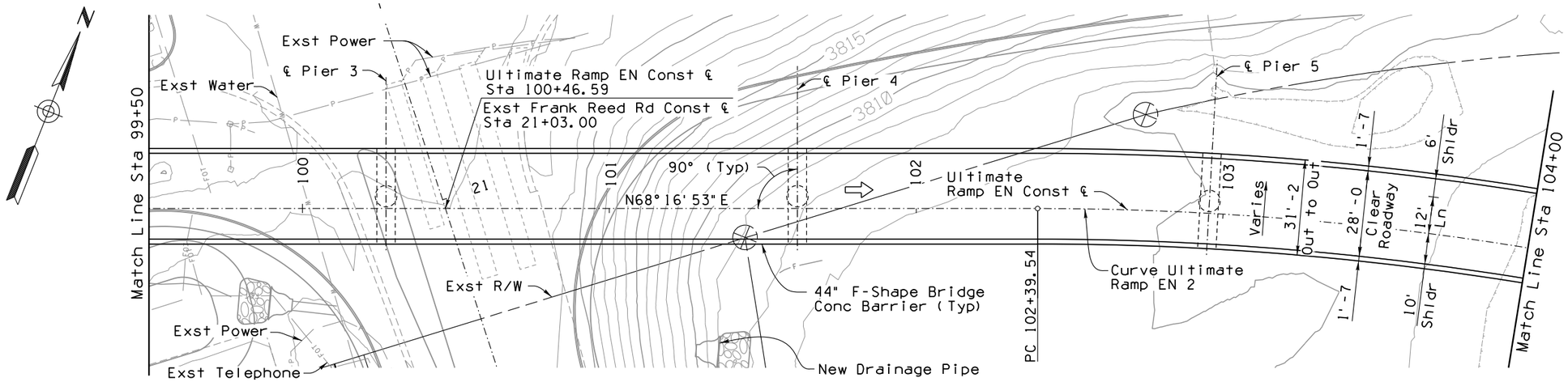
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-03.01

___ OF ___

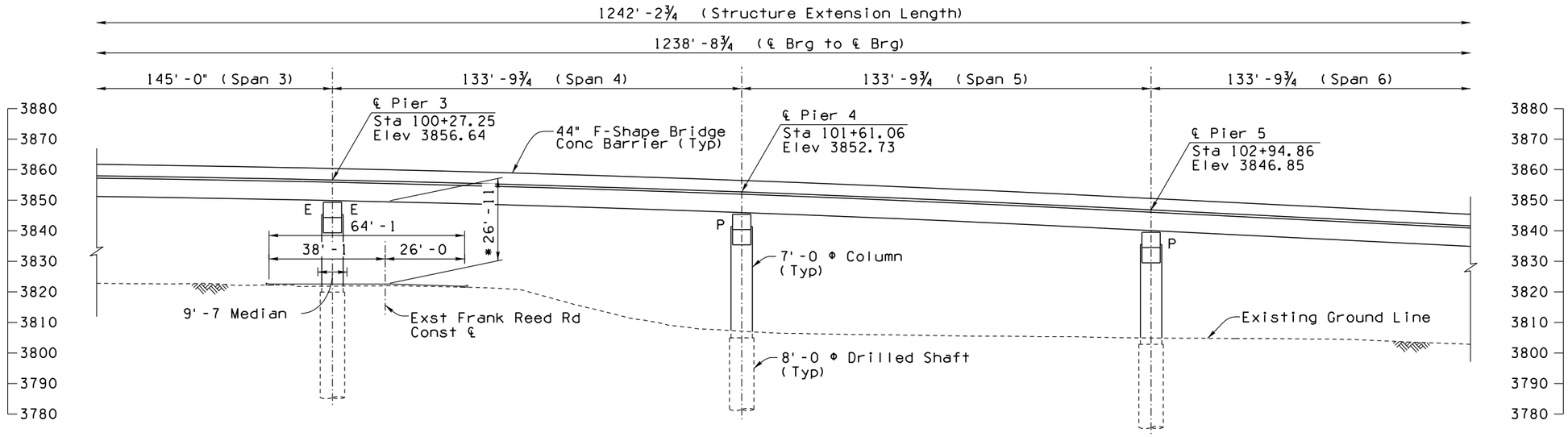
FILE NAME: c:\pwworking\phx\d0522165\s50engpl.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:55:05 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	151	163	
		189 SC 000			



PLAN

New 9 Span CAWF Precast Girder Bridge Extension
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

* Proposed Vertical Clearance

CURVE DATA
ULTIMATE RAMP
EN 2

PC STA=102+39.54
PI STA=104+17.92
PT STA=104+02.96
Δ=20°13'44" R
D=5°43'46"
R=1000.00'
T=178.39'
L=353.06'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 95+
RAMP EN ULTIMATE
PLAN & ELEVATION 2 OF 3

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

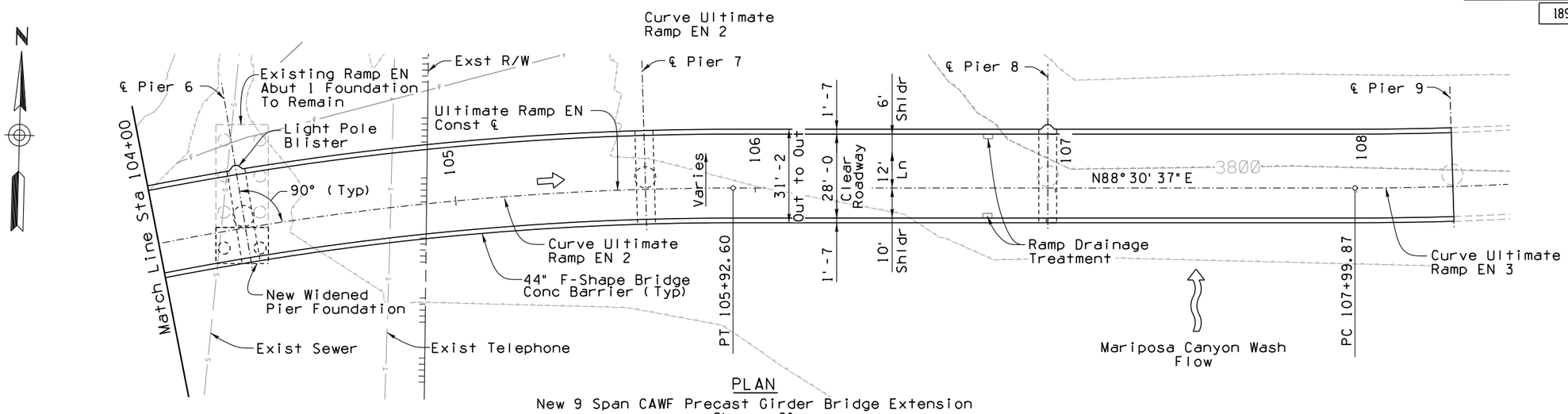
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-03.02

____ OF ____

FILE NAME: c:\pwworking\phx\d0522165\s50engp2.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:55:15 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	152	163	
		189 SC 000			



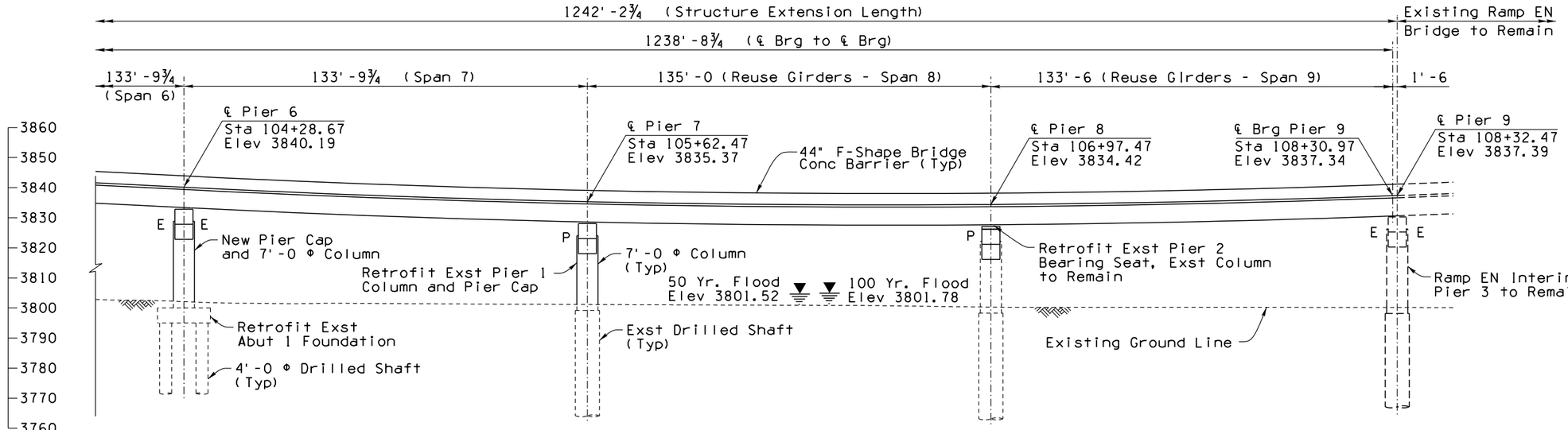
PLAN
New 9 Span CAWF Precast Girder Bridge Extension
Skew = 0°
Scale: 1" =20'

CURVE DATA
ULTIMATE RAMP
EN 2

PC STA=102+39.54
PI STA=104+17.92
PT STA=104+02.96
Δ=20°13'44" R
D=5°43'46"
R=1000.00'
T=178.39'
L=353.06'

CURVE DATA
ULTIMATE RAMP
EN 3

PC STA=107+99.87
PI STA=121+62.73
PT STA=127+19.99
Δ=104°46'33" Lt
D=5°27'24"
R=1050.00'
T=1362.86'
L=1920.12'



ELEVATION
Scale: 1" =20'

Note:
Precast girders for Spans 8 and 9
to be salvaged from EN Interim
Spans 2 and 3

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 95+
RAMP EN ULTIMATE
PLAN & ELEVATION 3 OF 3

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

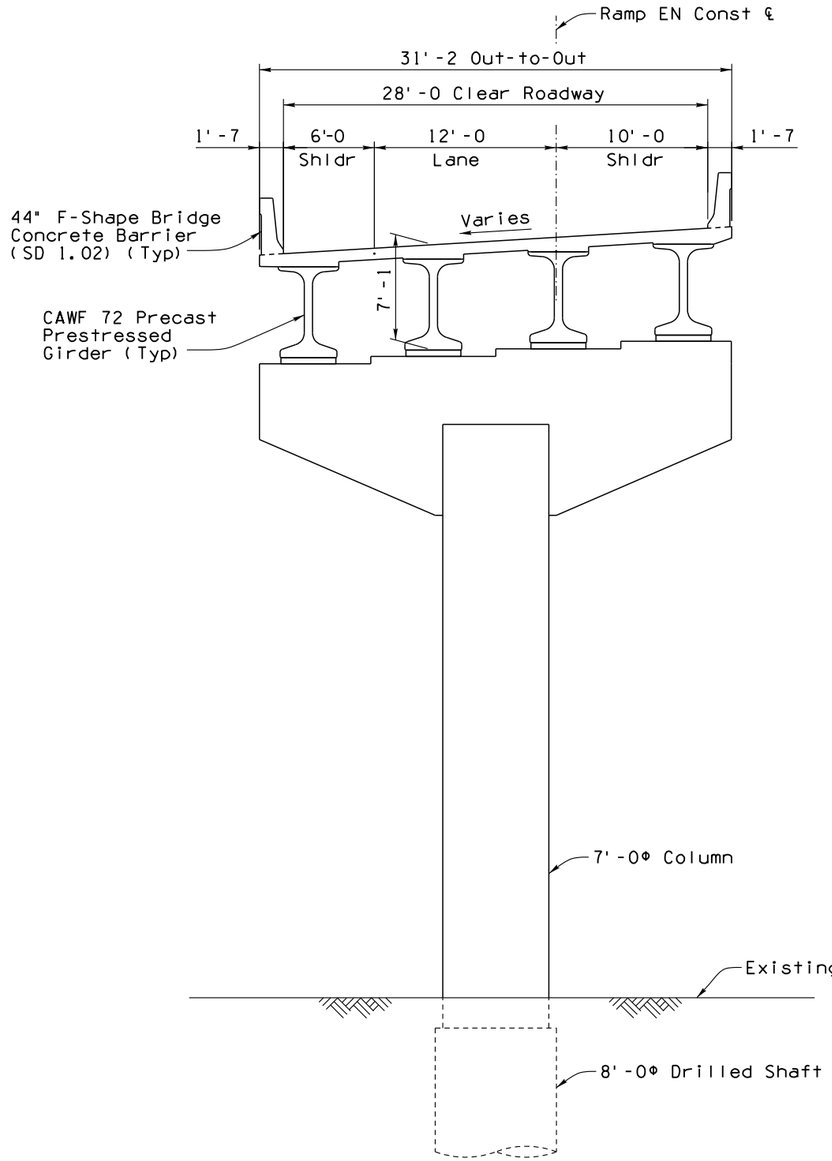
PRELIMINARY
STAGE II
Review
NOT FOR
CONSTRUCTION
OR RECORDING

DWG NO. S-03.03

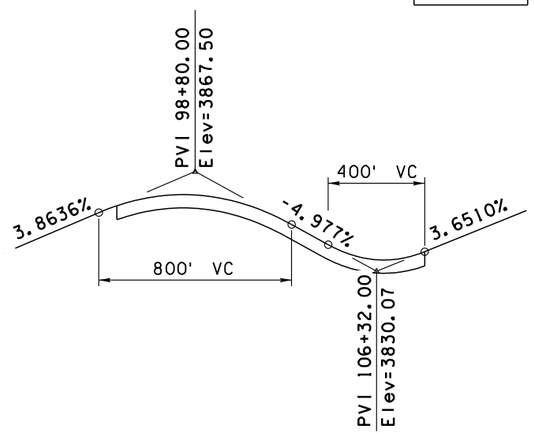
___ OF ___

FILE NAME=E:\pwworking\phx\d0522165\s50engp3.dgn PLOT DATE=Jul. 24, 2018 TIME=10:55:27 AM PLOT SCALE=1:40.0445 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

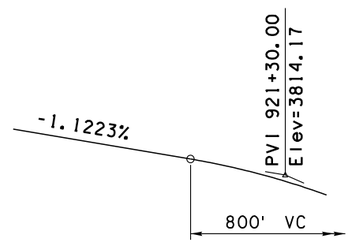
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	153	163	
		189 SC 000			



TYPICAL SECTION AT NEW PIER
Scale: 1"=5'-0



RAMP EN ULTIMATE
PROFILE GRADE
No Scale



SR 189 EB
PROFILE GRADE
No Scale

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 95+
RAMP EN ULTIMATE
TYPICAL SECTION

SR 189			LOCATION
ROUTE	MILEPOST	STRUCTURE NO.	INTERNATIONAL BORDER TO GRAND AVE

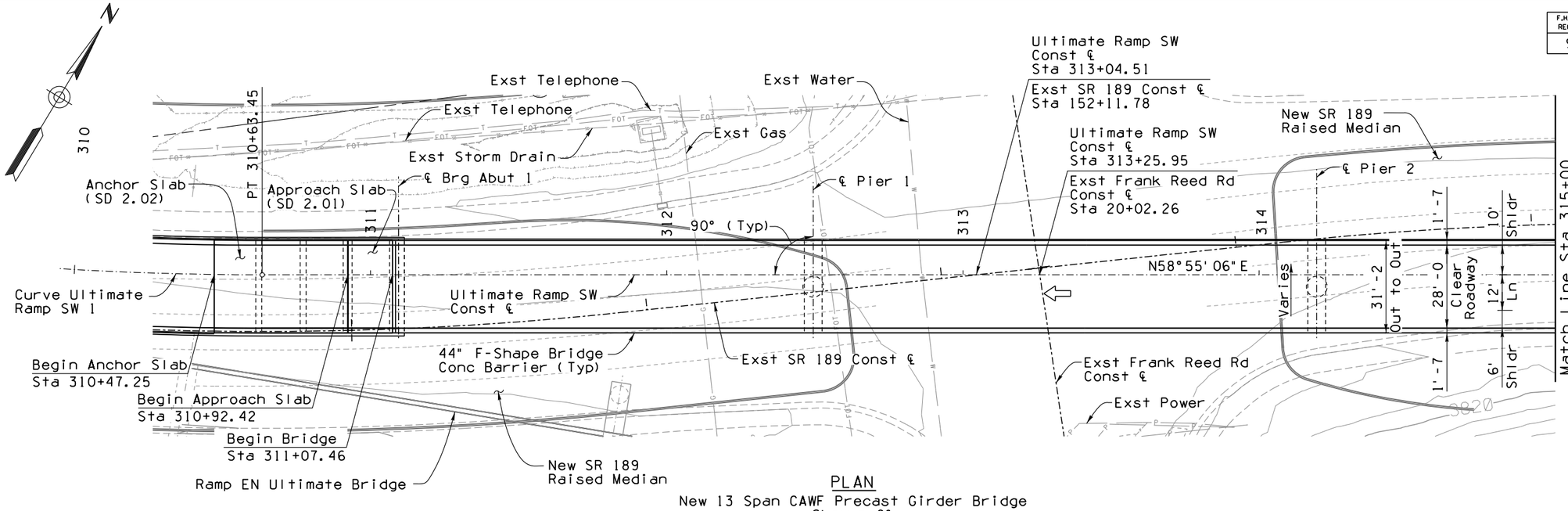
TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-03.04

___ OF ___

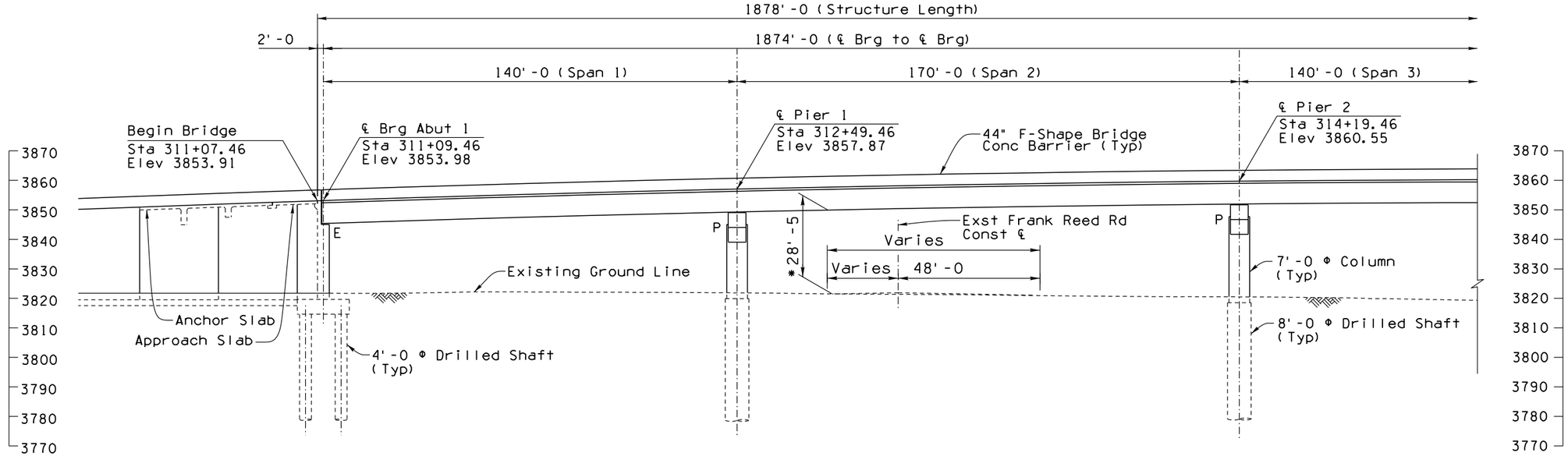
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	154	163	
		189 SC 000			



PLAN
New 13 Span CAWF Precast Girder Bridge
Skew = 0°
Scale: 1"=20'

CURVE DATA
ULTIMATE RAMP SW 1

PC STA=305+09.02
PI STA=307+91.96
PT STA=310+63.45
Δ=28°11'20" Lt
D=5°05'03"
R=1126.92'
T=282.95'
L=554.43'



