



U.S. DEPARTMENT OF TRANSPORTATION

**ADVANCED TRANSPORTATION AND CONGESTION MANAGEMENT
TECHNOLOGIES DEPLOYMENT INITIATIVE**

Project Name	City of Las Cruces ITS Interconnect Implementation
Eligible Entity Applying to Receive Federal Funding	City of Las Cruces
Total Project Cost (from all sources)	\$9,276,714.00
ATCMTD Request	\$4,624,343.00
Are matching funds restricted to a specific project component? If so, which one?	No
State(s) in which the project is located?	New Mexico
Is the project currently programmed in the: <ul style="list-style-type: none"> • Transportation Improvement Program (TIP) • Statewide Transportation Improvement Program (STIP) • MPO Long Range Transportation Plan • State Long Range Transportation Plan 	Yes, the project is in the MPO Long Range Transportation Plan titled, "Metropolitan Transportation Plan" (MTP).
Technologies Proposed to be Deployed (briefly list)	Fiber Optic INTERCONNECT Integration of Signal Systems with Traffic Management Center through Centrac ATMS PTZ Cameras Adaptive Signal Timing Bluetooth Travel Time Systems Dilemma Zone Protection State-of-the-Art Radar and Video Detection Systems Upgraded Cabinets and Advanced Controllers

CITY OF LAS CRUCES ITS INTERCONNECT IMPLEMENTATION

TABLE OF CONTENTS

Project Description

Introduction	Page 2
Description of Entity	Page 3
Geographic Area	Page 5
Challenges Addressed by Project	Page 8
Transportation System and Services	Page 10
Deployment Plan	Page 12
Challenges to Deployment	Page 14
System Performance Improvements	Page 15
Safety, Mobility, and Environmental Benefit Projections	Page 17
Vision, Goals and Objectives for Technology Deployment	Page 20
Partnering Organizations	Page 20
Local and Regional Advanced Transportation Technology	Page 22
Schedule for Deployment	Page 23

Staffing Description

Management of the Project	Page 26
Primary Point of Contact	Page 27

Appendices	Page 28
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CITY OF LAS CRUCES ITS INTERCONNECT IMPLEMENTATION

PROJECT DESCRIPTION

The goal of the INTERCONNECT phase of the City of Las Cruces' (City) Traffic Management Plan is to improve the current transportation system for all users by reducing travel times, improving traffic signal coordination, providing real-time traffic advisory information, reducing vehicle emissions, providing intelligent transportation system improvements that will optimize the efficiency of the transportation system, and increase mobility for transportation users throughout the Las Cruces Metropolitan Statistical Areas (MSA).

The City's Traffic Management Project is designed to address not only the immediate needs of the current system but to build a foundation for future improvements in the transportation system for the Las Cruces MSA. The overall plan for the project established existing conditions and infrastructure needs and; considering such items as planned road and utility improvements, other construction projects, expected development patterns, and the needs of all transportation system users; developed a logical, phased implementation approach that could be tailored to funding as it became available. The entire project includes design documents for Intelligent Transportation System (ITS) level interconnectivity including fiber optics, traffic signal boxes, electrical pull boxes, detection equipment, signal mast arms and bases, and intersections at which traffic signal hardware needs replacement or additions, to include, if applicable, ADA improvements and right-of-way acquisition needs to make needed geometric design improvements. Construction of an advanced traffic control center, server and connectivity needs, and recommended Intelligent Transportation System software upgrades will also be included.

The project has been phased and to date the traffic control center, server, and the advanced traffic management software (ATMS) for the ITS have been completed, including the construction of a dedicated traffic management control center. Also completed are several stretches of fiber optic infrastructure and intersection connectivity with the ATMS. This has allowed for the testing of the software and other traffic control center capabilities. The City is now ready to complete the phase of installing all the fiber optic infrastructure, adding conduit where necessary, installing the fiber optic switches and controllers, as well as the detection equipment at all intersections. The funding being requested is for this phase of the project, deemed the ITS INTERCONNECT Implementation Phase (INTERCONNECT). The funding for the completed sections and the traffic management control center have come from the New Mexico Department of Transportation (NMDOT), NM State legislative funding, and City funds. In order to fully implement the capacity of the ATMS control software, funding for the INTERCONNECT phase of the project is critical. Without the fiber optic connections to all intersections across the area, the remaining phases of the City's Traffic Management Project cannot be designed and implemented disallowing full ITS integration. The City of Las Cruces will be the entity entering into the agreement with FHWA, should funding be award. We will work in partnership with NMDOT, the Town of Mesilla, and Doña Ana County.