ELEVATION
Scale: 1"=20'
* Proposed Vertical Clearance

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
GENERAL PLAN & ELEV 1 OF 5

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

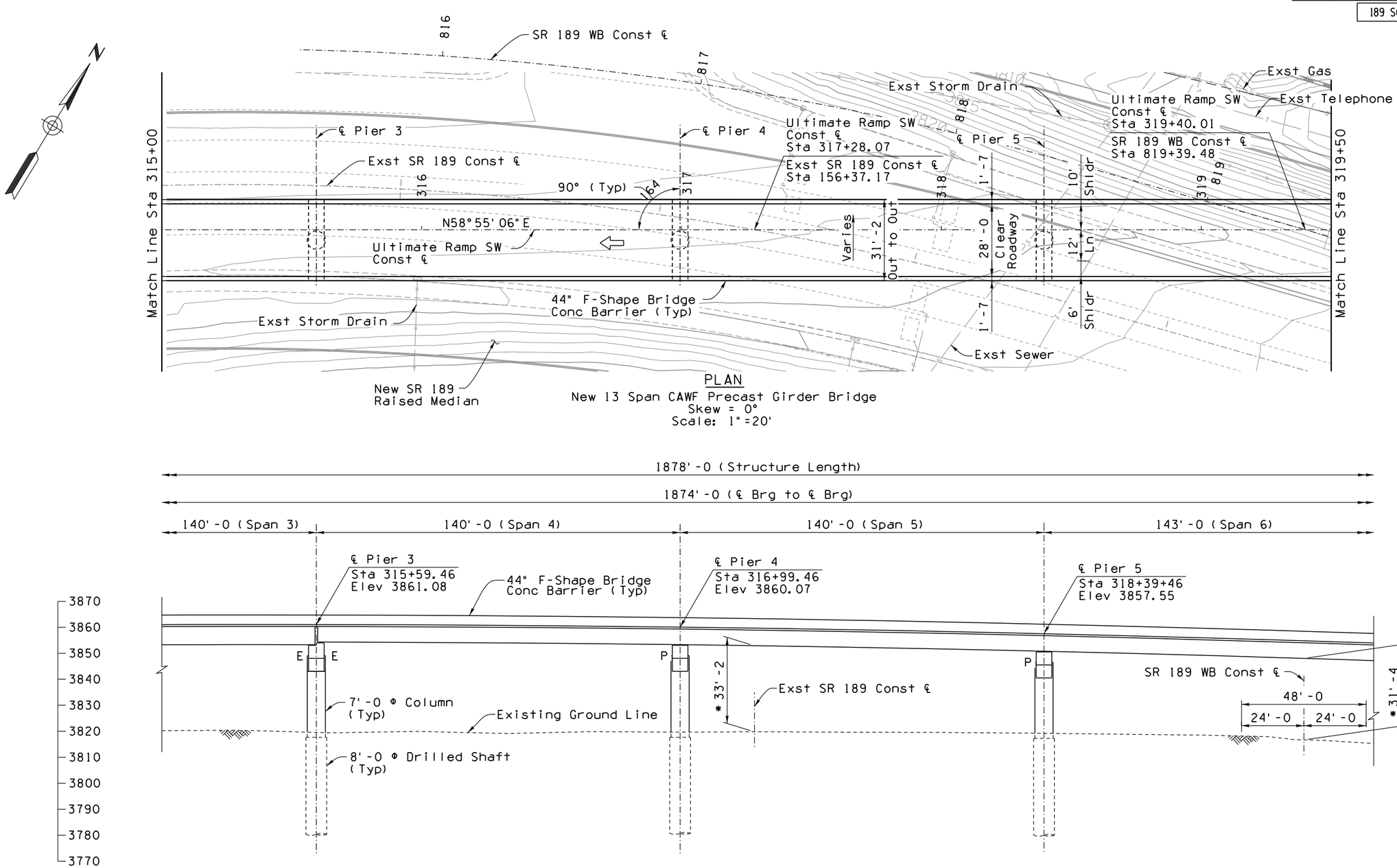
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-04.01

___ OF ___

FILE NAME=c:\pwworking\phx\d0522165\s50swgpl.dgn PLOT DATE=Jul, 24, 2018 TIME=10:55:43 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	155	163	
		189 SC 000			



PLAN
New 13 Span CAWF Precast Girder Bridge
Skew = 0°
Scale: 1"=20'

ELEVATION
Scale: 1"=20'
* Proposed Vertical Clearances

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
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PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
GENERAL PLAN & ELEV 2 OF 5

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

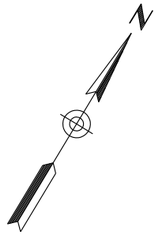
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

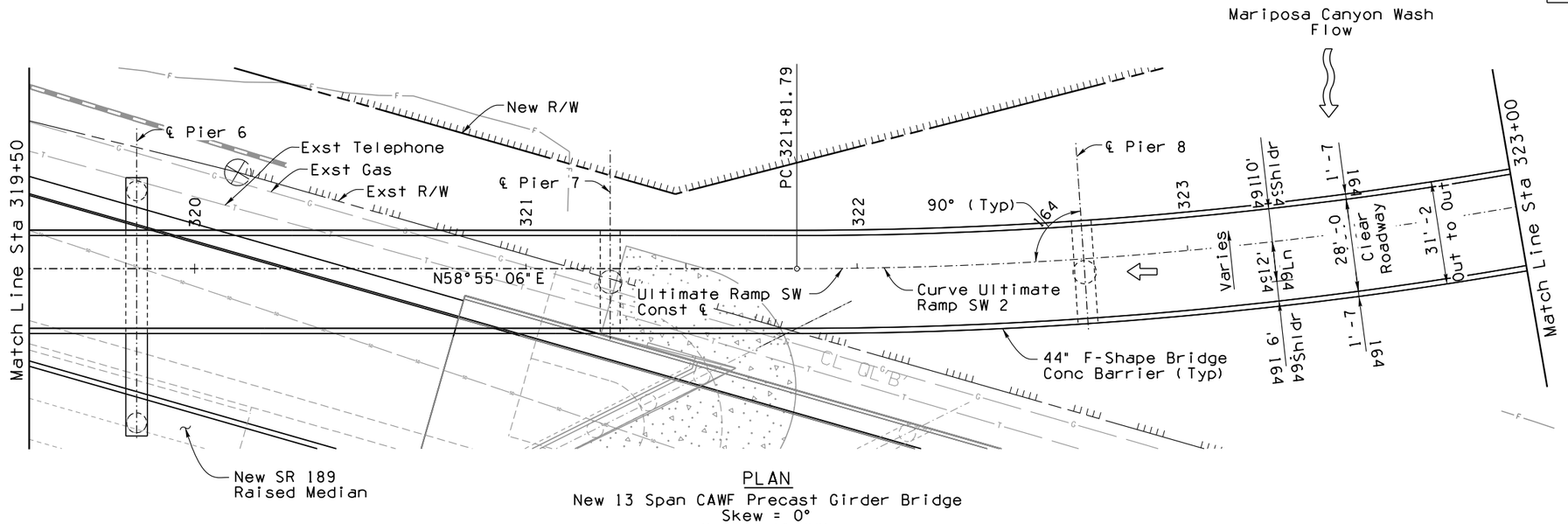
DWG NO. S-04.02

___ OF ___

FILE NAME: c:\pwworking\phx\d0522165\s50swgp2.dgn PLOT DATE: Jul, 24, 2018 TIME: 10:55:51 AM PLOT SCALE: 1:40 PLOT BY: AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	156	163	
		189 SC 000			

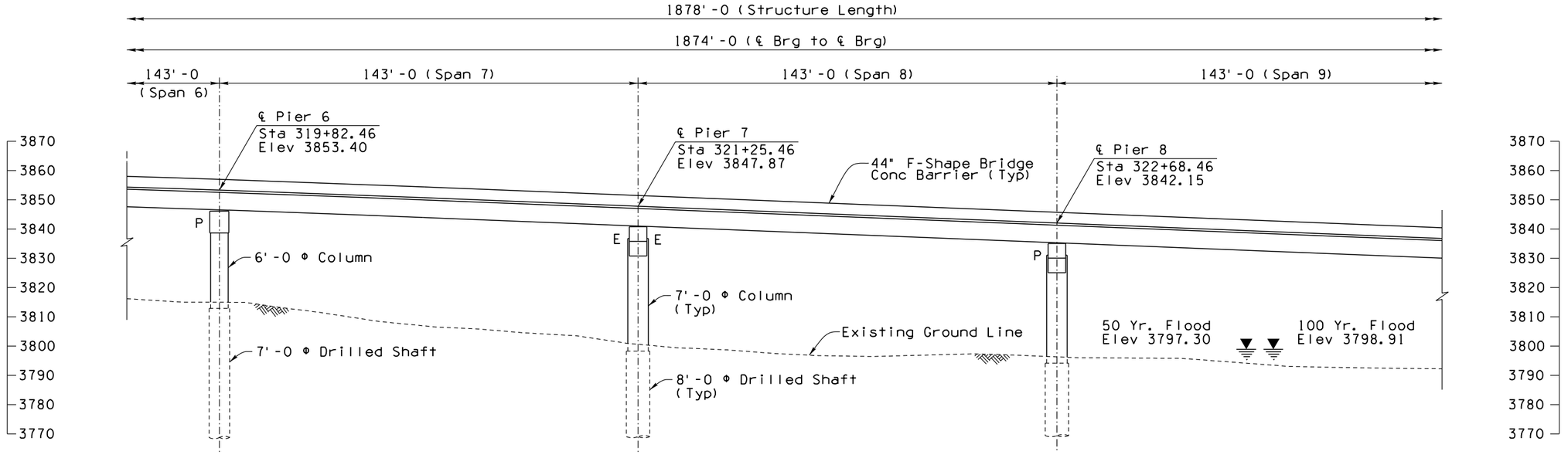




PLAN
New 13 Span CAWF Precast Girder Bridge
Skew = 0°
Scale: 1"=20'

CURVE DATA
ULTIMATE RAMP SW 2

PC STA=321+81.79
PI STA=326+66.88
PCC STA=331+08.71
Δ=41°43'10" Lt
D=4°30'03"
R=1273.00'
T=485.09'
L=926.92'



ELEVATION
Scale: 1"=20'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
GENERAL PLAN & ELEV 3 OF 5

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

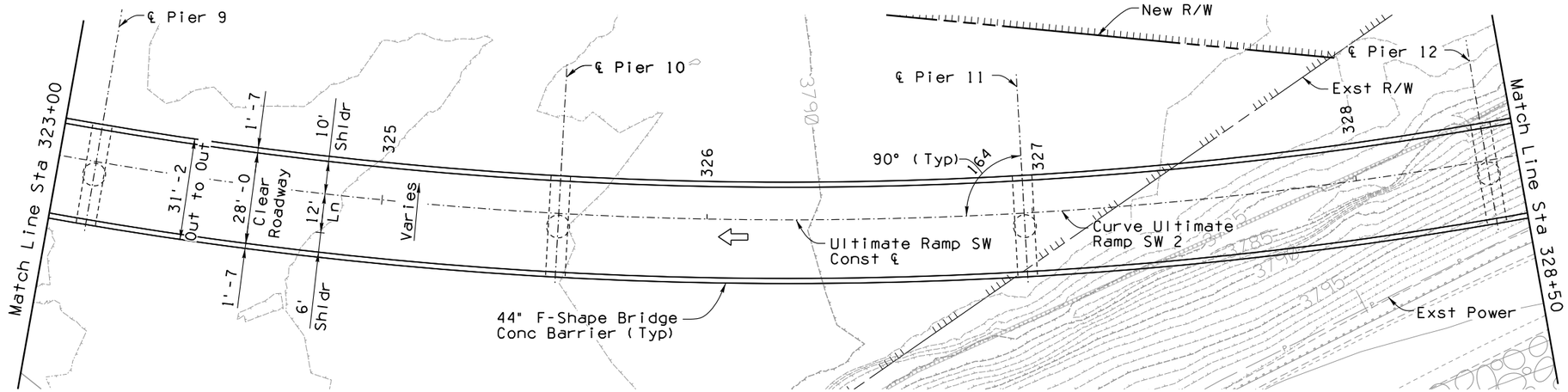
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-04.03

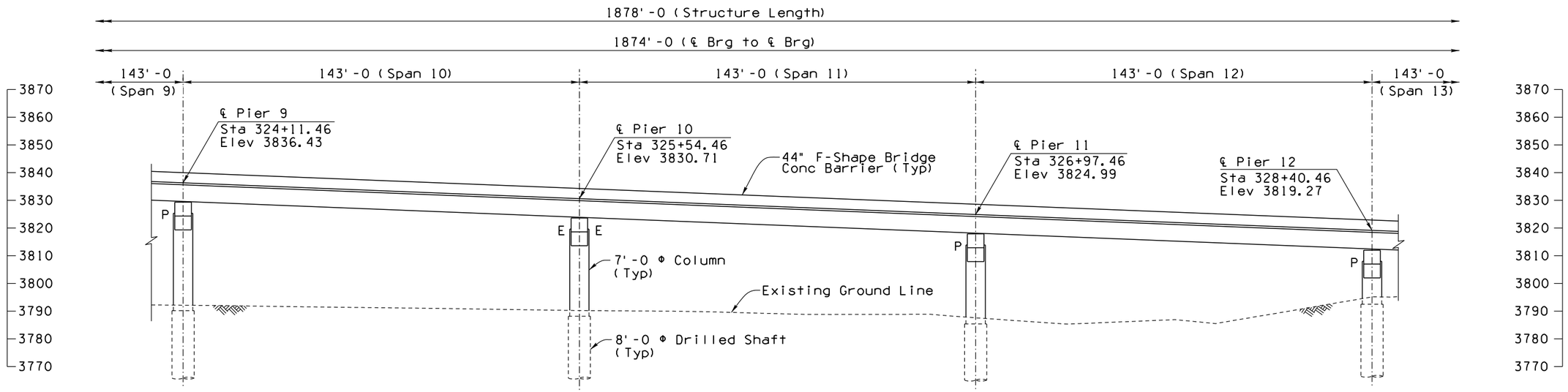
____ OF ____

FILE NAME=c:\pwworking\phx\d0522165\s50swgp3.dgn PLOT DATE=Jul. 24, 2018 TIME=10:55:59 AM PLOT SCALE=1:40 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	157	163	
		189 SC 000			



PLAN
New 13 Span CAWF Precast Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION
Scale: 1"=20'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
GENERAL PLAN & ELEV 4 OF 5

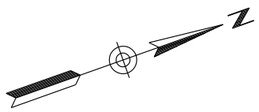
ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 189			INTERNATIONAL BORDER TO GRAND AVE

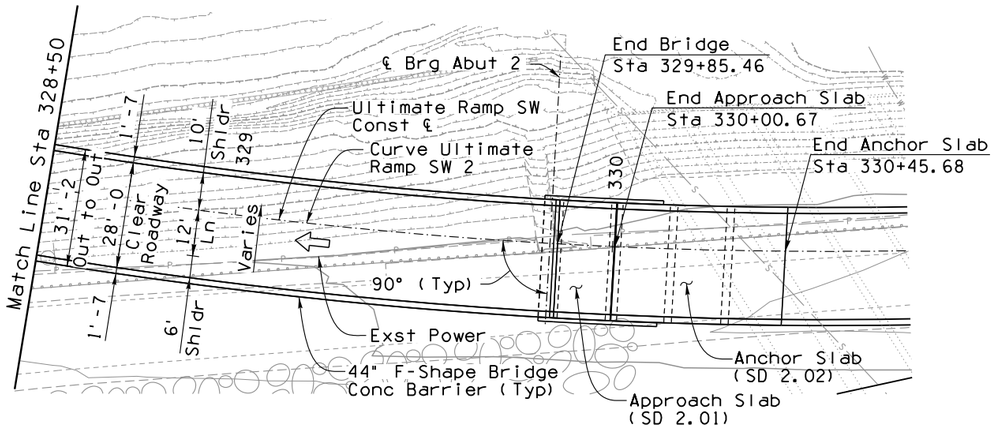
TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. S-04.04
___ OF ___

FILE NAME=c:\pworking\phx\d0522165\s50swgp4.dgn PLOT DATE:Jul, 24, 2018 TIME:10:56:07 AM PLOT SCALE=1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

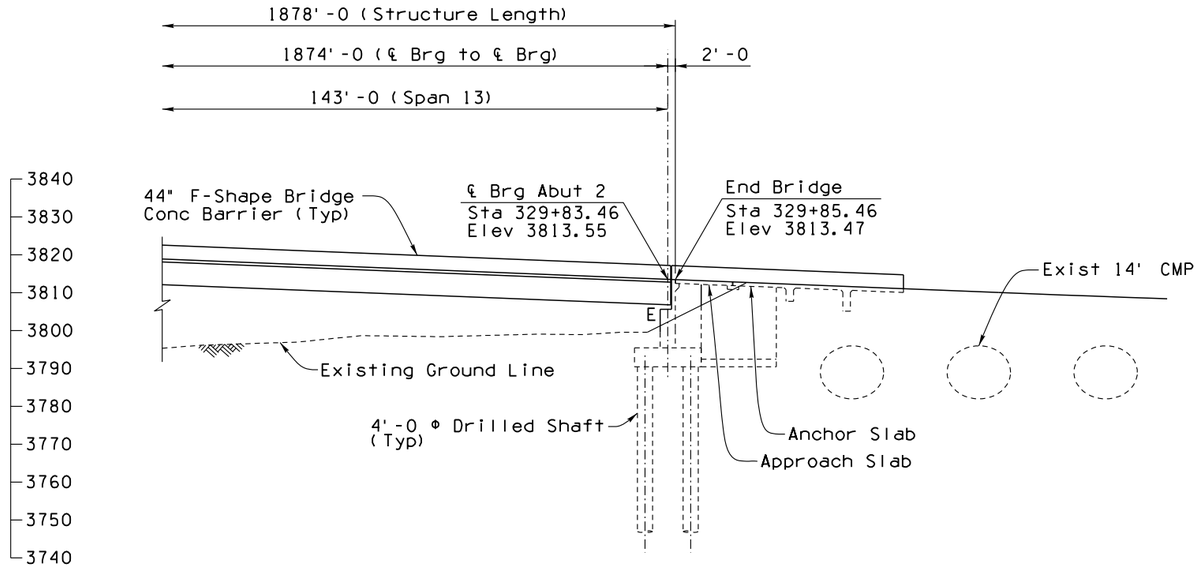
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	158	163	
		189 SC 000			





PLAN

New 13 Span CAWF Precast Girder Bridge
Skew = 0°
Scale: 1"=20'



ELEVATION

Scale: 1"=20'

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
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TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
GENERAL PLAN & ELEV 5 OF 5

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

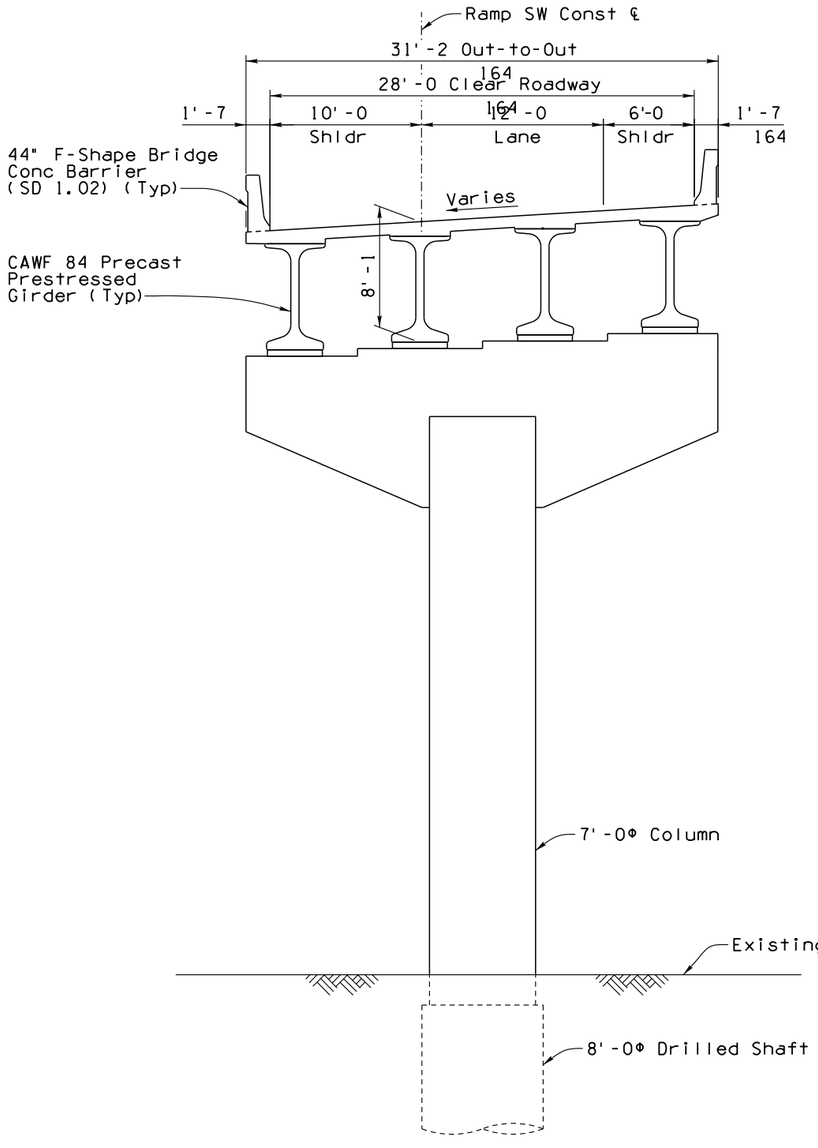
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-04.05

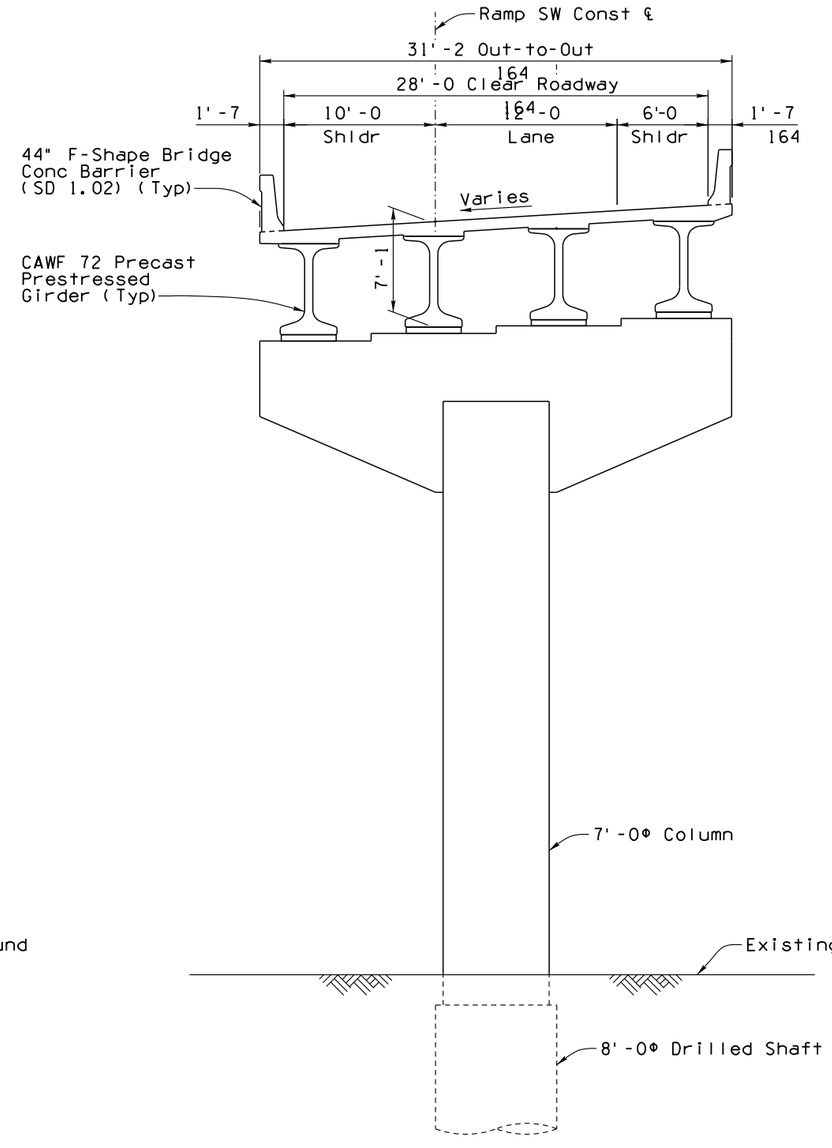
___ OF ___

FILE NAME:c:\pwworking\phx\d0522165\s50swgp5.dgn PLOT DATE:Jul, 24, 2018 TIME:10:56:15 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

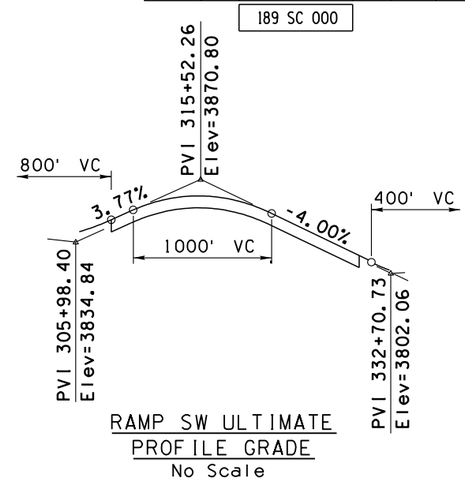
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	159	163	
		189 SC 000			



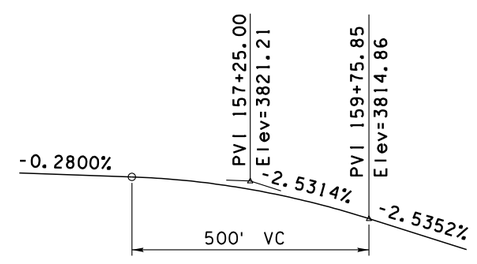
TYPICAL SECTION
SPANS 1, 2 & 3
Scale: 1"=5'-0



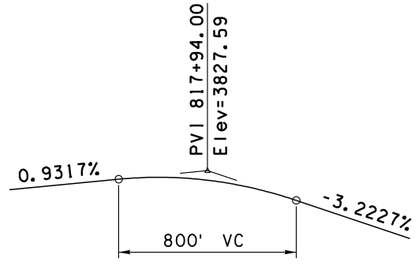
TYPICAL SECTION
SPANS 4 THRU 10
Scale: 1"=5'-0



RAMP SW ULTIMATE
PROFILE GRADE
No Scale



EXISTING SR 189
PROFILE GRADE
No Scale



SR 189 WB
PROFILE GRADE
No Scale

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 311+
RAMP SW ULTIMATE
TYPICAL SECTION

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 189			INTERNATIONAL BORDER TO GRAND AVE

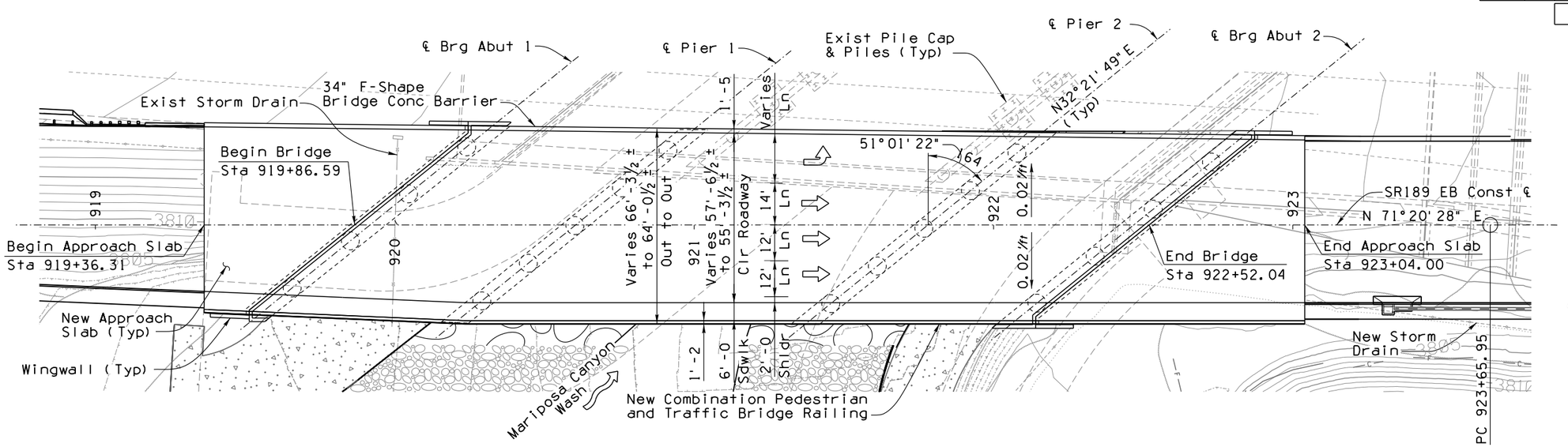
TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-04.06

____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	160	163	
		189 SC 000			

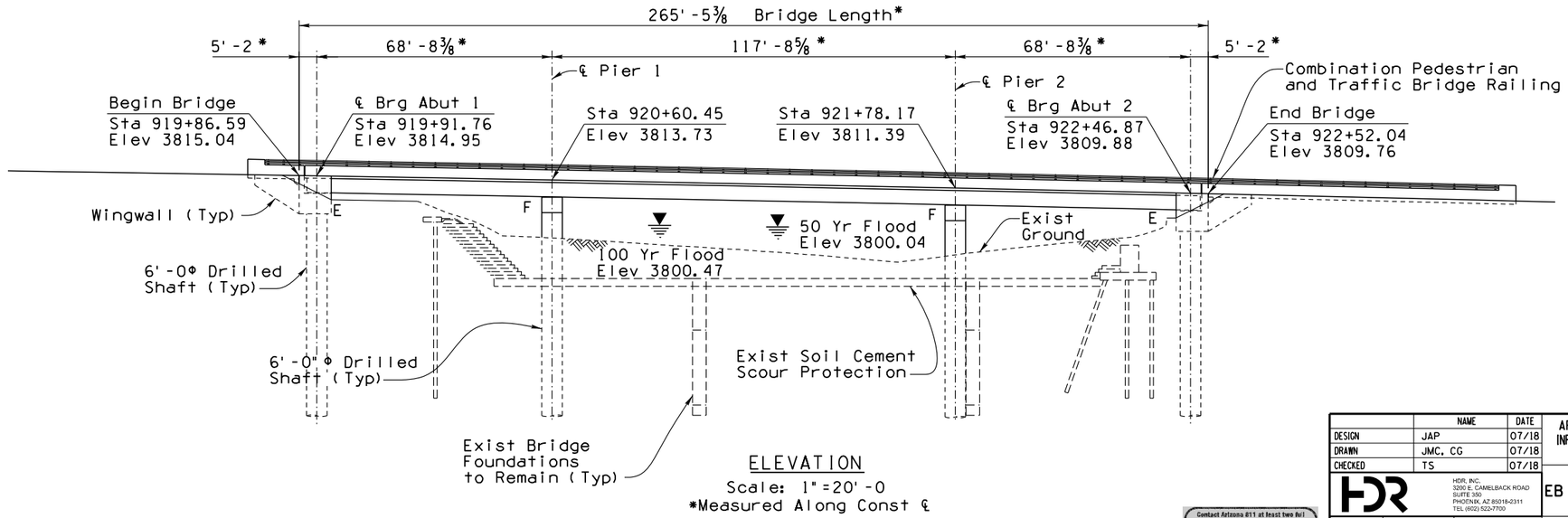


PLAN

New 3 Span Prestressed Precast Concrete Spread Box Girder Bridge
Skew 51°01'22" Rt
Scale: 1"=20'-0

CURVE DATA SR189 EB

PC Sta 923+65.95
PI Sta 925+42.12
PT Sta 927+18.19
Δ=3°31'22" R
D=1°00'00"
R=5729.00
T=176.18
L=352.24



ELEVATION

Scale: 1"=20'-0
*Measured Along Const ℄

	NAME	DATE
DESIGN	JAP	07/18
DRAWN	JMC, CG	07/18
CHECKED	TS	07/18

HDR, INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-0311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 919+
EB MARIPOSA CANYON BRIDGE NO 2
PLAN & ELEVATION

SR 189 (ROUTE) | MILEPOST | STRUCTURE NO.
LOCATION: INTERNATIONAL BORDER TO GRAND AVE

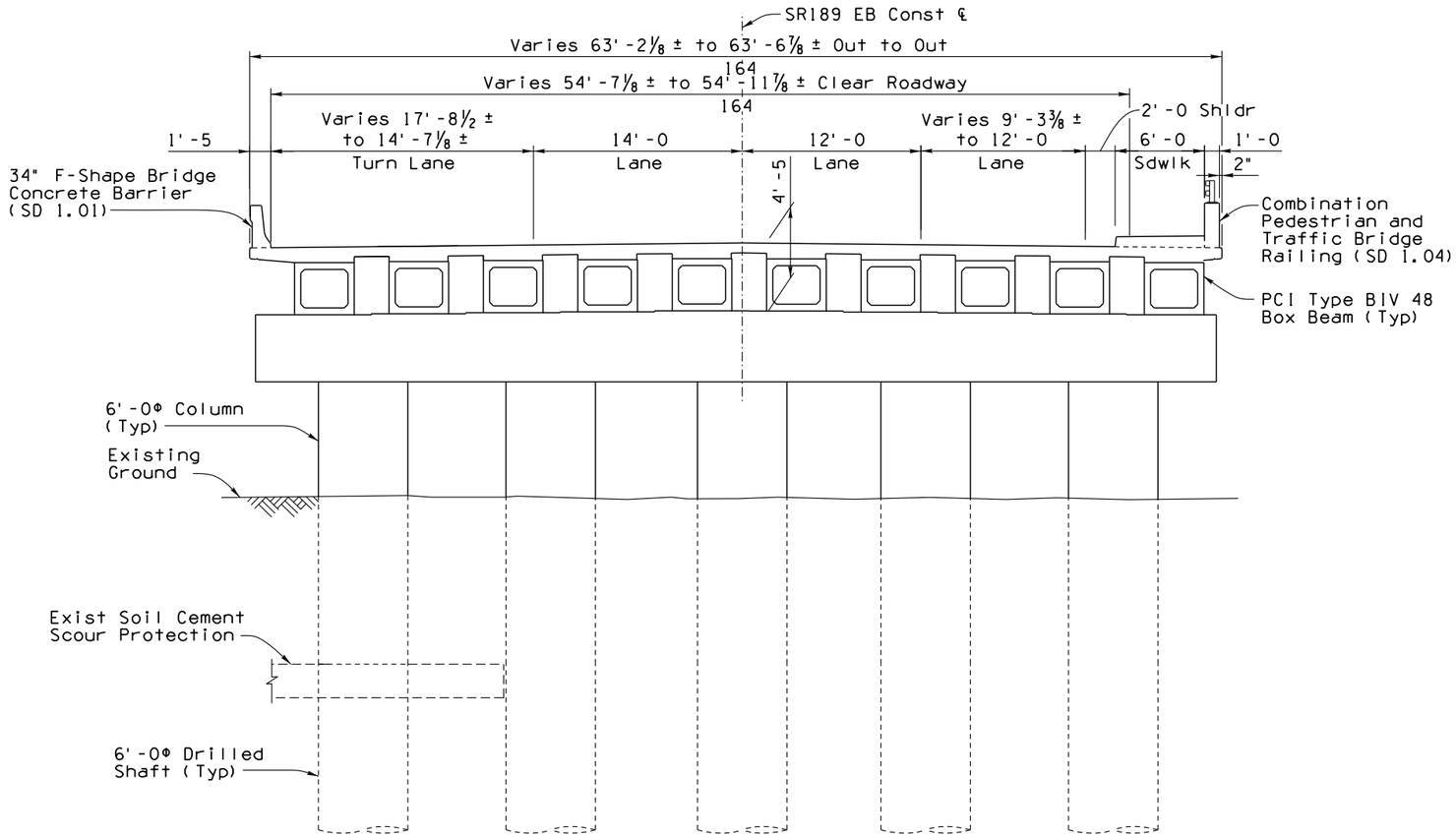
TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. S-05.01
___ OF ___

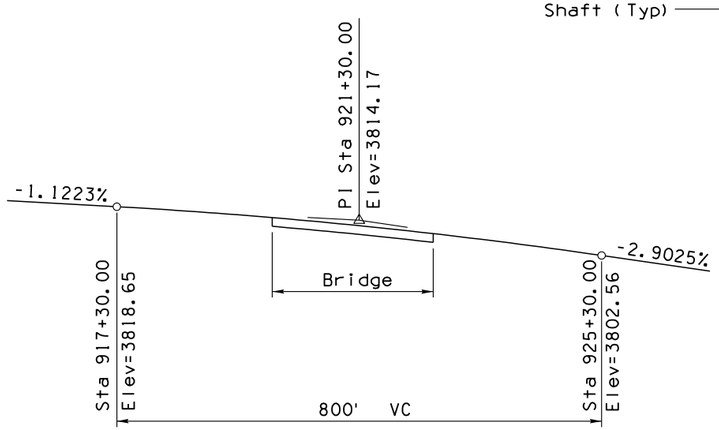
Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

FILE NAME:c:\pwworking\phx\d0522165\s50mgp1.dgn PLOT DATE:Jul. 24, 2018 TIME:10:56:32 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	161	163	
		189 SC 000			



TYPICAL BRIDGE SECTION
(Shown perpendicular to the Const ℄)
Scale: 1"=5'-0



SR 189 EB PROFILE GRADE
No Scale

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 919+
EB MARIPOSA CANYON BRIDGE NO 2
TYPICAL SECTION

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

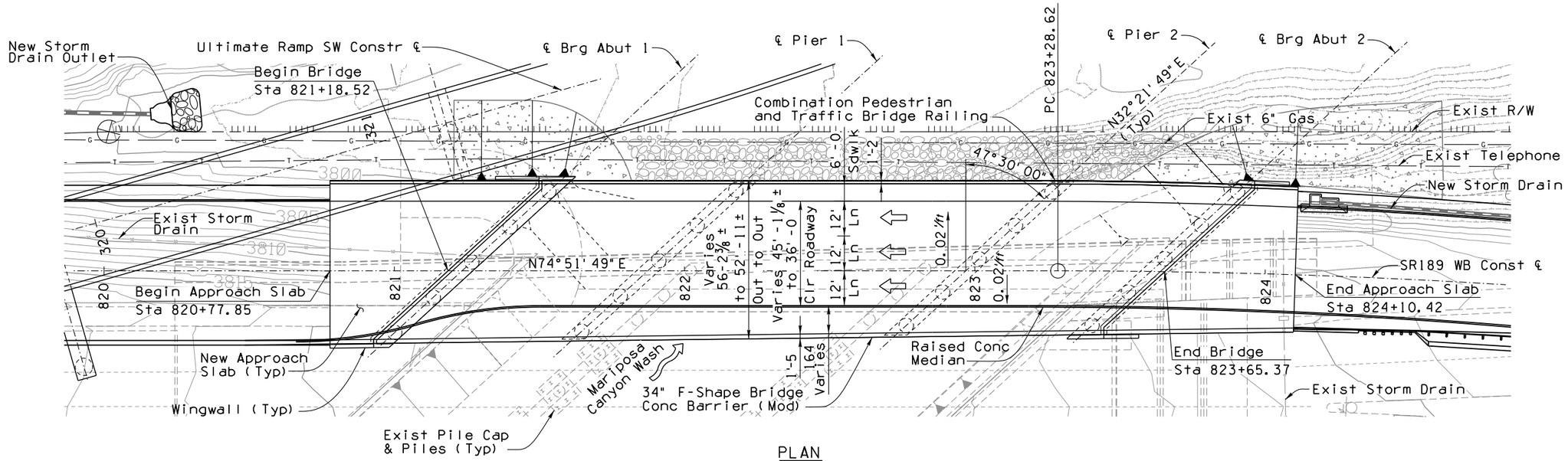
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-05.02

___ OF ___

FILE NAME=c:\pwworking\phx\d0522165\s50mxs1.dgn PLOT DATE=Jul. 24, 2018 TIME=10:56:37 AM PLOT SCALE=1:10 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	162	163	
		189 SC 000			

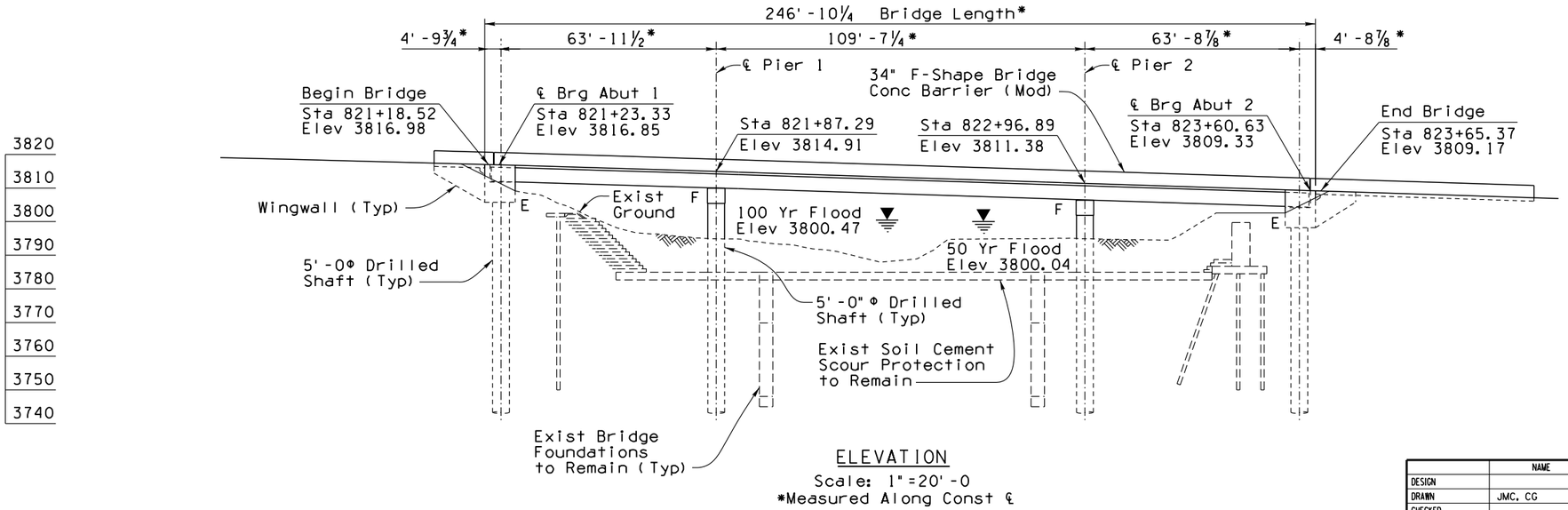


PLAN

New 3 Span Prestressed Precast Concrete Spread Box Girder Bridge
Skew 47°30'00" Rt
Scale: 1"=20'-0

CURVE DATA
SR189 WB

PC Sta 823+28.62
PI Sta 824+46.15
PRC Sta 825+63.50
Δ=5°22'59" R
D=2°17'31"
R=2500.00
T=117.53
L=234.88



ELEVATION

Scale: 1"=20'-0
*Measured Along Const ℄

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR INC.
3200 E. CAMELBACK ROAD
SUITE 350
PHOENIX, AZ 85018-2311
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 820+
WB MARIPOSA CANYON BRIDGE NO 2
PLAN & ELEVATION