The City of Las Cruces Streets and Traffic Operations Department currently maintains 120 traffic signals in the City, the Town of Mesilla, on the campus of New Mexico State University, and in

Doña Ana County. The signal system, portions of which date back to the 1970's, is antiquated and the department relies on dial-up technology to communicate remotely with the signals. The previous signal management software, Aries, was installed in the early 1990's and was limited in its ability to accommodate coordinated timing and the number of signals in the system. The new ATMS software performs optimally with fiber optic connectivity, but an internal fiber optic infrastructure network along nearly all major traffic corridors is non-existent, due to a lack of available funding for the large up-front expense of installation.

Las Cruces and the surrounding areas continue to grow in population and pressure on major traffic corridors and signalized intersections has compounded. However, the current traffic signal system does not allow for effective signal coordination, adaptive real-time adjustments to improve traffic flow, incident management, and other ITS technologies. Because of these issues, congestion and periodic intersection failures in several locations occurs and results in public outcry for a better coordinated signal system.

Description of Entity

The City of Las Cruces is in the southern region of New Mexico, approximately 45 miles from the Texas/Mexico border. The City is surrounded by large rural areas that make up the balance of Doña Ana County, New Mexico.



The mission of the City of Las Cruces is to provide responsive, cost effective and high quality services to the citizens of Las Cruces. The City Council works with the City Manager to shape the strategic direction based on specific goals outlined in the City's Strategic Plan. As noted in the Strategic Plan, the City is guided by five principles which include: excellence, integrity, customer focus, fiscal responsibility, and goal-oriented management. Utilizing these principles, key priorities are defined for Council and Staff on behalf of the community. They include

economic development, funding strategies, community revitalization, sustainability initiatives, and organizational excellence.

The City has many strengths throughout the fifteen departments that provide services and support to the residents of the greater Las Cruces community. In relation to this project the City will function as the backbone agency supporting the collaboration among the Town of Mesilla and Doña Ana County in achieving the overall goal of the project. The City has cooperative agreements with both entities to maintain and improve the signals in their jurisdictions. The City also has an agreement NMDOT for ITS to share fiber optics and infrastructure to connect the system to the larger NMDOT network. This ensures that a collective impact is realized to improve the connectivity of all major traffic corridors throughout the greater metropolitan area. The City has the needed organizational capacity to coordinate the shared vision and provide the long-term staffing resources to see the project to fruition.

The City implements a diverse and perpetual funding strategy to ensure there are sufficient funds to provide services and infrastructure improvements to the community in a fiscally responsible manner. These funding sources include taxes, bonds, loans, grants and program income. As noted by our independent auditing firm in a recent presentation to the City Council, the City is in a strong financial position for the upcoming years. During the same presentation, the auditors noted that the City ended the last fiscal year with a positive net revenue over expenses. The City traditionally maintains double the state's required reserve and has taken steps to provide funding streams for future infrastructure and development.

There are currently 1,245 regular full-time employees; 25 temporary full-time employees; 85 regular part-time employees; and 136 temporary part-time employees at the City. Additionally, there are 18 part-time employees and 133 full-time employees at the entities with which we have joint power agreements and are fiscal agent for. The Network Volunteer Center which organizes volunteers for most of the departments in the City has 350 volunteers registered.

The City houses the Mesilla Valley Metropolitan Planning Organization for Doña Ana County, which is responsible for planning all aspects of the transportation system including bicycle, auto, pedestrian, public transit, and aviation in Las Cruces, Mesilla, and part of Doña Ana County. This project is a part of the long-range Metropolitan Transportation Plan, which discusses the implementation of an ITS traffic management system as a priority that aligns with the Transportation Principles laid out in the plan. Those principles include:

- Maintain and improve the existing transportation system, first and foremost.
- Connect people to jobs, goods, services, education, and recreational opportunities.
- Preserve natural, cultural, historical, and agricultural resources.
- Promote and design healthy and livable communities.
- Provide and improve multi-modal and intermodal options for all users.
- Increase transportation safety for all users, starting with the most vulnerable modes.