SR 189	MILEPOST	STRUCTURE NO.
ROUTE		

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-06.01

___ OF ___

Contact Arizona 811 at least two full working days before you begin excavation
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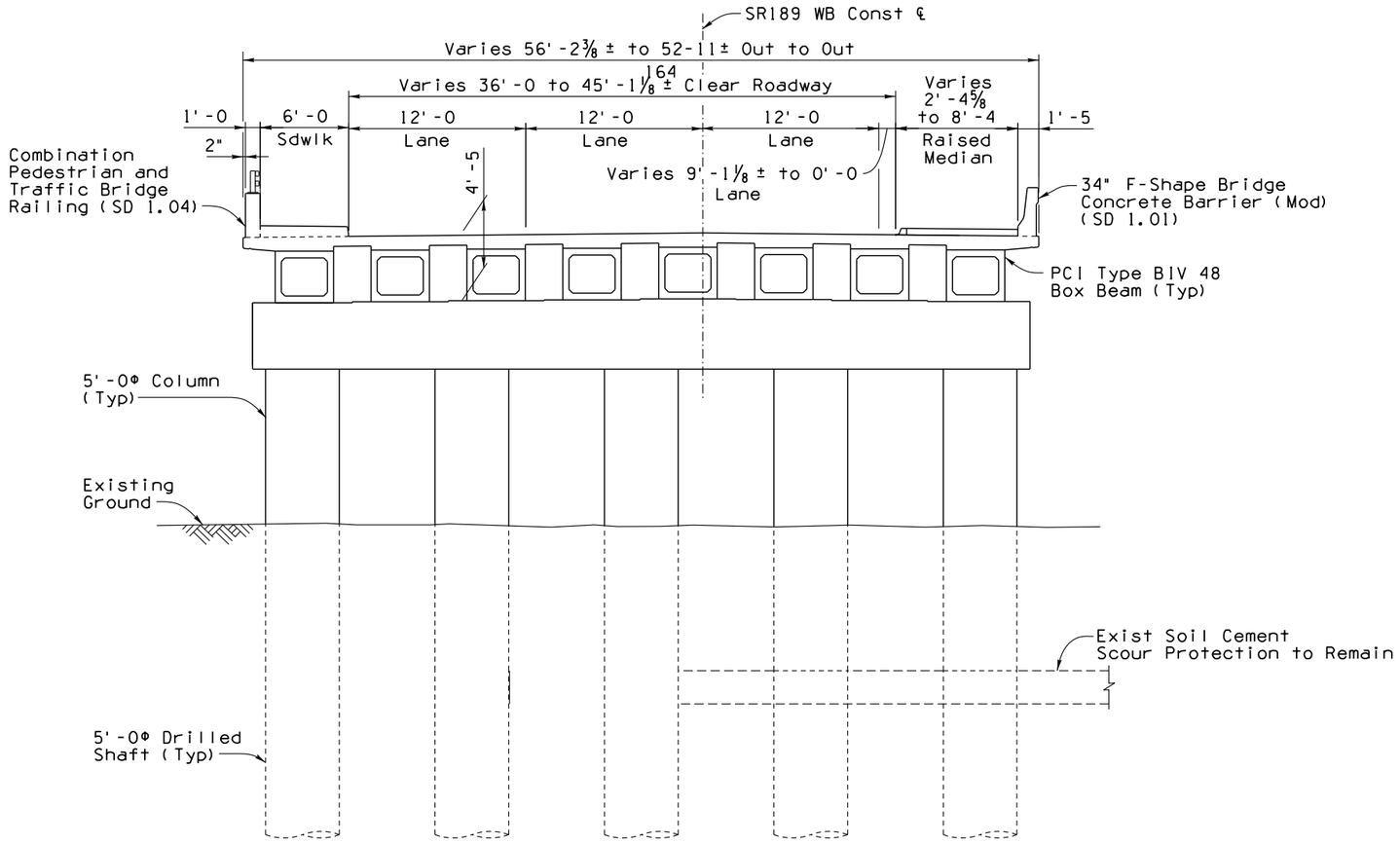
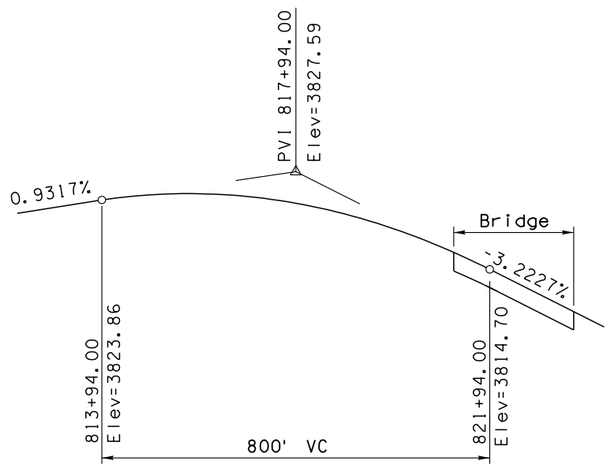
Call 811 or click Arizona811.com

FILE NAME:c:\pwworking\phx\d0522165\s50mgp2.dgn PLOT DATE:Jul. 24, 2018 TIME:10:56:47 AM PLOT SCALE:1:40 PLOT BY:AHOFFMAN
SURVEY NO. | FINISHED PLANS | REVISIONS | LOCATION | DATE

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	189-A(201)T	163	163	
		189 SC 000			



TYPICAL BRIDGE SECTION
(Shown perpendicular to the Const ℄)
Scale: 1"=5'-0



SR189 WB PROFILE GRADE
No Scale

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

	NAME	DATE
DESIGN		07/18
DRAWN	JMC, CG	07/18
CHECKED		07/18

HDR, INC.
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SUITE 350
PHOENIX, AZ 85018-2311
TEL (602) 522-7700

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP

STA 820+
WB MARIPOSA CANYON BRIDGE NO 2
TYPICAL SECTION

SR 189		
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
INTERNATIONAL BORDER TO GRAND AVE

TRACS NO. H8045 01L | 189-A(201)T

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-06.02

____ OF ____

FILE NAME=c:\pwworking\phx\d0522165\s50mxs2.dgn PLOT DATE=Jul. 24, 2018 TIME=10:56:53 AM PLOT SCALE=1:10 PLOT BY=AHOFFMAN
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

Appendix B. Option D Mariposa Traffic Interchange

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Appendix C. Summary of Comments

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Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
ADOT Roadway Support - Glenn Gaelick								
1	G. Gaelick	1	1	1st paragraph, 2nd sentence - "change of access report" should be "change of access request".		A	Will revise.	
2	G. Gaelick	2	24-28	There appears to be a significant improvement between the base and interim conditions based on travel times and LOS. There seems to be a negligible measure of benefit between interim and ultimate configuration LOS for each of the intersections listed. Could this justify eliminating the S-W Ramp and a widened SR189 median between I-19 & Loma Mariposa Road or would justification for constructing the S-W ramp be found elsewhere?		B/C	Justification to add Ramp SW was to support the resolution passed by the City and County to provide a multi-directional flyover ramp which is grade separated over FRR. This justification has been documented in the TI screening report and EA document. DCR will be revised to further expand on the justification of Ramp SW.	
3	G. Gaelick	3	25-28	Benefit of E-N Ramp ultimate configuration vs. interim configuration is difficult to ascertain. It appears that the elimination of E-N traffic crossing Frank Reed at grade is the primary difference and the issue appears to be whether the elimination of this at-grade crossing is worth the added structure cost.		B/C	Justification to add Ramp SW was to support the resolution passed by the City and County to provide a multi-directional flyover ramp which is grade separated over FRR. This justification has been documented in the TI screening report and EA document. DCR will be revised to further expand on the justification of Ramp SW.	
4	G. Gaelick	4	40-41	Under Area 2 header, 3rd paragraph – Figure 5 is nowhere to be found. Perhaps the entire sentence could be deleted without any harming the document.		A	Will revise DCR to reference the correct figure.	
5	G. Gaelick	5	General	Should an ADA compliance and Feasibility report be part of the DCR scope and should the construction scope include improvements pursuant to ADOT's ADA implementation plan?		B/C	Will evaluate.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
6	G. Gaelick	6	6/54	Based on a presumed northeast oriented perspective and a southwest direction of travel for the SW ramp, it seems like the depiction of lane and shoulder width callouts for the SW ramp along with the walls and barrier should be mirrored vertically about the centerline. This calls into question the location of the SW centerline on plan. Please check.		A	The typical section for Ramp SW is shown incorrectly. The lane configuration and the PGL will needed to be mirrored to show the correct layout. Will revise accordingly.	
7	G. Gaelick	7	8-15/54	The hollow oval icons presumed to be for existing centerline curve data seem out of place. Is Designer's intent to eventually utilize these cells for existing centerline geometry? Please clarify.		A	Yes, The hollow ovals represent the existing geometry data which will be populated in the future 30% level submittal.	
8	G. Gaelick	8	21/54	An end section for the 54" pipe extension and one for the new 24" pipe appear to be misplaced under the proposed SE leg of Loma Mariposa. Please check.		A	The end sections will be revised to match the proposed roadway.	
9	G. Gaelick	9	22/54	There is a callout for SR 189 EB Cst CL that appears to be pointing to the wrong centerline. Please check.		A	Will revise the callout to say SR 189 Ramp EN Cst CL.	
10	G. Gaelick	10	23/54	a) Graphically, the easternmost SR 189 bullnose seems to have a square corner. It seems like it should be similar to the one on the other side of Frank Reed Rd.		A	Will evaluate and revise accordingly. Bullnose configuration was determined by the WB-67 turning templates.	
				b) Please check with ADOT Bridge regarding the proposed piers shown in the SR189 bullnose areas on each side of Frank Reed Rd. and their potential disposition to impact.		A	Will coordinate with ADOT bridge.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
				c) Has a WB67 template been run through this intersection to ascertain any conflicts with turn movements?		A	Yes, we have ran WB67 templates through the intersection and can provide if needed. Additional template runs will be conducted as the design progresses.	
11	G. Gaelick	11	24/54	West of the Exst I-19 Ramps A & B intersection with SR189, please check the proximity of the median straddle bent column to the raised median curb. Same for the median pier immediately west of the straddle bent.		A	Will evaluate.	
12	G. Gaelick	12	28\54	The PCC callout for SW Ramp Sta 342+?9.87 would benefit from relocation.		A	Will revise graphically to clarify note.	
13	G. Gaelick	13	33/54	There is a catch basin shown ~ Sta 23+00 Lt along the south leg of Industrial Drive that seems to be misplaced.		A	Will adjust catch basin to match new roadway edges.	
14	G. Gaelick	14	34/54	Reason for SR189 EB & WB vertical control beginning at stations different from horizontal control in plan sheet 21/54 is unclear. Please clarify.		A	Horizontal sheets show beginning station at 122+00. Profile sheets show 124+00. Will revise to ensure horizontal and vertical control is consistent.	
15	G. Gaelick	15	37/54	Reason for SR189 EB & WB vertical control ending at stations different from horizontal control in plan sheet 24/54 is unclear. Please clarify.		A	Will correct horizontal and vertical stations to be consistent.	
16	G. Gaelick	16	47/54	a) Does the Lt. turn movement from Ramp SW onto the proposed east leg of Loma Mariposa that connects to Bell Road exclude Lt turn movement for SB SR189 traffic onto Bell Road?		D	Yes it does. Vehicles traveling SB on 189 will have the opportunity to access Bell Road from the Frank Reed Road intersection. Current traffic model shows that LOS is at acceptable levels.	
				b) It seems that the LT most SB through lane on SR 189 goes into a Rt turn only lane approaching the SB Rt in, Rt out only driveway Sta ~118+00 Lt. Is this the intent?		D	Yes, currently this is the intent. The outside SB through lane would need to merge to the left in order to continue south beyond the Rt-in/Rt-out driveway. Current traffic model	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
17	G. Gaelick	17	47-48/54	There may be value in merging the SW Ramp through traffic lane with SB 189 traffic prior to the Loma Mariposa intersection which could serve to: a) Decrease raised median area & R/W requirements on west side of SR189. b) Decrease the probability of Lt turn movements from EB Loma Mariposa going wrong direction on SW Ramp. c) Allow Lt turns from SB 189 to EB Loma Mariposa. Doing so might warrant construction of the S-W Ramp touchdown south of Frank Reed Rd. in the Interim Phase.		B/C	This was considered at one point but eliminated due to the delay and merging associated with the mix of vehicles approaching the intersection. Current traffic model shows that LOS is at acceptable levels.	

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ADOT Structures - Sherly Paul								
18	S. Paul	1	44	In Section 4.12 Structures, the height of the F-Shape Barrier should be 44-inch instead of 42-inch. Please correct for Ramp EN-Interim (page 44), Ramp EN –Ultimate (page 45) and for Ramp SW (page 45).		A		
19	S. Paul	2	45	Is Ramp South-to-West (SW)-Interim? Page 35, Figure 4.1shows only Ramp EN for Interim Condition. Page 36, Figure 4.2 shows as Ramp SW for Ultimate Condition. Please verify		D	Ramp SW is Ultimate Condition only.	
ADOT MPD - Carlos Lopez								
1	C. Lopez	1	page 1	under this section: flip the order of the paragraphs: 1) explain that based on stakeholder input and technical analysis the recommendation is the ultimate plan. Explain total cost and the benefits of the plan. Then follow that up with the (first) paragraph related to the programmed funding and funding shortfalls. Lastly, our current funding is $64M for construction and $4M for design. We need to have an interim condition that fits that $68M budget. Right now we are just over that figure.		A/C	Will revise DCR text to flip the order of the paragraphs. The current estimate is $62.9 million for construction and design. Adding the ICAP and the ROW estimate is what pushed the estimate over $68 million. Coordination with ADOT ROW is ongoing and HDR will revise the estimate to include the revised ROW estimate.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
2	C. Lopez	2	page 1	delete this section: The Alternatives development and screening section (above) talks about the corridor management alternative; now we need to explain the study process that led to the split ramp concept.		A	Will revise DCR to include a description of what led to the split lane concept. This discussion will be further documented in Section 3.0 (Evaluation of Alternatives)	
3	C. Lopez	3	page 2	revise to study area		A	Will revise.	
4	C. Lopez	4	page 2	update; it is now over 300k		A	Will revise.	
5	C. Lopez	5	page 2	This project opened in 2014? verify text to explain it is now open		A	POE expansion is completed and we will revise the DCR text accordingly.	
6	C. Lopez	6	page 6	based on the minimum of 200' ROW near SR 189/Frank Reed Rd; can we reconfigure design to stay within existing ROW?		B/C	We could evaluate eliminating or reducing the ROW impacts by re-aligning SR 189 to match the existing ROW geometry. This could potentially require reduced design speeds in order to achieve the tighter radius required.	
7	C. Lopez	7	page 12	Include language of the Feb 2015 counts. How do they relate to the 2011 existing conditions?		A	Will add text to include the results of the Feb 2015 counts.	
8	C. Lopez	8	page 23	fix		A	Will correct table headers.	
9	C. Lopez	9	page 24	In this table we show the interim/ultimate option but we have not presented what those look like. Let's make sure that if we show interim and ultimate references we provide the reader a graphic, explanation or reference of what they look like.		A	We can revise the DCR to include figures of the interim/ultimate condition prior to this section. The Interim and Ultimate figures will be placed in the Executive Summary to assist the reader in distinguishing between the two build options.	
10	C. Lopez	10	page 28	for the intersections with LOS E or F what can be done to improve those? If our design concept cannot fix those can we document what the main issues are?		A	We can clarify in the DCR to document what those main issues are. We will also review the TOAR to make sure both documents are consistent.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
11	C. Lopez	11	page 29	general comment; This chapter needs to be consistent with the EA chapter - Alternatives. Once you revise the EA chapter; this section should follow it closely.		A	Agree. Will coordinate with the EA chapter.	
12	C. Lopez	12	page 29	delete or move to another place that discusses stakeholder outreach and/or programming (funding).		A	Acknowledged. We will place the text in the appropriate section.	
13	C. Lopez	13	page 29	reshuffle sections 3.1 to section 3.4 I would like to show the (stage 1 or section 3.2) corridor alternatives first. Follow that with the evaluation criteria, show the matrix and ratings. Lastly, show recommended corridor. Next, jump to the (stage 2) TI alternatives.. show the 6 options, followed by the (stage 2) evaluation criteria. Show the matrix/ratings to identify the top two options and finally show how/why we ended with a hybrid (best of option A and D) to develop the ultimate plan.		A	Will revise according to the preferred order.	
14	C. Lopez	14	page 31	use the 3D graphics that you have for the six TI options.		A	We will include those 3D graphics into the report.	
15	C. Lopez	15	page 36	add; existing SB exit at SR189 is widened		A	Will revise to add.	
16	C. Lopez	16	page 36	show/reference to the justification; why do we need this signalized		B	Will coordinate with traffic group to show proper documentation for this level of design.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
17	C. Lopez	17	page 36	add more information to this: break out SR 189 corridor improvements and TI improvements; show more graphics; use the 3D graphics if applicable; similarly, for the recommended improvements add why we are recommending those; whether it is LOS, purpose and need etc..		A	Will expand on this section in the DCR. The SR189 corridor is broken out into Section 4.2 and I-19 TI is discussed in Section 4.3.	
18	C. Lopez	18	page 36	similar to comments on interim: add more explanation; add more graphics on the recommended improvements; use 3D graphics		A	Will expand on this section in the DCR.	
19	C. Lopez	19	page 37	General comment on all intersections: what map do we use to show intersection locations? when we show an improvement; add sentence explaining the purpose		A	The DCR currently does not have a map that shows all of the intersection improvement locations graphically but the DCR plans can give the reader a detailed look at the proposed improvements. Will expand on the DCR text to explain the purpose of the intersection improvement.	
20	C. Lopez	20	page 38	Revise: Explain Option D was preferred by stakeholders b/c it provided grade separation at FRR and provided multidirectional ramps. Based on our technical analysis and financial considerations we took the top two options A and D to address the stakeholder input in the ultimate plan. The ultimate plan includes the grade separation and multi directional ramps		A	Will revise.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Response By	Initial Disp.	Response	Final Disp.
21	C. Lopez	21	page 47	our current budget is $64M (construction) and $4M (design); ADOT ROW group will provide/verify ROW costs by mid April. Our goal is to have an interim project within the budget. This cost of $69.4M is above what we have.		B/C	Our estimate shows $57.4 million for construction and $3.5 million for design. The $69.4 million he is referring to is the total cost including below the line items which includes ROW as well. Need clarification if the current total budget of $68 million includes ROW acquisition.	

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
FHWA - Heier, Ammon							
1	A. Heier	1	Cover	Use Official color logos for FHWA and ADOT	A	Will comply.	A
2	A. Heier	2	Cover	FA # is STP-189-A(201)S - Please revise throughout	A	Will comply.	A
3	A. Heier	3	Cover	Update revised date after reviewing DCR throughout.	A	Will comply.	A
4	A. Heier	4	1	Delete repeat sentence in 3rd to 4th paragraph: " A public meeting was held in November 2014…"	A	Will comply.	A
5	A. Heier	5	8	"Logistics services, United Parcel Service and FedEx, are located in the industrial park" Add commas	A	Will comply.	A
6	A. Heier	6	46	Table 3-5 would lead me to believe that the Median U-Turn is the better overall choice. Could you add more clear justification as to why the Roundabout was selected? I believe FHWA had expressed concern that the Median U-Turn may support the high volumes of truck traffic better considering the roadway grades. To be clear, I'm not asking for the selection to be changed.	A	One of the primary reasons for the selection of the roundabout was it's ability to maintain access to adjacent private properties near the intersection. The median U-turn concept would limit access to the same properties or require a longer distance for a vehicle to gain access to a particular property. The roundabout also provided a more conservative environmental footprint at the intersection at this level of design. All three intersection concepts presented in the DCR meet the future travel demand needs. Report will be updated to clarify.	A
7	A. Heier	7	51	last sentence in last paragraph is redundant with parentheses in same paragraph.	A	Will revise to eliminate redundant paragraph.	A
8	A. Heier	8	58	Ultimate Condition Section - Typo - should be "therefore" instead of "therefore"	A	Will correct typo.	A

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
9	A. Heier	9	63	Why does Table 5.1 have costs of items of work when Tables 5-2 and 5-3 do not?	A	Current version of the DCR has cost in tables 5-2 and 5-3. Next version of the DCR will be shown in Tables 5-2 and 5-3.	A
10	A. Heier	10	Plans	Suggest extending overhead guidance sign for I-19 N ramp to mark SR 189 lanes as well.	A	The guide sign concept will be re-evaluated in the next phase of design.	A
11	A. Heier	11	Plans	Is there a way to make this sign less confusing? So both directions take a driver down SR 189 South? Seems hard to navigate for an unfamiliar driver.	A	The guide sign concept will be re-evaluated in the next phase of design.	A
12	A. Heier	12	Plans	Suggest improving existing SB on-ramp to parallel tapers.	D	Improving the SB on-ramp to parallel tapers would be outside of the current environmental footprint for this study. Initial observations appears to indicate that the existing ROW could provide enough room to add a parallel on-ramp. Further discussions needed during the next phase of design to see how this can be incorporated into the project.	D

Overall Number	Reviewer	Reviewer Number	Sheet No.	Comment	Initial Disp.	Response	Final Disp.
13	A. Heier	13	Plans	It seems like a really quick merge would be required for the existing NB onramp onto I-19 which will be complicated by traffic merging on from the new on-ramp only a few hundred feet away. Could the existing on-ramp be improved to allow more time for traffic to merge before the new on-ramp joins?	A	Per AASHTO Figure 10-68, 1000' is required between successive ramps. The AASHTO figure is for success ramps entering the same through lane. Modifications to the existing on-ramp and the flyover ramp is required to increase spacing between ramps. Current design in the DCR has Ramp 2 configured as a parralel entrance ramp and provides 1000' of accel lane which meets or exceeds ADOT RDG critera. To increase spacing, configuring Ramp 2 into a taper type entrance could potentially increase spacing. Design concept will be revised to change the configuration to successive taper ramps.	A
14	A. Heier	14	General	The on-ramp to the I-19 northbound will have two flows of traffic from the existing on-ramp to remain in the ultimate condition and the fly over ramp from SR-189. The merging of two lanes of traffic mostly trucks using the fly over ramp to access I-19 may require further analysis. Required/Maximum length for acceleration and merging for successive entrances should be taken into account.	A	Please see response to Comment No. 13.	A

Appendix D. Order of Magnitude Project Cost Estimates

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Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
2010011	CLEARING AND GRUBBING	ACRE	56	$1,300.00	$72,800.00
2020001	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.SUM	1	$500,000.00	$500,000.00
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	14,510	$5.00	$72,550.00
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.	69,143	$3.50	$242,000.50
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.	38,956	$5.00	$194,780.00
2020031	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	SQ.YD.	1,949	$30.00	$58,470.00
2020042	REMOVAL OF PIPE (ALL TYPES AND SIZES DRAINAGE AND IRRIGATION PIPE)	L.FT.	1,891	$30.00	$56,730.00
2020050	REMOVAL OF STRUCTURE (2-10X4 RCBC)	L.SUM	1	$10,000.00	$10,000.00
2020051	REMOVAL OF STRUCTURE (10X5 RCBC)	L.SUM	1	$10,000.00	$10,000.00
2020052	REMOVE (CONCRETE DITCH)	L.FT.	225	$25.00	$5,625.00
2020053	REMOVE (HEADWALL)	EACH	4	$300.00	$1,200.00
2020054	REMOVE (CSA)	L.SUM	1	$10,000.00	$10,000.00
2020071	REMOVE GUARD RAIL	L.FT.	6,803	$5.00	$34,015.00
2020153	Remove (Signs, Structures, Foundations, and Posts)	L.SUM	1	$50,000.00	$50,000.00
2020158	REMOVE (CATCH BASIN)	EACH	27	$900.00	$24,300.00
2020159	REMOVE (SPILLWAY)	EACH	9	$900.00	$8,100.00
2030301	ROADWAY EXCAVATION	CU.YD.	135,188	$5.00	$675,940.00
2030401	DRAINAGE EXCAVATION	CU.YD.	2,000	$5.00	$10,000.00
2090005	FURNISH WATER	M.GAL.	120,000	$1.50	$180,000.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	16,908	$42.00	$710,136.00
4010010	PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ.YD.	3,087	$28.00	$86,436.00
4010013	PORTLAND CEMENT CONCRETE PAVEMENT (13")	SQ.YD.	3,450	$38.00	$131,100.00
4040111	TACK COAT	TON	26	$450.00	$11,700.00
4040230	ASPHALT BINDER	TON	915	$850.00	$777,750.00
4060017	ASPHALTIC CONCRETE	TON	18,297	$34.00	$622,098.00
4060027	MINERAL ADMIXTURE	TON	174	$90.00	$15,660.00
5012524	STORM DRAIN PIPE, 24"	L.FT.	3,165	$80.00	$253,200.00
5012536	STORM DRAIN PIPE, 36"	L.FT.	1,582	$120.00	$189,840.00
5012542	STORM DRAIN PIPE, 42"	L.FT.	527	$150.00	$79,050.00
5012918	PIPE CULVERT, 18"	L.FT.	45	$80.00	$3,600.00
5012924	PIPE CULVERT, 24"	L.FT.	1,180	$80.00	$94,400.00

Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
5012930	PIPE CULVERT, 30"	L.FT.	142	$90.00	$12,780.00
5012936	PIPE CULVERT, 36"	L.FT.	28	$120.00	$3,360.00
5012942	PIPE CULVERT, 42"	L.FT.	22	$150.00	$3,300.00
5012954	PIPE CULVERT, 54"	L.FT.	36	$175.00	$6,300.00
5014524	FLARED END SECTION, 24" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	50	$400.00	$20,000.00
5030021	CONCRETE CATCH BASIN (C-15.20) ONE 3.5' WING, H=8' OR LESS	EACH	25	$4,000.00	$100,000.00
5030023	CONCRETE CATCH BASIN (C-15.20) ONE 7.5' WING, H=8' OR LESS	EACH	17	$5,000.00	$85,000.00
5030092	CONCRETE CATCH BASIN (C-15.40) ONE 3.5' WING, H=8' OR LESS	EACH	4	$4,000.00	$16,000.00
5030142	CONCRETE CATCH BASIN (MEDIAN) (C-15.80) (H=8' OR LESS)	EACH	7	$4,000.00	$28,000.00
5030601	CATCH BASIN (STORMCEPTOR)	EACH	2	$10,000.00	$20,000.00
5050089	MANHOLE (C-18.10, FOR PIPES UNDER 36")	EACH	7	$6,000.00	$42,000.00
5050090	MANHOLE (C-18.10, FOR PIPES 36" AND OVER)	EACH	5	$8,000.00	$40,000.00
6010002	STRUCTURAL CONCRETE (CLASS S) (F'C = 3000)	CU.YD.	44	$400.00	$17,600.00
6050002	REINFORCING STEEL	LB.	2,276	$0.75	$1,707.00
6060048	BRIDGE SIGN STRUCTURE (SD9.20, TYPE 4F)	EACH	2	$192,000.00	$384,000.00
6060079	FOUNDATION FOR BRIDGE SIGN STRUCTURE (SD9.20, TYPE 4F)	EACH	4	$18,000.00	$72,000.00
6060134	CANTILEVER SIGN STRUCTURE (SD9.10, TYPE 4C)	EACH	1	$66,000.00	$66,000.00
6060257	FOUNDATION FOR CANTILEVER SIGN STRUCTURE (SD9.10, TYPE 4C)	EACH	1	$10,800.00	$10,800.00
6070002	BREAKAWAY SIGN POST S4X7.7	L.FT.	72	$40.00	$2,880.00
6070004	BREAKAWAY SIGN POST W6X12	L.FT.	96	$50.00	$4,800.00
6070022	FOUNDATION FOR BREAKAWAY SIGN POST S4X7.7	EACH	6	$400.00	$2,400.00
6070024	FOUNDATION FOR BREAKAWAY SIGN POST W6X12	EACH	8	$600.00	$4,800.00
6080018	EXTRUDED ALUMINUM SIGN PANEL	SQ.FT.	763	$25.00	$19,075.00
7040070	Pavement Marking (White Thermoplastic) (Extruded) (0.090")	LF	137,383	$0.50	$68,691.30
7040071	Pavement Marking (Yellow Thermoplastic) (Extruded)(0.090")	LF	24,043	$0.50	$12,021.59
7040074	Pavement Symbol (Extruded Thermoplastic) (Alkyd) (0.090")	Each	114	$100.00	$11,400.00
7042031	Primer Sealer for PCCP Thermoplastic Striping	LF	161,426	$0.20	$32,285.15
7042036	Primer Sealer for PCCP Thermoplastic Symbol/Legend	LF	114	$25.00	$2,850.00
7042051	Removal of Curing Compound from PCCP (Striping)	LF	161,426	$0.20	$32,285.15
7042056	Removal of Curing Compound from PCCP (Symbol\Legend)	Each	114	$20.00	$2,280.00

Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
7060013	Pavement Markers, Raised, Type C	Each	200	$3.00	$600.00
7060015	Pavement Markers, Raised, Type D	Each	100	$3.00	$300.00
7080001	Permanent Pavement Marking (Painted White)	LF	97,583	$0.15	$14,637.51
7080011	Permanent Pavement Marking (Painted Yellow)	LF	16,029	$0.15	$2,404.32
7080121	Permanent Pavement Marking (Painted Symbol) (Arrow)	Each	114	$40.00	$4,560.00
7080301	Paint Bullnose	Each	14	$100.00	$1,400.00
7310012	POLE (TYPE A) (12')	EACH	13	$1,000.00	$13,000.00
7310100	POLE (TYPE I) (STANDARD BASE)	EACH	19	$2,200.00	$41,800.00
7310130	POLE (TYPE Q)	EACH	1	$5,000.00	$5,000.00
7310140	POLE (TYPE R)	EACH	9	$5,000.00	$45,000.00
7310180	POLE (FOR 100 FT. HIGH MAST)	EACH	2	$9,000.00	$18,000.00
7310190	POLE (TYPE W)	EACH	4	$5,000.00	$20,000.00
7310195	POST (PEDESTRIAN PUSH BUTTON)	EACH	1	$600.00	$600.00
7310200	POLE FOUNDATION (TYPE A)	EACH	13	$600.00	$7,800.00
7310201	BREAKAWAY BASE FOR LIGHTING POLES (OVER 30')	EACH	19	$650.00	$12,350.00
7310286	POLE FOUNDATION (TYPE I) (BREAKAWAY)	EACH	15	$1,200.00	$18,000.00
7310310	POLE FOUNDATION (TYPE Q)	EACH	1	$3,000.00	$3,000.00
7310320	POLE FOUNDATION (TYPE R)	EACH	9	$3,000.00	$27,000.00
7310360	POLE FOUNDATION (FOR 100 FT. HIGH MAST)	EACH	2	$8,500.00	$17,000.00
7310371	POLE FOUNDATION (TYPE W)	EACH	4	$3,000.00	$12,000.00
7310390	PEDESTRIAN PUSH BUTTON POST FOUNDATION	EACH	1	$175.00	$175.00
7310511	MAST ARM (10 FT.) (TAPERED)	EACH	11	$500.00	$5,500.00
7310551	MAST ARM (20 FT.) (TAPERED)	EACH	14	$1,000.00	$14,000.00
7310554	MAST ARM (20 FT.) (SPECIAL)	EACH	8	$850.00	$6,800.00
7310580	MAST ARM (35 FT.) (TAPERED)	EACH	1	$2,000.00	$2,000.00
7310600	MAST ARM (45 FT.) (TAPERED)	EACH	3	$2,500.00	$7,500.00
7310610	MAST ARM (50 FT.) (TAPERED)	EACH	2	$3,500.00	$7,000.00
7310620	MAST ARM (55 FT.) (TAPERED)	EACH	4	$5,000.00	$20,000.00

Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
7310630	HIGH MAST RAISING AND LOWERING DEVICE	EACH	2	$5,000.00	$10,000.00
7310635	MAST ARM (60 FT.) (TAPERED)	EACH	3	$5,000.00	$15,000.00
7310640	MAST ARM (65 FT.) (TAPERED)	EACH	1	$7,500.00	$7,500.00
7310810	REMOVE AND SALVAGE EXISTING LIGHTING POLE	L.SUM	1	$1,500.00	$1,500.00
7310830	RELOCATE EXISTING LIGHT POLES	L.SUM	1	$5,000.00	$5,000.00
7320060	ELECTRICAL CONDUIT (2 1/2") (PVC)	L.FT.	45	$20.00	$900.00
7320070	ELECTRICAL CONDUIT (3") (PVC)	L.FT.	3,000	$7.00	$21,000.00
7320070	ELECTRICAL CONDUIT (3") (PVC)	L.FT.	650	$20.00	$13,000.00
7320073	ELECTRICAL CONDUIT (2 - 3") (PVC)	L.FT.	3,250	$20.00	$65,000.00
7320292	ELECTRICAL CONDUIT (2 - 4") (PVC)	L.FT.	75	$25.00	$1,875.00
7320351	JUNCTION BOX	EACH	4	$500.00	$2,000.00
7320410	PULLBOX (NO. 5)	EACH	26	$350.00	$9,100.00
7320410	PULL BOX (NO. 5)	EACH	16	$500.00	$8,000.00
7320420	PULL BOX (NO. 7)	EACH	4	$550.00	$2,200.00
7320482	RESET AND/OR RELOCATE EXISTING PULL BOXES	L.SUM	1	$5,000.00	$5,000.00
7320650	CONDUCTORS	L.SUM	1	$34,000.00	$34,000.00
7330060	TRAFFIC SIGNAL FACE (TYPE F)	EACH	42	$800.00	$33,600.00
7330135	TRAFFIC SIGNAL FACE (TYPE R)	EACH	21	$800.00	$16,800.00
7330211	PEDESTRIAN SIGNAL (MAN/HAND)(COUNTDOWN)	EACH	33	$550.00	$18,150.00
7330220	PEDESTRIAN PUSH BUTTON	EACH	33	$350.00	$11,550.00
7330310	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE II)	EACH	39	$120.00	$4,680.00
7330330	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE IV)	EACH	6	$500.00	$3,000.00
7330340	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE V)	EACH	8	$500.00	$4,000.00
7330350	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VI)	EACH	4	$500.00	$2,000.00
7330360	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VII)	EACH	9	$350.00	$3,150.00
7330370	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VIII)	EACH	5	$600.00	$3,000.00
7330380	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE IX)	EACH	2	$900.00	$1,800.00
7330524	SIGN ASSEMBLY (INTERNALLY ILLUMINATED STREET NAME SIGN)	EACH	14	$5,200.00	$72,800.00
7330550	REMOVE AND SALVAGE TRAFFIC SIGNALS AND LOAD CENTER CABINETS	L.SUM	5	$5,000.00	$25,000.00
7340050	CONTROL CABINET (TYPE V)	EACH	3	$25,000.00	$75,000.00
7340120	METER PEDESTAL CABINET	EACH	3	$4,000.00	$12,000.00

Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
7340300	CONTROL CABINET FOUNDATION	EACH	3	$1,000.00	$3,000.00
7350006	LOOP DETECTOR (COUNTER) (FULL REPLACEMENT)	EACH	4	$10,000.00	$40,000.00
7350204	VIDEO DETECTION SYSTEM (4-CAMERA)	L.SUM	3	$20,000.00	$60,000.00
7350552	OPTICOM PRE-EMPTION UNIT	L.SUM	3	$10,000.00	$30,000.00
7360030	LUMINAIRE (HORIZONTAL MOUNT) (HPS 250 WATT)	EACH	14	$450.00	$6,300.00
7360030	LUMINAIRE (HORIZONTAL MOUNT) (HPS 250 WATT)	EACH	8	$450.00	$3,600.00
7360051	LUMINAIRE (HORIZONTAL MOUNT) (HPS 400 WATT)	EACH	11	$450.00	$4,950.00
7360080	LUMINAIRE (HIGH MAST) (HPS 400 WATT)	EACH	8	$700.00	$5,600.00
7360160	POWER SUPPLY (BATTERY BACKUP)	EACH	3	$8,000.00	$24,000.00
7360240	LOAD CENTER CABINET FOUNDATION	EACH	2	$750.00	$1,500.00
7360243	LOAD CENTER CABINET (TYPE IV) (	EACH	2	$10,000.00	$20,000.00
7370452	ELECTRICAL SYSTEM (AND CONNECTIONS)	L.SUM	1	$10,000.00	$10,000.00
7370500	VARIABLE MESSAGE SIGN	EACH	2	$220,000.00	$440,000.00
7370656	CCTV CONTROL SIGNAL DISTRIBUTION UNIT (CCSDU)	L.SUM	1	$20,000.00	$20,000.00
7370705	CCTV FIELD EQUIPMENT	EACH	2	$6,000.00	$12,000.00
7379038	RADIO SYSTEM	L.SUM	1	$20,000.00	$20,000.00
7379111	VARIABLE MESSAGE SIGN ASSEMBLY INSTALLATION	EACH	2	$5,000.00	$10,000.00
9020002	CHAIN LINK FENCE, TYPE 1 (48")	L.FT.	43,310	$10.00	$433,100.00
9020116	CHAIN LINK FENCE GATE, TYPE 1 (72") (20' WIDE)	EACH	2	$1,200.00	$2,400.00
9050001	GUARD RAIL, W-BEAM, SINGLE FACE	L.FT.	6,899	$13.00	$89,687.00
9050027	GUARD RAIL TERMINAL (TANGENT TYPE) (CURB/GUTTER ALT.)	EACH	14	$3,300.00	$46,200.00
9080041	CONCRETE CURB (C-05.10 TYPE A-1, H=7")	L.FT.	5,024	$15.00	$75,360.00
9080084	CONCRETE CURB AND GUTTER (C-05.10, TYPE D, D-1, D-2 or D-3, H=7")	L.FT.	34,000	$16.00	$544,000.00
9080086	CONCRETE CURB AND GUTTER (C-5.10)(TYPE C OR C-1)	L.FT.	3,133	$14.00	$43,862.00
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	49,508	$4.00	$198,032.00
9080511	SCUPPER (MAG DET. 203)	EACH	8	$4,000.00	$32,000.00
9090531	RESET SURVEY MONUMENT	EACH	50	$300.00	$15,000.00
9100008	CONCRETE BARRIER (HALF BARRIER)	L.FT.	1,408	$70.00	$98,560.00

Estimate of probable cost for Interim Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
9130053	RIPRAP (DUMPED) (D50=6")	CU.YD.	344	$75.00	$25,800.00
9130054	RIPRAP (DUMPED) (D50=12")	CU.YD.	504	$89.00	$44,856.00
9130055	RIPRAP (DUMPED) (D50=18")	CU.YD.	336	$100.00	$33,600.00
9130401	SOIL CEMENT BANK PROTECTION	CU.YD.	2,993	$150.00	$448,950.00
9140155	RETAINING WALL (	SQ.FT.	31,700	$55.00	$1,743,500.00
9141801	PIPE PLUG (24", C-13.76)	EACH	6	$250.00	$1,500.00
9170001	EMBANKMENT SPILLWAY (C-4.10)	LN. FT.	154	$75.00	$11,550.00
9170021	INLET (C-4.10) (SINGLE)	EACH	6	$2,000.00	$12,000.00
9170041	OUTLET (C-4.10)	EACH	6	$3,000.00	$18,000.00
9201006	CONCRETE CHANNEL LINING (6")	SQ.YD.	321	$55.00	$17,655.00
9210012	MEDIAN PAVING (STAMPED CONCRETE)	SQ.YD.	16,410	$60.00	$984,586.67
9240050	MISCELLANEOUS WORK (SMART INFRASTRUCTURE)	L.SUM	1	$200,000.00	$200,000.00
9240119	MISCELLANEOUS WORK (HIGH MAST LIGHT POLE MAINTENANCE PLATFORM)	EACH	2	$8,000.00	$16,000.00
				CONSTRUCTION - SECTION 1 TOTAL	$12,978,276.19
	BRIDGE NO. 1: Ramp EN Interim				
2030501	STRUCTURAL EXCAVATION	CU.YD.	570	$20.00	$11,400.00
2030506	STRUCTURE BACKFILL	CU.YD.	280	$40.00	$11,200.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	1,917	$500.00	$958,500.00
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	2,398	$550.00	$1,318,900.00
6010006	STRUCTURAL CONCRETE (CLASS S) (F'C = 5,000)	CU.YD.	1,413	$700.00	$989,100.00
6011141	F-SHAPE BRIDGE CONCRETE BARRIER AND TRANSITION (44")	L.FT.	5,062	$90.00	$455,577.43
6011345	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	218	$200.00	$43,633.33
6011371	APPROACH SLAB (SD 2.01)	SQ.FT.	935	$15.00	$14,025.00
6011372	ANCHOR SLAB (TYPE 1) (SD 2.02)	SQ.FT.	2,805	$15.00	$42,075.00
6014973	PRECAST, P/S MEMBERS (WF72)	L.FT.	7,342	$250.00	$1,835,500.00
6015101	RESTRAINERS, VERTICAL EARTHQUAKE (FIXED)	EACH	24	$110.00	$2,640.00
6015102	RESTRAINERS, VERTICAL EARTHQUAKE (EXPANSION)	EACH	10	$200.00	$2,000.00
6020001	PRESTRESSING CAST-IN-PLACE CONCRETE	L.SUM	1	$144,425.00	$144,425.00
6050002	REINFORCING STEEL	LB.	1,234,880	$1.00	$1,234,880.00
9210001	SLOPE PAVING	SQ. YD.	186	$65.00	$12,090.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$7,075,945.76

Estimate of probable cost for Interim Condition					
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
6090048	DRILLED SHAFT FOUNDATION (48")	L.FT.	648	$400.00	$259,200.00
6090096	DRILLED SHAFT FOUNDATION (96")	L.FT.	1,320	$1,200.00	$1,584,000.00
				BRIDGE NO. 1 TOTAL	$8,919,145.76
	BRIDGE NO. 2: Mariposa Bridge No. 2 Interim (Widening)				
2020009	REMOVAL OF STRUCTURAL CONCRETE	CU.YD.	58	$500.00	$29,000.00
2030501	STRUCTURAL EXCAVATION	CU.YD.	218	$20.00	$4,360.00
2030506	STRUCTURE BACKFILL	CU.YD.	315	$40.00	$12,600.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	274	$500.00	$137,000.00
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	292	$550.00	$160,600.00
6010006	STRUCTURAL CONCRETE (CLASS S) (F'C = 5,000)	CU.YD.	3	$700.00	$2,100.00
6011132	COMBINATION PEDESTRIAN-TRAFFIC BRIDGE RAILING	L.FT.	395	$160.00	$63,200.00
6011344	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	31	$200.00	$6,200.00
6011371	APPROACH SLAB (SD 2.01)	SQ. FT.	2,294	$15.00	$34,410.00
6011372	ANCHOR SLAB (TYPE 1) (SD 2.02)	SQ. FT.	908	$15.00	$13,620.00
6030012	FURNISH HP PILES (HP 12X53)	L.FT.	849	$250.00	$212,250.00
6030194	DRIVE HP PILES (HP 12X53)	L.FT.	849	$150.00	$127,350.00
6050002	REINFORCING STEEL	LB.	158,218	$1.00	$158,217.83
6050102	PLACE DOWELS	EACH	586	$15.00	$8,790.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$969,697.83
6090048	DRILLED SHAFT FOUNDATION (48")	L.FT.	160	$600.00	$96,000.00
				BRIDGE NO. 2 TOTAL	$1,065,697.83
	RCB CULVERT # 1 (BE01)				
2030501	STRUCTURAL EXCAVATION	CU.YD.	221	$20.00	$4,420.00
2030506	STRUCTURE BACKFILL	CU.YD.	27	$35.00	$945.00
6010002	STRUCTURAL CONCRETE (CLASS S) (F'C = 3000)	CU.YD.	103	$250.00	$25,750.00
6050002	REINFORCING STEEL	LB.	12,753	$0.75	$9,564.75
6110201	METAL HANDRAIL	L.FT.	30	$50.00	$1,500.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1	$42,179.75	
				RCB CULVERT #1 TOTAL	$42,179.75
	RCB CULVERT #2 (BE02)				
2030501	STRUCTURAL EXCAVATION	CU.YD.	168	$20.00	$3,360.00
2030506	STRUCTURE BACKFILL	CU.YD.	12	$35.00	$420.00
6010002	STRUCTURAL CONCRETE (CLASS S) (F'C = 3000)	CU.YD.	85	$250.00	$21,250.00