The MTP further discusses specific projects in the Transportation Projects Priorities Plan is a map that brings together projects for all modes that are on a list to be funded, or are on the TIP and already funded. The map illustrates the following types of projects:

- projects funded in the 2016-2021 TIP
- prioritized illustrative unfunded projects
- corridors that would benefit from Intelligent Transportation Systems (ITS) applications
- transit projects that cannot be illustrated on the map

The Transportation Project Priorities Plan, as well as the full Metropolitan Transportation Plan, can be view on the Mesilla Valley MPO website at: <http://mesillavalleympo.org/mpo-documents-resources/>

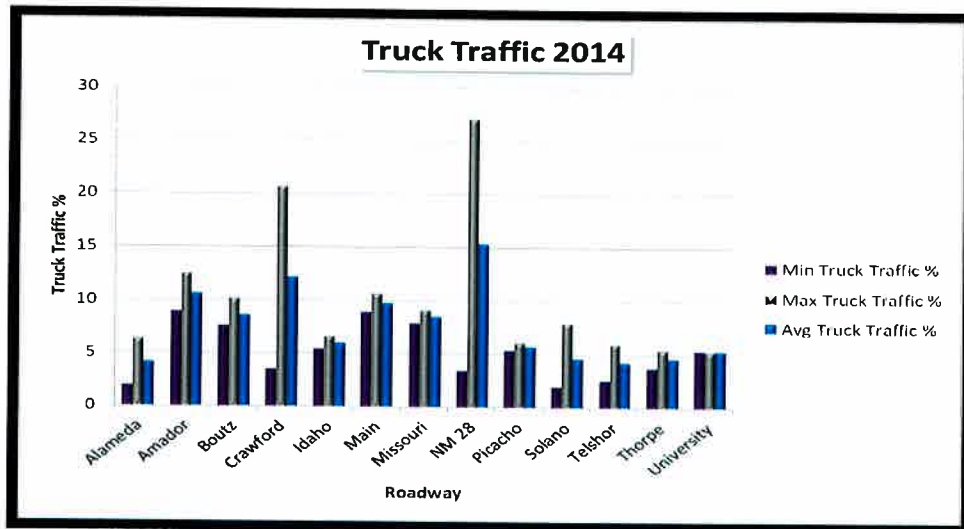
Geographic Area

The City serves as the main hub of the south central New Mexico region, providing employment and services to not only Las Cruces residents but to those in the adjacent community of Mesilla and the surrounding unincorporated areas of Doña Ana County. Additionally, individuals residing in El Paso, Texas and Ciudad Juarez, Mexico to the south; and NASA White Sands Missile Range and the White Sands Test Facility to the east; travel to and from the Las Cruces MSA on a regular basis for a variety of reasons including for employment, school, medical services, and personal/leisure reasons.

The Las Cruces MSA has a young, growing regional workforce. Many residents in the rural areas commute to Las Cruces or El Paso for employment, and the following are some statistics regarding the workforce and commuting provided by the Mesilla Valley Economic Development Alliance (MVEDA), <http://www.mveda.com/data-center/labor-market/>.

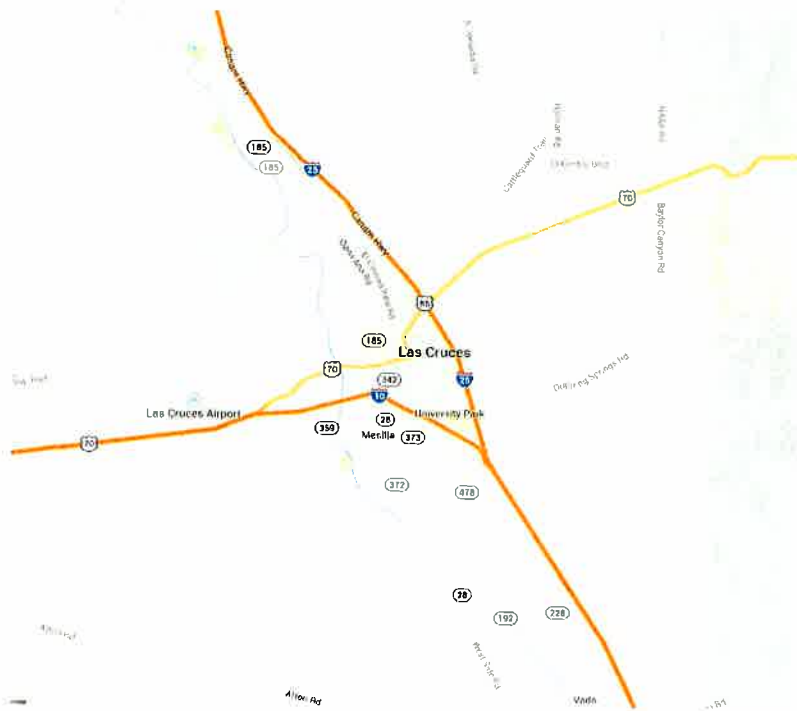
- The regional civilian labor force within a one-hour commute exceeds 450,000 (in the U.S.)
- The unemployment rate within a one-hour commute is 9.7%
- The average wage per job within a one-hour commute is \$34,668
- The median age within a one-hour commute is 34.6
- The average commute time is 20 minutes within the Las Cruces area