Estimate of probable cost for Interim Condition					
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
6050002	REINFORCING STEEL	LB.	12,771	$0.75	$9,578.25
6110201	METAL HANDRAIL	L.FT.	30	$40.00	$1,200.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1	$35,808.25	
				RCB CULVERT #2 TOTAL	$35,808.25
	SUMMARY				
	CONSTRUCTION - SECTION 1 TOTAL				$12,978,276.19
	BRIDGE NO. 1 TOTAL				$8,919,145.76
	BRIDGE NO. 2 TOTAL				$1,065,697.83
	RCB CULVERT #1 TOTAL				$42,179.75
	RCB CULVERT #2 TOTAL				$35,808.25
	ITEM SUBTOTAL				$23,041,107.78
	PROJECT WIDE COST				
	MAINTENANCE AND PROJECTION OF TRAFFIC (4%)				$921,644.31
	DUST AND WATER PALLIATIVE (0.75%)				$172,808.31
	QUALITY CONTROL (0.75%)				$172,808.31
	CONSTRUCTION SURVEYING (1.5%)				$345,616.62
	EROSION CONTROL (0.3%)				$69,123.32
	MOBILIZATION (8% OF ALL CONSTRUCTION ITEMS)				$1,843,288.62
	PROJECT WIDE SUBTOTAL				$3,525,289.49
	UNIDENTIFIED ITEMS (20% OF ITEM TOTAL AND PROJECT WIDE TOTAL)				$5,313,279.45
	PROJECT WIDE TOTAL				$8,838,568.94
	OTHER PROJECT COST				
	CONSTRUCTION ENGINEERING (10%)	COST		$3,187,967.67	$3,187,967.67
	CONSTRUCTION CONTINGENCIES (5%)	COST		$1,593,983.84	$1,593,983.84
	UTILITY RELOCATIONS	LANE-MILE	2.0	$2,000,000.00	$4,000,000.00
	LANDSCAPING	COST		$1,000,000.00	$1,000,000.00
	ENGINEERING DESIGN (8% OF ALL ITEMS)	COST		$2,550,374.14	$2,550,374.14
	RIGHT OF WAY	COST		$4,500,000.00	$4,500,000.00
	ENVIORNMENTAL MITIGATION (UNKNOWN AT THIS TIME)	COST		$0.00	$0.00
	OTHER PROJECT COST TOTAL				$16,832,325.65

CONSTRUCTION TOTAL	$23,041,107.78
PROJECT WIDE TOTAL	$8,838,568.94
OTHER PROJECT COST TOTAL	$16,832,325.65
TOTAL PROJECT COST	$48,712,002.36
INDIRECT COST ALLOCATION (10.14%)	$4,939,397.04
GRAND PROJECT TOTAL	$53,651,399.40

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
2010011	CLEARING AND GRUBBING	ACRE	12	$1,300.00	$15,600.00
2020001	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.SUM	1	$24,000.00	$24,000.00
2020003	REMOVE BRIDGE (GIRDER BRIDGE OVER MARIPOSA WASH)	L.SUM	1	$500,000.00	$500,000.00
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	11,932	$5.00	$59,660.00
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.	59,070	$3.50	$206,745.00
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.	36,214	$5.00	$181,070.00
2020031	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	SQ.YD.	665	$30.00	$19,950.00
2020042	REMOVAL OF PIPE (ALL TYPES AND SIZES DRAINAGE AND IRRIGATION PIPE)	L.FT.	1,743	$30.00	$52,290.00
2020053	REMOVE (HEADWALL)	EACH	4	$300.00	$1,200.00
2020054	REMOVE (CSA)	L.SUM	1	$10,000.00	$10,000.00
2020153	Remove (Signs, Structures, Foundations, and Posts)	L.SUM	1	$50,000.00	$50,000.00
2020158	REMOVE (CATCH BASIN)	EACH	20	$900.00	$18,000.00
2020162	REMOVE (RETAINING WALL)	SQ.YD.	1,698	$72.00	$122,240.00
2030301	ROADWAY EXCAVATION	CU.YD.	102,549	$5.00	$512,745.00
2030901	BORROW	CU.YD.	80,451	$7.00	$563,157.00
2090005	FURNISH WATER	M.GAL.	120,000	$1.50	$180,000.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	13,927	$42.00	$584,934.00
4010010	PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ.YD.	13,400	$28.00	$375,200.00
4010013	PORTLAND CEMENT CONCRETE PAVEMENT (13")	SQ.YD.	3,201	$38.00	$121,638.00
4040111	TACK COAT	TON	20	$450.00	$9,000.00
4040230	ASPHALT BINDER	TON	793	$850.00	$674,050.00
4060017	ASPHALTIC CONCRETE	TON	15,867	$34.00	$539,478.00
4060027	MINERAL ADMIXTURE	TON	151	$90.00	$13,590.00
5012524	STORM DRAIN PIPE, 24"	L.FT.	2,244	$80.00	$179,520.00
5012536	STORM DRAIN PIPE, 36"	L.FT.	1,122	$120.00	$134,640.00
5012542	STORM DRAIN PIPE, 42"	L.FT.	374	$150.00	$56,100.00
5012924	PIPE CULVERT, 24"	L.FT.	110	$80.00	$8,800.00
5012930	PIPE CULVERT, 30"	L.FT.	52	$90.00	$4,680.00
5012936	PIPE CULVERT, 36"	L.FT.	9	$120.00	$1,080.00
5012954	PIPE CULVERT, 54"	L.FT.	126	$175.00	$22,050.00
5014524	FLARED END SECTION, 24" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	14	$400.00	$5,600.00
5030021	CONCRETE CATCH BASIN (C-15.20) ONE 3.5' WING, H=8' OR LESS	EACH	8	$4,000.00	$32,000.00

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
5030023	CONCRETE CATCH BASIN (C-15.20) ONE 7.5' WING, H=8' OR LESS	EACH	5	$5,000.00	$25,000.00
5030092	CONCRETE CATCH BASIN (C-15.40) ONE 3.5' WING, H=8' OR LESS	EACH	11	$4,000.00	$44,000.00
5030142	CONCRETE CATCH BASIN (MEDIAN) (C-15.80) (H=8' OR LESS)	EACH	4	$4,000.00	$16,000.00
5050089	MANHOLE (C-18.10, FOR PIPES UNDER 36")	EACH	4	$6,000.00	$24,000.00
5050090	MANHOLE (C-18.10, FOR PIPES 36" AND OVER)	EACH	2	$8,000.00	$16,000.00
6010001	STRUCTURAL CONCRETE (CLASS S) (F'C = 2500)	CU.YD.	17	$120.00	$2,040.00
6050002	REINFORCING STEEL	LB.	958	$0.75	$718.50
6060048	BRIDGE SIGN STRUCTURE (SD9.20, TYPE 4F)	EACH	1	$160,000.00	$160,000.00
6060079	FOUNDATION FOR BRIDGE SIGN STRUCTURE (SD9.20, TYPE 4F)	EACH	2	$18,000.00	$36,000.00
6060134	CANTILEVER SIGN STRUCTURE (SD9.10, TYPE 4C)	EACH	1	$55,000.00	$55,000.00
6060257	FOUNDATION FOR CANTILEVER SIGN STRUCTURE (SD9.10, TYPE 4C)	EACH	1	$10,800.00	$10,800.00
6070002	BREAKAWAY SIGN POST S4X7.7	L.FT.	48	$40.00	$1,920.00
6070022	FOUNDATION FOR BREAKAWAY SIGN POST S4X7.7	EACH	4	$400.00	$1,600.00
6080018	EXTRUDED ALUMINUM SIGN PANEL	SQ.FT.	354	$25.00	$8,850.00
7040070	Pavement Marking (White Thermoplastic) (Extruded) (0.090")	LF	100,489	$0.50	$50,244.50
7040071	Pavement Marking (Yellow Thermoplastic) (Extruded)(0.090")	LF	717	$0.50	$358.50
7040074	Pavement Symbol (Extruded Thermoplastic) (Alkyd) (0.090")	Each	77	$100.00	$7,700.00
7042031	Primer Sealer for PCCP Thermoplastic Striping	LF	101,207	$0.20	$20,241.40
7042036	Primer Sealer for PCCP Thermoplastic Symbol/Legend	LF	77	$25.00	$1,925.00
7042051	Removal of Curing Compound from PCCP (Striping)	LF	101,207	$0.20	$20,241.40
7042056	Removal of Curing Compound from PCCP (Symbol\Legend)	Each	77	$20.00	$1,540.00
7060013	Pavement Markers, Raised, Type C	Each	400	$3.00	$1,200.00
7060015	Pavement Markers, Raised, Type D	Each	100	$3.00	$300.00
7080001	Permanent Pavement Marking (Painted White)	LF	70,892	$0.15	$10,633.80
7080011	Permanent Pavement Marking (Painted Yellow)	LF	478	$0.15	$71.70
7080121	Permanent Pavement Marking (Painted Symbol) (Arrow)	Each	77	$40.00	$3,080.00
7080301	Paint Bullnose	Each	16	$100.00	$1,600.00
7310012	POLE (TYPE A) (12')	EACH	6	$1,000.00	$6,000.00
7310100	POLE (TYPE I) (STANDARD BASE)	EACH	16	$2,200.00	$35,200.00
7310140	POLE (TYPE R)	EACH	7	$5,000.00	$35,000.00
7310180	POLE (FOR 100 FT. HIGH MAST)	EACH	1	$9,000.00	$9,000.00
7310190	POLE (TYPE W)	EACH	4	$5,000.00	$20,000.00
7310200	POLE FOUNDATION (TYPE A)	EACH	6	$600.00	$3,600.00

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
7310201	BREAKAWAY BASE FOR LIGHTING POLES (OVER 30')	EACH	16	$650.00	$10,400.00
7310286	POLE FOUNDATION (TYPE I) (BREAKAWAY)	EACH	2	$1,200.00	$2,400.00
7310320	POLE FOUNDATION (TYPE R)	EACH	7	$3,000.00	$21,000.00
7310360	POLE FOUNDATION (FOR 100 FT. HIGH MAST)	EACH	1	$8,500.00	$8,500.00
7310371	POLE FOUNDATION (TYPE W)	EACH	4	$3,000.00	$12,000.00
7310443	MOUNTING BRACKET (6' DUAL)	EACH	4	$200.00	$800.00
7310506	MAST ARM (6 FT.) (TAPERED)	EACH	8	$350.00	$2,800.00
7310511	MAST ARM (10 FT.) (TAPERED)	EACH	10	$500.00	$5,000.00
7310551	MAST ARM (20 FT.) (TAPERED)	EACH	10	$1,000.00	$10,000.00
7310600	MAST ARM (45 FT.) (TAPERED)	EACH	2	$2,500.00	$5,000.00
7310610	MAST ARM (50 FT.) (TAPERED)	EACH	2	$3,500.00	$7,000.00
7310620	MAST ARM (55 FT.) (TAPERED)	EACH	2	$5,000.00	$10,000.00
7310630	HIGH MAST RAISING AND LOWERING DEVICE	EACH	1	$5,000.00	$5,000.00
7310640	MAST ARM (65 FT.) (TAPERED)	EACH	4	$7,500.00	$30,000.00
7320060	ELECTRICAL CONDUIT (2 1/2") (PVC)	L.FT.	30	$20.00	$600.00
7320070	ELECTRICAL CONDUIT (3") (PVC)	L.FT.	5,000	$7.00	$35,000.00
7320070	ELECTRICAL CONDUIT (3") (PVC)	L.FT.	450	$20.00	$9,000.00
7320073	ELECTRICAL CONDUIT (2 - 3") (PVC)	L.FT.	4,750	$20.00	$95,000.00
7320292	ELECTRICAL CONDUIT (2 - 4") (PVC)	L.FT.	50	$25.00	$1,250.00
7320351	JUNCTION BOX	EACH	14	$500.00	$7,000.00
7320410	PULLBOX (NO. 5)	EACH	7	$350.00	$2,450.00
7320410	PULL BOX (NO. 5)	EACH	16	$500.00	$8,000.00
7320420	PULL BOX (NO. 7)	EACH	2	$550.00	$1,100.00
7320482	RESET AND/OR RELOCATE EXISTING PULL BOXES	L.SUM	2	$5,000.00	$10,000.00
7320650	CONDUCTORS	L.SUM	1	$30,000.00	$30,000.00
7330060	TRAFFIC SIGNAL FACE (TYPE F)	EACH	38	$800.00	$30,400.00
7330135	TRAFFIC SIGNAL FACE (TYPE R)	EACH	14	$800.00	$11,200.00
7330211	PEDESTRIAN SIGNAL (MAN/HAND)(COUNTDOWN)	EACH	6	$550.00	$3,300.00
7330220	PEDESTRIAN PUSH BUTTON	EACH	6	$350.00	$2,100.00
7330310	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE II)	EACH	30	$120.00	$3,600.00
7330330	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE IV)	EACH	6	$500.00	$3,000.00
7330340	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE V)	EACH	2	$500.00	$1,000.00
7330350	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VI)	EACH	1	$500.00	$500.00
7330360	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VII)	EACH	2	$350.00	$700.00
7330370	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VIII)	EACH	7	$600.00	$4,200.00
7330524	SIGN ASSEMBLY (INTERNALLY ILLUMINATED STREET NAME SIGN)	EACH	11	$5,200.00	$57,200.00

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
7330550	REMOVE AND SALVAGE TRAFFIC SIGNALS AND LOAD CENTER CABINETS	L.SUM	1	$5,000.00	$5,000.00
7340050	CONTROL CABINET (TYPE V)	EACH	2	$25,000.00	$50,000.00
7340120	METER PEDESTAL CABINET	EACH	2	$4,000.00	$8,000.00
7340300	CONTROL CABINET FOUNDATION	EACH	2	$1,000.00	$2,000.00
7350006	LOOP DETECTOR (COUNTER) (FULL REPLACEMENT)	EACH	1	$10,000.00	$10,000.00
7350204	VIDEO DETECTION SYSTEM (4-CAMERA)	L.SUM	2	$20,000.00	$40,000.00
7350552	OPTICOM PRE-EMPTION UNIT	L.SUM	2	$10,000.00	$20,000.00
7360030	LUMINAIRE (HORIZONTAL MOUNT) (HPS 250 WATT)	EACH	10	$450.00	$4,500.00
7360051	LUMINAIRE (HORIZONTAL MOUNT) (HPS 400 WATT)	EACH	18	$450.00	$8,100.00
7360080	LUMINAIRE (HIGH MAST) (HPS 400 WATT)	EACH	4	$700.00	$2,800.00
7360160	POWER SUPPLY (BATTERY BACKUP)	EACH	2	$8,000.00	$16,000.00
7370452	ELECTRICAL SYSTEM (AND CONNECTIONS)	L.SUM	1	$10,000.00	$10,000.00
9020002	CHAIN LINK FENCE, TYPE 1 (48")	L.FT.	14,000	$7.00	$98,000.00
9020116	CHAIN LINK FENCE GATE, TYPE 1 (72") (20' WIDE)	EACH	2	$1,200.00	$2,400.00
9080084	CONCRETE CURB AND GUTTER (C-05.10, TYPE D, D-1, D-2 or D-3, H=7")	L.FT.	445	$16.00	$7,120.00
9080086	CONCRETE CURB AND GUTTER (C-5.10)(TYPE C OR C-1)	L.FT.	10,834	$14.00	$151,676.00
9080201	CONCRETE SIDEWALK (C-05.20)	SQ.FT.	29,263	$4.00	$117,052.00
9090531	RESET SURVEY MONUMENT	EACH	30	$300.00	$9,000.00
9100008	CONCRETE BARRIER (HALF BARRIER)	L.FT.	5,597	$40.00	$223,880.00
9130030	RIPRAP (GABIONS) (RENO MATTRESS)	CU.YD.	1,259	$175.00	$220,325.00
9130053	RIPRAP (DUMPED) (D50=6")	CU.YD.	284	$75.00	$21,300.00
9130054	RIPRAP (DUMPED) (D50=12")	CU.YD.	444	$89.00	$39,516.00
9130401	SOIL CEMENT BANK PROTECTION	CU.YD.	27,935	$150.00	$4,190,250.00
9140155	RETAINING WALL (	SQ.FT.	60,460	$55.00	$3,325,300.00
9210012	MEDIAN PAVING (STAMPED CONCRETE)	SQ.YD.	12,435	$60.00	$746,100.00
9240050	MISCELLANEOUS WORK (SMART INFRASTRUCTURE)	L.SUM	1	$200,000.00	$200,000.00
9240119	MISCELLANEOUS WORK (HIGH MAST LIGHT POLE MAINTENANCE PLATFORM)	EACH	1	$8,000.00	$8,000.00
		CONSTRUCTION - SECTION 1 TOTAL			$15,891,700.80
	BRIDGE NO. 1: Ramp EN Ultimate				
2030501	STRUCTURAL EXCAVATION	CU.YD.	365	$20.00	$7,300.00
2030506	STRUCTURE BACKFILL	CU.YD.	250	$40.00	$10,000.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	1,028	$500.00	$514,000.00
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	1,541	$550.00	$847,550.00
6011141	F-SHAPE BRIDGE CONCRETE BARRIER AND TRANSITION (44")	L.FT.	2,725	$90.00	$245,252.38

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
6011344	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	125	$200.00	$24,933.33
6011347	APPROACH SLAB (SD 2.01)	SQ.FT.	935	$15.00	$14,025.00
6011371	ANCHOR SLAB (TYPE 1) (SD 2.02)	SQ.FT.	2,805	$15.00	$42,075.00
6011372	PRECAST, P/S MEMBERS (WF72)	L.FT.	3,845	$255.00	$980,464.80
6014953	RESTRAINERS, VERTICAL EARTHQUAKE (FIXED)	EACH	15	$110.00	$1,650.00
6015101	RESTRAINERS, VERTICAL EARTHQUAKE (EXPANSION)	EACH	12	$200.00	$2,400.00
6050002	REINFORCING STEEL	LB.	573,120	$1.00	$573,120.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$3,262,770.51
6090048	DRILLED SHAFT FOUNDATION (48")	L.FT.	320	$400.00	$128,000.00
6090084	DRILLED SHAFT FOUNDATION (84")	L.FT.	140	$800.00	$112,000.00
6090096	DRILLED SHAFT FOUNDATION (96")	L.FT.	450	$1,200.00	$540,000.00
				BRIDGE NO. 1 TOTAL	**$4,042,770.51**
	BRIDGE NO. 2: Mariposa Bridge No. 2 Ultimate EB				
2030501	STRUCTURAL EXCAVATION	CU.YD.	430	$20.00	$8,600.00
2030506	STRUCTURE BACKFILL	CU.YD.	240	$40.00	$9,600.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	641	$500.00	$320,500.00
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	1,044	$550.00	$574,200.00
6011132	COMBINATION PEDESTRIAN-TRAFFIC BRIDGE RAILING	L.FT.	262	$80.00	$20,960.00
6011141	F-SHAPE BRIDGE CONCRETE BARRIER AND TRANSITION (44")	L.FT.	260	$60.00	$15,600.00
6011344	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	205	$200.00	$41,000.00
6011347	APPROACH SLAB (SD 2.01)	SQ.FT.	6,550	$15.00	$98,250.00
6014964	PRECAST, P/S MEMBER (BOX BEAM TYPE BIV-48)	L.FT.	2,672	$300.00	$801,600.00
6014953	RESTRAINERS, VERTICAL EARTHQUAKE (FIXED)	EACH	18	$110.00	$1,980.00
6015101	RESTRAINERS, VERTICAL EARTHQUAKE (EXPANSION)	EACH	18	$200.00	$3,600.00
6050002	REINFORCING STEEL	LB.	374,155	$1.00	$374,155.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$2,270,045.00
6090072	DRILLED SHAFT FOUNDATION (72")	L.FT.	1,740	$600.00	$1,044,000.00
				BRIDGE NO. 2 TOTAL	**$3,314,045.00**
	BRIDGE NO. 3: Mariposa Bridge No. 2 Ultimate WB				
2030501	STRUCTURAL EXCAVATION	CU.YD.	350	$20.00	$7,000.00
2030506	STRUCTURE BACKFILL	CU.YD.	260	$40.00	$10,400.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	515	$500.00	$257,500.00

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	777	$550.00	$427,350.00
6011132	COMBINATION PEDESTRIAN-TRAFFIC BRIDGE RAILING	L.FT.	241	$80.00	$19,280.00
6011141	F-SHAPE BRIDGE CONCRETE BARRIER AND TRANSITION (44")	L.FT.	236	$60.00	$14,160.00
6011344	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	175	$200.00	$35,000.00
6011347	APPROACH SLAB (SD 2.01)	SQ.FT.	4,719	$15.00	$70,785.00
6014964	PRECAST, P/S MEMBER (BOX BEAM TYPE BIV-48)	L.FT.	1,977	$300.00	$593,100.00
6014953	RESTRAINERS, VERTICAL EARTHQUAKE (FIXED)	EACH	14	$110.00	$1,540.00
6015101	RESTRAINERS, VERTICAL EARTHQUAKE (EXPANSION)	EACH	14	$200.00	$2,800.00
6050002	REINFORCING STEEL	LB.	284,350	$1.00	$284,350.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$1,723,265.00
6090060	DRILLED SHAFT FOUNDATION (60")	L.FT.	1,760	$500.00	$880,000.00
				BRIDGE NO. 3 TOTAL	**$2,603,265.00**
	BRIDGE NO. 4: Ramp SW Ultimate				
2030501	STRUCTURAL EXCAVATION	CU.YD.	565	$20.00	$11,300.00
2030506	STRUCTURE BACKFILL	CU.YD.	405	$40.00	$16,200.00
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	1,855	$500.00	$927,500.00
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	2,489	$550.00	$1,368,777.70
6011141	F-SHAPE BRIDGE CONCRETE BARRIER AND TRANSITION (44")	L.FT.	4,001	$90.00	$360,090.00
6011344	DECK JOINT ASSEMBLY (STRIP SEAL JOINT)	L.FT.	249	$200.00	$49,866.67
6011347	APPROACH SLAB (SD 2.01)	SQ.FT.	935	$15.00	$14,025.00
6011371	ANCHOR SLAB (TYPE 1) (SD 2.02)	SQ.FT.	2,805	$15.00	$42,075.00
6011372	PRECAST, P/S MEMBERS (WF72)	L.FT.	7,430	$250.00	$1,857,500.00
6011373	PRECAST, P/S MEMBERS (WF84)	L.FT.	1,788	$300.00	$536,400.00
6014953	RESTRAINERS, VERTICAL EARTHQUAKE (FIXED)	EACH	21	$110.00	$2,310.00
6015101	RESTRAINERS, VERTICAL EARTHQUAKE (EXPANSION)	EACH	8	$200.00	$1,600.00
6050002	REINFORCING STEEL	LB.	961,747	$1.00	$961,746.68
9210001	SLOPE PAVING	SQ. YD.	100	$65.00	$6,500.00
9999903	LUMP SUM STRUCTURE (TOTAL OF PRECEEDING STRUCTURE ITEMS)	L. SUM	1		$6,155,891.05
6090048	DRILLED SHAFT FOUNDATION (48")	L.FT.	708	$400.00	$283,200.00
6090084	DRILLED SHAFT FOUNDATION (84")	L.FT.	140	$800.00	$112,000.00
6090096	DRILLED SHAFT FOUNDATION (96")	L.FT.	1,056	$1,200.00	$1,267,200.00
				BRIDGE NO. 4 TOTAL	**$7,818,291.05**

Estimate of probable cost for Ultimate Condition					
Item	Description	Unit	Quantity	Unit Price	Amount
	SUMMARY				
	CONSTRUCTION - SECTION 1 TOTAL				$15,891,700.80
	BRIDGE NO. 1 TOTAL				$4,042,770.51
	BRIDGE NO. 2 TOTAL				$3,314,045.00
	BRIDGE NO. 3 TOTAL				$2,603,265.00
	BRIDGE NO. 4 TOTAL				$7,818,291.05
	ITEM SUBTOTAL				**$33,670,072.36**
	PROJECT WIDE COST				
	MAINTENANCE AND PROJECTION OF TRAFFIC (2%)				$673,401.45
	DUST AND WATER PALLIATIVE (0.75%)				$252,525.54
	QUALITY CONTROL (0.75%)				$252,525.54
	CONSTRUCTION SURVEYING (1.5%)				$505,051.09
	EROSION CONTROL (0.3%)				$101,010.22
	MOBILIZATION (8% OF ALL CONSTRUCTION ITEMS)				$2,693,605.79
	PROJECT WIDE SUBTOTAL				**$4,478,119.62**
	UNIDENTIFIED ITEMS (20% OF ITEM TOTAL AND PROJECT WIDE TOTAL)				$7,629,638.40
	PROJECT WIDE TOTAL				**$12,107,758.02**
	OTHER PROJECT COST				
	CONSTRUCTION ENGINEERING (10%)	COST		$4,577,783.04	$4,577,783.04
	CONSTRUCTION CONTINGENCIES (5%)	COST		$2,288,891.52	$2,288,891.52
	UTILITY RELOCATIONS	LANE-MILE	0.5	$2,000,000.00	$1,000,000.00
	LANDSCAPING	COST		$250,000.00	$250,000.00
	ENGINEERING DESIGN (8% OF ALL ITEMS)	COST		$3,662,226.43	$3,662,226.43
	RIGHT OF WAY	COST		$26,900,000.00	$26,900,000.00
	ENVIORNMENTAL MITIGATION (UNKNOWN AT THIS TIME)	COST		$0.00	$0.00
	OTHER PROJECT COST TOTAL				**$38,678,900.99**

CONSTRUCTION TOTAL	**$33,670,072.36**
PROJECT WIDE TOTAL	**$12,107,758.02**
OTHER PROJECT COST TOTAL	**$38,678,900.99**
TOTAL PROJECT COST	**$84,456,731.37**
INDIRECT COST ALLOCATION (10.14%)	**$8,563,912.56**
GRAND PROJECT TOTAL	**$93,020,643.93**

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Appendix E. Alternatives Development and Screening, Stage I

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Evaluation category	Proposed criteria		Proposed approach	Build Alternative						No-build
				Corridor management		Expressway		Connector route		
				Score	Notes	Score	Notes	Score	Notes	Notes
Traffic operations	1	Travel time/travel speed	Midday peak period travel time between the Mariposa POE and I-19/Mariposa Road TI	3	- 18 mph average travel speed - 9.67 minute travel time/2.9 miles	4	- Assumes only northbound and southbound POE traffic to/from I-19 use expressway - Local traffic uses frontage roads - LOS A - 60 mph average travel speed - 2.9 minute travel time/2.9 miles	4	- Assumes only northbound and southbound POE traffic from I-19 and Centro Commercial - LOS B - 57 mph average travel speed - 2.9 minute average travel time/2.8 miles	- 12 mph average travel speed - 14 minute travel time/2.9 miles
	2	Reduce vehicle conflicts	Qualitative assessment of access consolidation, elimination or consolidation of driveways, and reduction of conflict points compared to the no-build alternative	3	- Improve existing SR 189 corridor - Implement access management strategies - Intersection improvements	4	- Expressway assumes access-controlled route to I-19 - Access to one-way frontage road system from adjacent land uses may be consolidated - Grade separated intersections at some locations	2	- No change to existing access on SR 189 - Connector route assumes access-controlled route to I-19 - No reduction to vehicle conflicts on existing SR 189	- No change to existing access
		Sub-Total (Average)		**3.0**		**4.0**		**3.0**		
Implementation	3	Phasing and impacts to adjacent businesses	Assessment of the implementation opportunities and constraints for each corridor alternative would be measured by considering construction duration, construction phasing, potential roadway closures, and impacts on existing traffic	5	- Spot improvements have shorter construction duration and immediate traffic operations benefits - Spot improvements reduce potential for road closures. No new bridge structures are proposed over SR 189 which further reduces the possibility of road closures - Impacts on existing traffic are minimized. This corridor alternative would have an at-grade profile which would assist in maintaining access to properties located along the corridor - Flexible implementation since the access management opportunities can be prioritized by identifying the critical locations for spot improvements	2	- Longer construction duration due to construction of a grade separated expressway and new frontage roads - The possibility of road closures are high due to full reconstruction of SR 189. - New bridge structures are proposed over SR 189 which further increases the possibility of road closures - Impacts on existing traffic are increased. This corridor alternative would have a barrier separated expressway that would modify the existing circulation in the area	3	- Longer construction duration due to construction through mountainous terrain - The possibility of road closures are low since construction activities would be focused on the route connections to SR 189 and I-19 - Impacts on existing traffic are minimized or eliminated since this alternative is a new route with no existing access points to be maintained - No existing road or access point that will need to be maintained	- No construction impact
		Sub-Total (Average)		**5**		**2**		**3**		
Environmental impacts	4	Biological resources	Assess presence/impacts to threatened and endangered species, critical habitat, state sensitive species, and protected native plants	3	- Potential impact on Pima pineapple cactus - Requires assessment of habitat for other listed species - Potential impact on protected native plants	3	- Potential impact on Pima pineapple cactus - Requires assessment of habitat for other listed species - Potential impact on protected native plants	2	- Potential impact on Pima pineapple cactus - Impact on undeveloped land would affect greater number of wildlife and plant species - Potential impact on protected native plant species	-No impact on biological resources beyond typical maintenance

Evaluation category	Proposed criteria		Proposed approach	Build Alternative						No-build
				Corridor management		Expressway		Connector route		
				Score	Notes	Score	Notes	Score	Notes	Notes
Environmental impacts	5	Cultural resources	Assess impact on known archaeological and cultural resource sites	3	- Could affect one archaeological site	3	- Could affect one archaeological site	2	- Could affect one archaeological site; could indirectly affect historical district and other historic properties; much more additional survey needed than other alternatives - Potential indirect affects to the Crawford Historic District and Nogales Multiple Resource Area	- No impact on cultural resources
	6	Floodplains and water resources	Assess impact to floodplains, wetlands, riparian areas, and involvement with Section 404 resources	4	- Existing bridged crossing of floodway/potential waters of the U.S. at two locations - Bridge widening at one location	3	- Existing bridged crossing of floodway/potential waters of the U.S. at two locations - Bridge widening at two locations	1	- New crossing of floodway/potential waters of the U.S. - Flood Insurance Rate Map (FIRM) update required - Greatest potential impact to waters of the U.S.	-No impact on floodplains and water resources
	7	Section 4(f) and 6(f)	Section 4(f) resources within 0.25 miles of the alternatives or where access may be of concern	4	- Nogales High School (0.07 miles)	4	- Nogales High School (0.05 miles)	3	- Camp Little Park (0.25 miles) - Mary L. Welty Elementary School (0.03 miles) - Nogales High School (0.04 miles) - Potential visual impact Nogales MRA Crawford Hill Historic District (0.01 miles)	- No impacts to Section 4(f) resources
	8	Soils and topography	Assessment of soils, topography/geology for impacts and fatal flaws		- No limiting impacts or fatal flaws - No impacts on existing developed landforms		- No limiting impacts or fatal flaws - No impacts on existing developed landforms		- Impacts on undeveloped native soils and topography - Impacts on alluvial fan slopes and drainages - No fatal flaws	- No limiting impacts or fatal flaws - No impacts on existing developed landforms
	9	Prime and unique farmland	Acreage of farmland in the alternatives		- No farmland		- No farmland		- No farmland	- No farmland
	10	Visual resources	Evaluate proposed facility form, line, color, and location in relation to existing facilities and development and assess anticipated changes to the visual character. Determine if there are key viewpoints from residential, recreational, or other important areas	4	- Impacts would be primarily at intersections but would be consistent with existing visual character - Impacts anticipated to be low both from the road and to the road	3	- Access controlled roadway and parallel collector-distributer road system would increase the visual footprint of the roadway - Visual character anticipated to remain the same due to existing level and type of development	2	- Potential for new visual impacts close to residential neighborhoods - Potential for additional views of cut slopes - New roadway in undeveloped area	-No impact on visual resources
	11	Title VI/Environmental Justice	Evaluate census tract data within the project area as compared to the City of Nogales and Santa Cruz County		- No disproportionate impacts on minority and environmental justice populations		- No disproportionate impacts on minority and environmental justice populations		- No disproportionate impacts on minority and environmental justice populations	- No disproportionate impacts on minority and environmental justice populations
	12	Hazardous materials	Review of regulatory data to determine the density and location of potential sites	2	- Potential for high density of hazardous materials sites	3	- Potential for moderate density of hazardous materials sites	4	- Low potential for hazardous materials sites	- No impacts to hazardous materials sites

Evaluation category	Proposed criteria		Proposed approach	Build Alternative						No-build
				Corridor management		Expressway		Connector route		
				Score	Notes	Score	Notes	Score	Notes	Notes
Environmental impacts	13	Air quality	Prepare quantitative particulate matter hot-spot analysis for PM^{10} and $PM^{2.5}$, and level 2 qualitative MSAT evaluation		- No discernable differences between alternatives		- No discernable differences between alternatives		- No discernable differences between alternatives	- No air quality or transportation conformity issues
	14	Noise	Prepare noise analysis to evaluate impacts to nearby residential, school, and hospital land uses	3	- Nogales High School (0.07 miles)	3	- Nogales High School (0.07 miles)	2	- Camp Little Park (0.25 miles) - Mary L. Welty Elementary School (0.03 miles) - Nogales High School (0.04 miles)	- No noise impacts
		Sub-Total (Average)		**3.3**		**3.1**		**2.3**		
Cost	15	Construction costs	Assessment of overall corridor costs	5	- $55.5 million (planning level costs)	1	- $150 million (planning level costs)	2	- $120 million (planning level costs)	- $0
	16	Land cost	Assessment of the amount of new right-of-way required for the corridor alternatives. Alternatives that require the least amount of new right-of-way indicates a higher rating and an assessment of potential for full or partial takes	4	- Least right-of-way required - Improvements may avoid full right-of-way takes from residences and businesses	2	- New right-of-way would be added to the existing SR 189 corridor between the Mariposa POE and I-19 for expressway and frontage road footprint - Potential for full and partial right-of-way takes from residences and businesses	3	- New corridor right-of-way would be required between SR 189 and I-19 for the connector route footprint	- No right-of-way impacts
		Sub-Total (Average)		**4.5**		**1.5**		**2.5**		
Regional plan consistency	17	Assessment of compatibility with adopted plans	Qualitative assessment of compatibility with adopted transportation plans	5	- Improvements to the existing corridor is Mariposa / I-19 Connector Route Study preferred alternative - Unified Nogales Santa Cruz County Transportation Plan recommends widening and improvement - Alternative would support anticipated growth in local traffic	4	- Improvements to the existing corridor is Mariposa / I-19 Connector Route Study preferred alternative - Unified Nogales Santa Cruz County Transportation Plan recommends widening and improvement but does not address expressways - Alternative would support anticipated growth of local traffic	2	- Not supported by Mariposa / I-19 Connector Route Study - Not supported by Unified Nogales Santa Cruz County Transportation Plan - Alternative would not directly support anticipated growth of local traffic	- Not supported by Mariposa / I-19 Connector Route Study - Not supported by Unified Nogales Santa Cruz County Transportation Plan - No build would not support anticipated growth of local traffic
		Sub-Total (Average)		**5**		**4**		**2**		
Stakeholder preference	18	Nogales, Santa Cruz County	Preference of corridor alternative	5	- Concern about operations at Frank Reed Road - Stakeholders have passed resolutions in support of the corridor management alternative	1	- Concern about construction access	1	- Concern travelers may not shop in Nogales	
	19	Community	Preference of corridor alternative	3	- Conflicts exist between truck traffic and local traffic	3	- Expressway may keep travelers from shopping in Nogales	3	- Could inhibit development in SR 189 corridor	
		Sub-Total (Average)		**4.0**		**2.0**		**2.0**		
		Total of Averages		**24.8**		**16.6**		**14.8**		

Appendix F. Alternatives Development and Screening, Stage II

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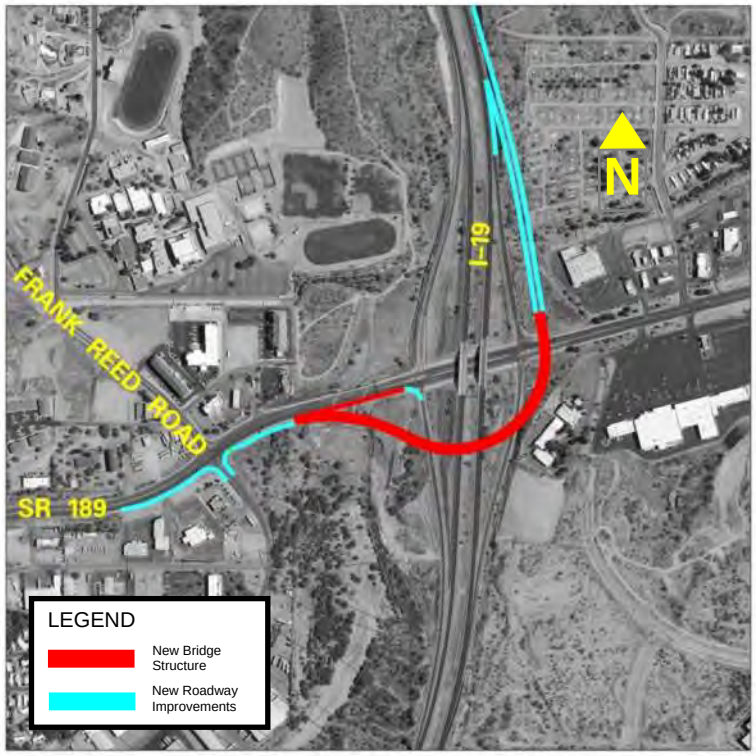
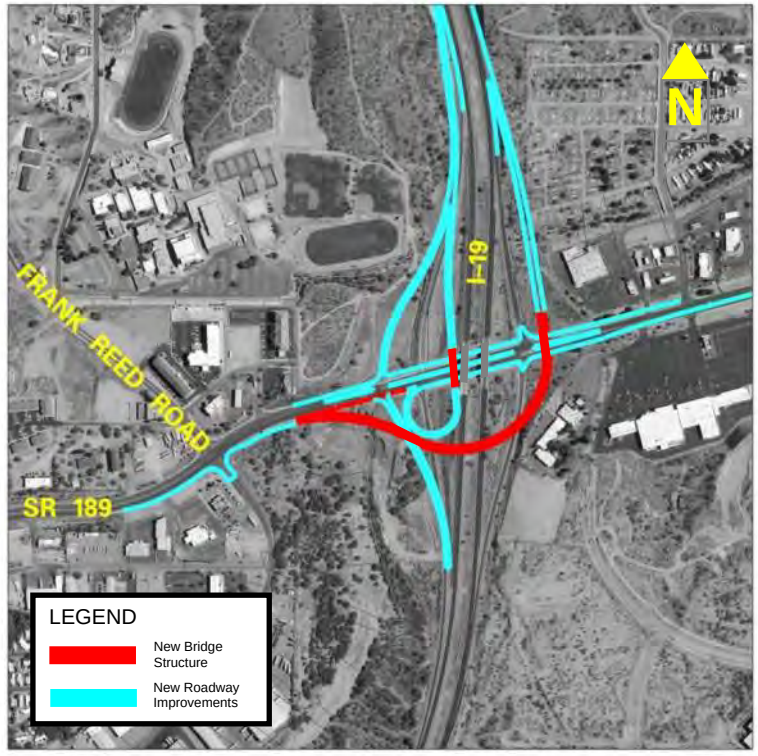
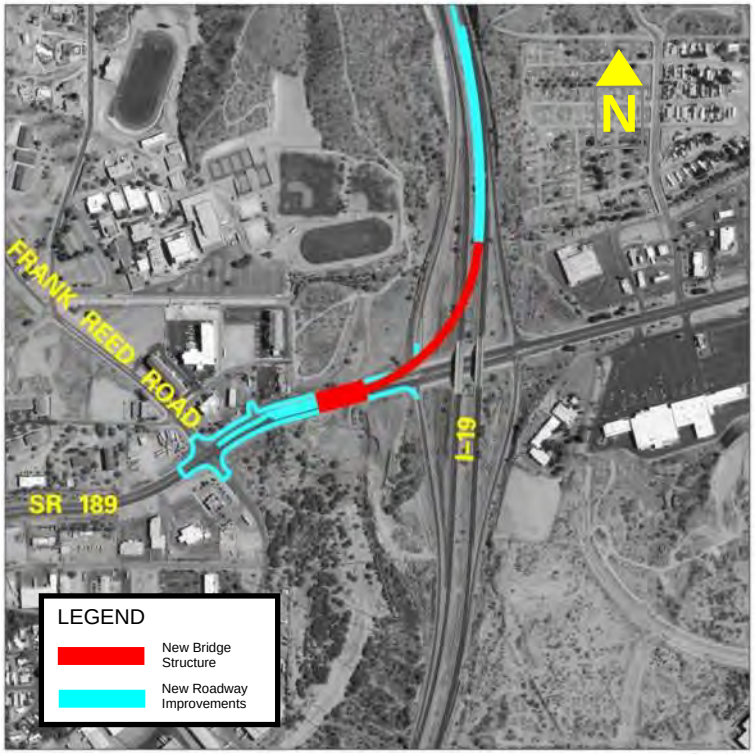
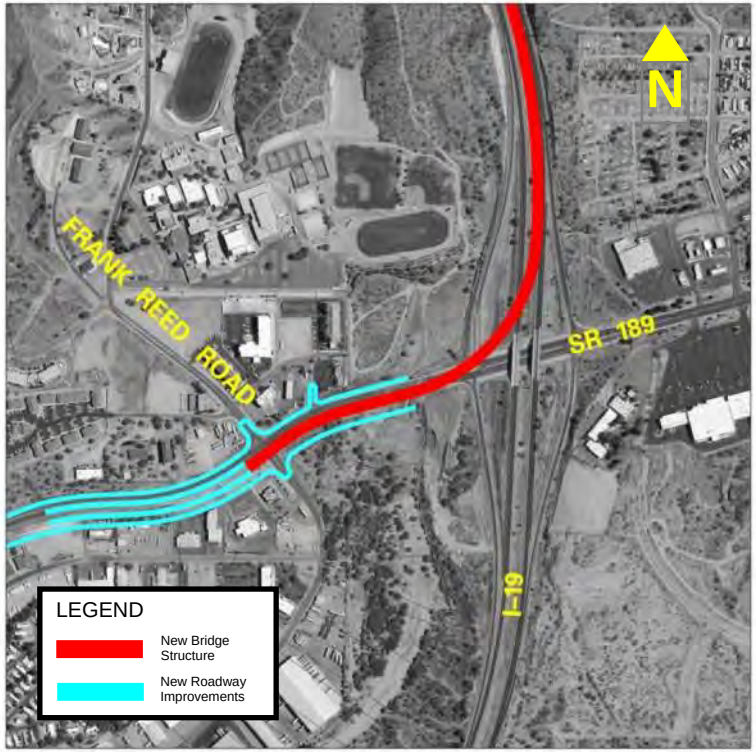
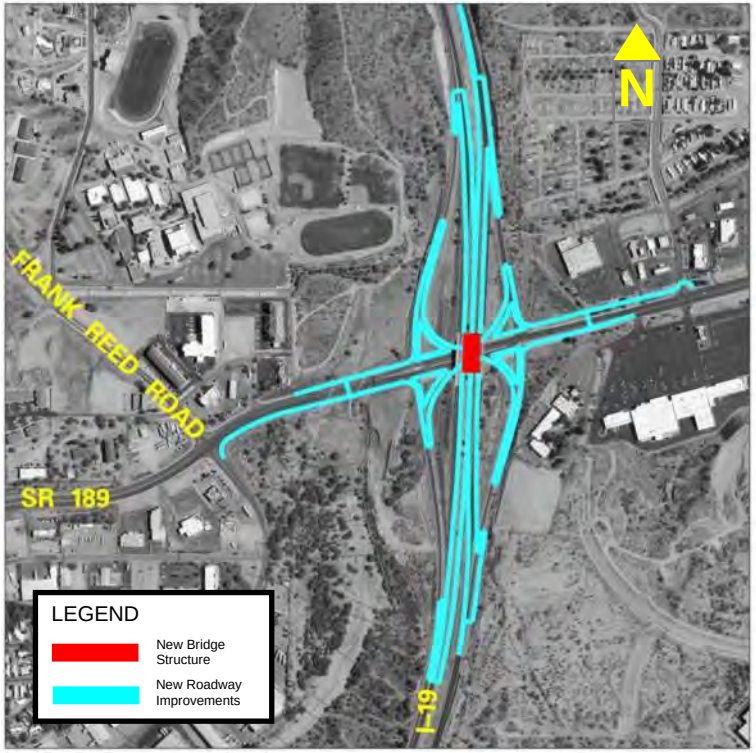
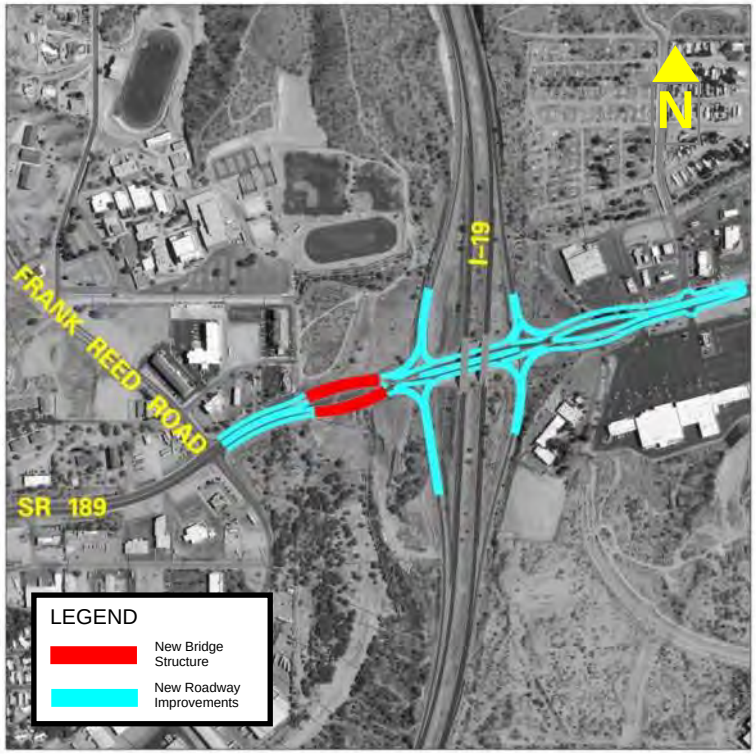
	DIAMOND WITH FLYOVER	DIAMOND WITH FLYOVER AND SE LOOP RAMP
	Option A	**Option B**
Figure		
Key Features	- Provides SR189 EB trucks west of Frank Reed Road the opportunity to bypass the traffic signal to head NB on I-19.	- Provides SR189 EB trucks west of Frank Reed Road the opportunity to bypass the traffic signal to head NB on I-19. - SB I-19 trucks that wish to go EB on SR 189 will be able to bypass the left turn movement by taking the SE loop ramp to access Grand Avenue.

	DIAMOND WITH INSIDE FLYOVER	DIAMOND WITH INSIDE FLYOVER AND GRADE SEPARATION AT FRANK REED ROAD
	Option C	**Option D**
Figure		
Key Features	- Provides SR189 EB trucks west of Frank Reed Road the opportunity to bypass the traffic signal to head NB on I-19. - Minimizes footprint over Mariposa Canyon Wash.	- Provides SR189 EB trucks the opportunity to bypass the traffic signal at Frank Reed Road to head NB on I-19. - Minimizes footprint over Mariposa Canyon Wash.

	SINGLE POINT URBAN INTERCHANGE (SPUI)	DIVERGING DIAMOND INTERCHANGE (DDI)
	Option E	**Option F**
Figure		
Key Features	- Improved traffic operation through the use of a single signal to control the entire interchange.	- This interchange configuration allows for two-phase operation at the intersections. The left turn movements are eliminated to improve the efficiency of the interchange.

Evaluation category	Proposed criteria		Proposed approach	MARIPOSA TRAFFIC INTERCHANGE STAGE II EVALUATION											
				DIAMOND WITH FLYOVER		DIAMOND WITH FLYOVER AND SE LOOP RAMP		DIAMOND WITH INSIDE FLYOVER		DIAMOND WITH INSIDE FLYOVER AND GRADE SEPARATION AT FRANK REED ROAD		SINGLE POINT URBAN INTERCHANGE (SPUI)		DIVERGING DIAMOND INTERCHANGE (DDI)	
				Score	Option A	Score	Option B	Score	Option C	Score	Option D	Score	Option E	Score	Option F
Traffic operations	1A	Intersection operations	Intersection level of service along the SR 189 corridor. 17 intersections were evaluated. Higher level of service indicates better performance.	3	**Mid-day peak hour:** 7 intersections at LOS A/B 7 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 6 intersections at LOS C/D 1 intersection at LOS E/F 1 unknown	3	**Mid-day peak hour:** 7 intersections at LOS A/B 7 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 6 intersections at LOS C/D 1 intersection at LOS E/F 1 unknown	1	**Mid-day peak hour:** 7 intersections at LOS A/B 7 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 5 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown	5	**Mid-day peak hour:** 8 intersections at LOS A/B 7 intersections at LOS C/D 1 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 6 intersections at LOS C/D 1 intersection at LOS E/F 1 unknown	1	**Mid-day peak hour:** 7 intersections at LOS A/B 7 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 5 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown	1	**Mid-day peak hour:** 7 intersections at LOS A/B 7 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown **PM Peak hour:** 9 intersections at LOS A/B 5 intersections at LOS C/D 2 intersection at LOS E/F 1 unknown
	1B	Ramp operations	Ramp intersection level of service at the traffic interchange. 2 intersections were evaluated. Higher level of service indicates better performance.	3	**Mid-day peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F **PM Peak hour:** 1 intersections at LOS A/B 1 intersections at LOS C/D 0 intersection at LOS E/F	5	**Mid-day peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F **PM Peak hour:** 2 intersections at LOS A/B 0 intersections at LOS C/D 0 intersection at LOS E/F	3	**Mid-day peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F **PM Peak hour:** 1 intersections at LOS A/B 1 intersections at LOS C/D 0 intersection at LOS E/F	3	**Mid-day peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F **PM Peak hour:** 1 intersections at LOS A/B 1 intersections at LOS C/D 0 intersection at LOS E/F	1	**Mid-day peak hour:** 0 intersections at LOS A/B 0 intersections at LOS C/D 2 intersection at LOS E/F **PM Peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F	2	**Mid-day peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F **PM Peak hour:** 0 intersections at LOS A/B 2 intersections at LOS C/D 0 intersection at LOS E/F
	1C	Travel time/travel speed	Average intersection delay in the corridor. Lower average intersection delay indicates better performance.	4	Compared to the other TI options, this option had moderate intersection delays for the corridor. Mid-day average intersection delay is 27.1 seconds. PM average intersection delay is 21.4 seconds.	4	Compared to the other TI options, this option had moderate intersection delays for the corridor. Mid-day average intersection delay is 26.2 seconds. PM average intersection delay is 21.6 seconds.	2	Compared to the other TI options, this option had moderate intersection delays for the corridor. Mid-day average intersection delay is 27.3 seconds. PM average intersection delay is 25.1 seconds.	5	Compared to the other TI options, this option had the lowest intersection delays for the corridor. Mid-day average intersection delay is 24.4 seconds. PM average intersection delay is 21.3 seconds.	1	Compared to the other TI options, this option had the highest intersection delays for the corridor. Mid-day average intersection delay is 28.5 seconds. PM average intersection delay is 25.3 seconds.	2	Compared to the other TI options, this option had moderate intersection delays for the corridor. Mid-day average intersection delay is 26.5 seconds. PM average intersection delay is 25.7 seconds.
		Sub-Total (Average)		**3.3**		**4.0**		**2.0**		**4.3**		**1.0**		**1.7**	
Pedestrian and bicycle travel	2	Ease of movement through intersection	Assessment of pedestrian and bicycle circulation through the interchange. Minimal restrictions to pedestrian and bicycle circulation indicates better performance.	1	Pedestrian movement may need to be restricted to the north side of SR 189 but may be mitigated.	1	Pedestrian movement may need to be restricted to the north side of SR 189 but may be mitigated.	5	Pedestrian movement allowed for both north and south side of SR 189.	5	Pedestrian movement allowed for both north and south side of SR 189.	3	Pedestrian movement allowed for both north and south side of SR 189. Additional cross walk locations required	2	Pedestrian movement allowed for both north and south side of SR 189. Additional cross walk locations required
		Sub-Total (Average)		**1.0**		**1.0**		**5.0**		**5.0**		**3.0**		**2.0**	
Route continuity	3	Ability of vehicles to go through or reverse directions	Assessment of how vehicles can continue on I-19 through the proposed interchange. The ability for vehicles to continue on I-19 or reverse directions through the interchange alternative indicates better performance.	5	Vehicles can continue on I-19 through the proposed TI or reverse directions.	5	Vehicles can continue on I-19 through the proposed TI or reverse directions.	5	Vehicles can continue on I-19 through the proposed TI or reverse directions.	5	Vehicles can continue on I-19 through the proposed TI or reverse directions.	1	Vehicles will have restrictions to continue on I-19 through the proposed TI. Vehicles can reverse directions on I-19 through the proposed TI.	1	Vehicles will have restrictions to continue on I-19 through the proposed TI. Vehicles can reverse directions on I-19 through the proposed TI.
		Sub-Total (Average)		**5.0**		**5.0**		**5.0**		**5.0**		**1.0**		**1.0**	
Environmental impacts	4A	Cultural resources	Assessment of interchange impact on known cultural resources sites. No impacts to sites indicates better performance.	1	Impacts NRHP-eligible archaeological site	1	Impacts NRHP-eligible archaeological site	3	May or may not impact NRHP-eligible site; field investigation required	3	May or may not impact NRHP-eligible site; field investigation required	1	Impacts NRHP-eligible archaeological site	4	No impacts to known cultural resources (survey may be required resulting in discovery)
	4B	Floodplains and water resources	longitudinal wash crossings introduce greater impacts than perpendicular crossings, or bridges.	3	Longitudinal crossings of washes in the NE quadrant of the TI	1	Longitudinal crossings of washes in the NE quadrant of the TI. More extensive reconfiguration of the TI; therefore, more potential for impacts (especially on the west side of the TI)	2	Improvements may extend outside existing roadway footprint due to bridge widening.	4	Improvements are within the existing roadway footprint; therefore minimal impact, if any.	4	Improvements are within the existing roadway footprint; therefore minimal impact, if any.	2	Improvements may extend outside existing roadway footprint due to bridge widening.

Evaluation category	Proposed criteria		Proposed approach	MARIPOSA TRAFFIC INTERCHANGE STAGE II EVALUATION											
				DIAMOND WITH FLYOVER		DIAMOND WITH FLYOVER AND SE LOOP RAMP		DIAMOND WITH INSIDE FLYOVER		DIAMOND WITH INSIDE FLYOVER AND GRADE SEPARATION AT FRANK REED ROAD		SINGLE POINT URBAN INTERCHANGE (SPUI)		DIVERGING DIAMOND INTERCHANGE (DDI)	
				Score	Option A	Score	Option B	Score	Option C	Score	Option D	Score	Option E	Score	Option F
Environmental impacts	4C	Section 4(f) and 6(f)	No direct or constructive uses are anticipated. Proximity impacts may vary depending on how close the roadway is to Section 4(f) resources. There are no known historic Section 4(f) resources that would be impacted by the TI.	5	No changes to the roadway adjacent to Nogales High School	4	No direct use. Option B is adjacent to Nogales High School and likely to have the most proximity impacts. Unlikely there will be constructive use of the resource	5	'No changes to the roadway adjacent to Nogales High School	5	'No changes to the roadway adjacent to Nogales High School	5	Changes to the roadway adjacent to Nogales High School are within the existing roadway footprint.	5	Changes to the roadway adjacent to Nogales High School are within the existing roadway footprint.
	4D	Visual resources	Flyovers are more visually intrusive than at-grade roadway features; internal flyovers less so than outside flyovers.	2	Outside flyover	2	Outside flyover, but more extensive reconfiguration of the TI which introduces more and different elements	3	Inside flyover	3	Inside flyover, but elevated over the greatest distance of any of the alternatives	5	All proposed roadway elements match existing roadway grade. Proposed elements are within the current roadway footprint	5	All proposed roadway elements match existing roadway grade. match existing roadway grade. Proposed elements are within the current roadway footprint
	4E	Hazardous materials	The greater the number of known hazardous materials sites within the proposed footprints, the greater the potential impact.	3	Three hazardous materials sites within proposed TI footprint	3	Three hazardous materials sites within proposed TI footprint	4	Two hazardous materials sites within the proposed TI footprint	2	Four hazardous materials sites within the proposed TI footprint	3	Three hazardous materials sites within the proposed TI footprint	3	Three hazardous materials sites within the proposed TI footprint
	4F	Noise	Proximity of noise generators to residences and business would be considered to have a greatest impact. Additionally, the higher roadway structures would also increase noise exposure to residences and businesses	2	Higher potential noise impacts due to flyover. Roadway is closer to residents and businesses than existing condition.	1	Higher potential noise impacts due to flyover. Roadway is closer to residents and businesses than existing condition. This option scores lower than Option A because its proximity to Nogales High School.	3	Higher potential noise impacts due to flyover. Flyover is inside the existing roadway footprint; therefore, it's distance to residents and businesses remains similar to existing.	2	Although this option is essentially within the existing roadway footprint, it is elevated for a much longer distance than the other options, increasing noise exposure to noise receptors.	5	Within existing roadway footprint and no changes to existing grade	5	Within existing roadway footprint and no changes to existing grade
		Sub-Total (Average)		**2.7**		**2.0**		**3.3**		**3.2**		**3.8**		**4.0**	
Cost	5A	Bridge Structures	Assessment of the locations and types of structures required to support the interchange alternative. A reduction in the amount of bridge required indicates a higher rating.	3	1) New bridge structure over I-19 for the flyover (Length=2000'); 2) Widening to the south of existing bridge structure over Mariposa Canyon Wash	2	1) New bridge structure over I-19 for the flyover (Length=2000'); 2) Widening to the south of existing bridge structure over Mariposa Canyon Wash; 3) SE loop ramp bridge structure over SR 189 (Length=200')	3	1) Modification or reconstruction of existing bridge over Mariposa Canyon Wash to accommodate retaining walls and flyover ramp (Length=300'); 2) New bridge structure over I-19 for the flyover (Length=1200')	1	1) Modification or reconstruction of existing bridge over Mariposa Canyon Wash to accommodate retaining walls and flyover ramp (Length=300'); 2) New bridge structure over Frank Reed Road intersection and I-19 for the flyover (Length=3800')	3	1) New single span I-19 bridge structure required over SR 189 (Length=250')	4	1) Modification or reconstruction of existing bridge over Mariposa Canyon Wash
	5B	Retaining Walls	Assessment of the locations and types of structures required to support the interchange alternative. A reduction in the amount of retaining walls required indicates a higher rating.	4	Minimal to no retaining walls required.	4	Minimal to no retaining walls required.	3	Moderate amount of retaining walls required due to inside flyover ramp structure.	1	High amount of retaining walls required due to grade separation west of Frank Reed Road intersection.	5	Minimal to no retaining walls required.	5	Minimal to no retaining walls required.
	5C	Evaluate the amount of right-of-way required	Assessment of the amount of new right-of-way required for the interchange alternatives. Alternatives that require the least amount of new right-of-way indicate a higher rating.	2	New R/W required along SR 189 and I-19 due to flyover.	1	New R/W required along SR 189 and I-19 due to flyover and the reconfiguration of the SB ramps.	5	Additional R/W may not be required.	5	Additional R/W may not be required.	4	Layout would likely fit within the existing R/W.	2	Additional R/W may be required along SR-189 on either side of I-19 as the layout bulges out from existing.
		Sub-Total (Average)		**3.0**		**2.3**		**3.7**		**2.3**		**4.0**		**3.7**	

Evaluation category	Proposed criteria		Proposed approach	MARIPOSA TRAFFIC INTERCHANGE STAGE II EVALUATION											
				DIAMOND WITH FLYOVER		DIAMOND WITH FLYOVER AND SE LOOP RAMP		DIAMOND WITH INSIDE FLYOVER		DIAMOND WITH INSIDE FLYOVER AND GRADE SEPARATION AT FRANK REED ROAD		SINGLE POINT URBAN INTERCHANGE (SPUI)		DIVERGING DIAMOND INTERCHANGE (DDI)	
				Score	Option A	Score	Option B	Score	Option C	Score	Option D	Score	Option E	Score	Option F
Implementation	6A	Construction Phasing	Assessment of the implementation opportunities and constraints for each TI alternative would be measured by how the alternative can be phased to provide shorter construction durations.	5	Potentially shorter construction durations due to most activities occurring outside the existing roadway footprint. Most construction activities can occur under live traffic.	5	Potentially shorter construction durations due to most activities occurring outside the existing roadway footprint. Most construction activities can occur under live traffic.	3	Potentially moderate construction durations due to detours required for retaining wall and flyover construction along SR-189.	1	Potentially long construction durations due to detours required for retaining wall and flyover construction. NB and SB movements through the Frank Reed Road intersection will require detours or closures due to grade separated structure construction.	2	Potentially long construction durations due to detours required for removal and construction of the I-19 mainline bridge. Potential re-profiling of I-19 may be required to provided minimum vertical clearance on SR 189.	2	Potential mainline or ramp closures not anticipated. Potentially shorter construction durations due to most activities occurring outside the existing roadway footprint. However, re-striping and signing the DDI could potentially increase construction durations.
	6B	Construction impacts to adjacent businesses	Assessment of the implementation opportunities and constraints for each corridor alternative would be measured by considering impacts to adjacent businesses due to potential roadway closures and impacts on existing traffic	4	Potential mainline or ramp closures at 5 locations. Impacts to existing driveways before and after construction are not anticipated.	3	Potential mainline or ramp closures at 5 locations. Impacts to existing driveways before and after construction are not anticipated.	2	Potential mainline or ramp closures at 3 locations. Existing driveway east of Frank Reed Road will need to be revised as a right-in/right-out.	1	Potential mainline or ramp closures at 4 locations. Existing driveway east of Frank Reed Road will need to be revised as a right-in/right-out. Businesses west of Frank Reed Road will only have right-in/right-out access due to inside ramp entrance.	2	Potential mainline or ramp closures at 1 location. Impacts to existing driveways before and after construction are not anticipated.	2	Potential mainline or ramp closures not anticipated. Impacts to existing driveways are anticipated east and west of I-19.
		Sub-Total (Average)		**4.5**		**4.0**		**2.5**		**1.0**		**2.0**		**2.0**	
Design considerations	7A	Ramp grades	Assessment of profile grades for ramps. 3% grade or less is desirable.	3	Approximately 4% grade at flyover ramp entrance.	3	Approximately 4% grade at flyover ramp entrance.	1	Approximately 5.2% grade at flyover ramp entrance.	4	Approximately 3% grade at flyover ramp entrance.	4	Alternative matches existing ramp grades.	5	Alternative matches existing ramp grades.
	7B	Driver Expectancy	Assessment of general expectations of the public for the corridor. Assumes that the drivers are anticipating a standard diamond TI that is consistent with the majority of the TIs within the corridor.	5	TI configuration and flyover ramp location is consistent with other TIs in the corridor.	4	TI configuration and flyover ramp location is consistent with other TIs in the corridor. This alternative contains a loop ramp that provides an additional movement from SB I-19 to EB SR 189 that will require additional signage.	2	TI configuration is consistent with other TIs in the corridor. The inside entrance/exit flyover ramp at SR 189 and I-19 is not typical of the corridor.	2	TI configuration is consistent with other TIs in the corridor. The inside entrance/exit flyover ramp at SR 189 and I-19 is not typical of the corridor.	3	TI configuration is not consistent with other TIs in the corridor but is still pretty similar to a diamond TI.	1	TI configuration is not consistent with other TIs in the corridor.
	7C	Weaving distance along SR189	Assessment of weaving distance from the Frank Reed Road/SR 189 intersection to I-19 entrance ramps. Desirable weaving distance is 1000'.	1	Desirable weaving distance for EB SR 189 to NB I-19 is 1000'. 450' provided.	1	Desirable weaving distance for EB SR 189 to NB I-19 is 1000'. 450' provided.	1	Desirable weaving distance for EB SR 189 to NB I-19 is 1000'. 450' provided.	5	Desirable weaving distance is met.	5	Desirable weaving distance is met.	5	Desirable weaving distance is met.
		Sub-Total (Average)		**3.0**		**2.7**		**1.3**		**3.7**		**4.0**		**3.7**	
Stakeholder and Public Input	8A	Stakeholder	Assesment of the support for the TI alternative	5	Support for this alternative and for alternative D or maybe a hybrid of the two.	3	Neutral support	3	Potential conflicts with high school kids at the Frank Reed Road intersection.	5	This option would get the trucks away from the high school kids. Support for this alternative and for alternative A or maybe a hybrid of the two.	3	Neutral support	3	Neutral support
	8B	Agency	Assesment of the support for the TI alternative	3	Neutral support	3	Neutral support	3	Neutral support	3	Neutral support	3	Neutral support	3	Neutral support
	8C	Community	Assesment of the support for the TI alternative	5	Best option for the increase of the trucking industry.	5	Will address exiting and entering I-19 traffic and is safer for the produce trucks.	5	Support for this alternative along with related improvemnts between SR 189 and Frank Reed Road.	5	This option will cut down congestion, eliminates the mix of pedestrian and vehicle conflicts, and reduces the mix of commercial and inexperienced drivers at Frank Reed Road.	3	Neutral support	5	This option appears to be the best improvement versus cost option.
		Sub-Total (Average)		**4.3**		**3.7**		**3.7**		**4.3**		**3.0**		**3.7**	
		Total of Averages		**26.8**		**24.7**		**26.5**		**28.8**		**21.8**		**21.7**	

Appendix G. Traffic and Safety Files

Available upon request

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