Las Cruces is located at the intersection of the three critical arterials of Interstate 10 and 25, and US Highway 70. There is a great deal of long-haul truck traffic utilizing the services available in Las Cruces while moving to other major cities. Traffic from the recently enhanced Santa Teresa Port of Entry with Mexico that needs to go north on I-25, west on I-10, or east on US Hwy 70 comes through the Las Cruces MSA and many will utilize services taking them from the interstate or highway onto the surface roads in Las Cruces. A 13.8-mile corridor of US Hwy 70 goes through the center of Las Cruces, resulting in a large number of long-haul trucks moving through the most congested parts of the City and the surrounding area. The Las Cruces area is the 12-hour stopping point for many over the road truckers traveling east or west, thus requiring them to utilize the services available in Las Cruces, as opposed to stopping on the interstate. As shown on the graph below, the amount of truck traffic on major arterial roads in the area in 2014 is significant, <http://mesillavalleympo.org/wp-content/uploads/2016/01/truckroutemap.pdf>.



The population of the Las Cruces MSA is estimated at 101,408 (July 1, 2014, US Census QuickFacts), with 61.5% of the population in the civilian workforce. This does not include the military workforce at the nearby White Sands Missile Range, Holloman Air Force Base, and Fort Bliss, many of whom reside in the Las Cruces area. Additionally, many members of the Border Patrol that serve the surrounding areas live in Las Cruces. There is a large volume of traffic in areas where major residential areas feed into the main arterials in Las Cruces. Additionally, the City of Las Cruces has a robust transit system, RoadRUNNER Transit operating fixed route buses and paratransit vehicles throughout the area. Regionally, there is the NMDOT Park & Ride transit program that operates buses for commuters between El Paso, Texas; Anthony; Las Cruces; and Alamogordo, all in New Mexico. ZTrans operates transit routes from Las Cruces to Otero County locations to the east and the South Central Regional Transit District operates transit buses that travel north and south in the county.

The City of Las Cruces, New Mexico, is situated at the crossroads of three major arterials: Interstates 10 and 25, and U.S. Highway 70; all of which carry heavy volumes of traffic. Traffic loads on these arterials include personal and public safety transportation (cars, vans, trucks, ambulances and motorcycles); freight trucks; international and cross-national transit (large capacity transit buses); hazardous materials transiting cross-country, to and from the NASA White Sands Missile Range and to and from the White Sands Test Facility; and occasional military transport vehicles. Compounding over-the-road transportation concerns is the Burlington Northern Santa Fe (BNSF) freight-only railway system that cuts through the heart of Las Cruces and carries hundreds of railcars each day loaded with a variety of goods and products. The Las Cruces MSA contains approximately 77 square miles with a population of 101,408 (U.S. Census 2010/2014-estimate). The area experiences seasonal increases in population due to New Mexico State University enrollment and agricultural workers. The City has a large variety of residential, commercial and industrial facilities spread throughout its area. Despite the recent economic downturn, the City's population continues to grow: up approximately 3.9% from 97,618 in 2010. Below is an area map of Las Cruces for reference as it relates to the major arterials:



The City is New Mexico's second largest city and is located in the southwest region of the state. It is located approximately 42 miles from the United States/Mexico International Border. Las Cruces and its surrounding area is a high desert climate. Large diurnal temperature variations, sometimes as much as 50 degrees in a 24-hour period, and extremely high winds are common, primarily from February-May every year. The high winds periodically cause severe dust storms that result in low to no-visibility conditions and necessitate highway closures during the windy seasons.

According to current US Census statistics (US Census 2010-2014 estimate), the median household income for the City of Las Cruces is \$40,658; slightly lower than the state of New Mexico's figure of \$44,968, and well below the U.S. average of \$53,482. Approximately 24% of Las Cruces' citizens are reported to earn below the poverty level; higher than the state figure of 21.3% and significantly higher than the reported national figure of 14.8%. Below is a table showing population, demographic and income data as reported by the U.S. Census 2010-2014 estimates, http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

QuickFacts: PEOPLE	LAS CRUCES	NEW MEXICO
Population, 2014 estimate	101,408	2,085,572
Population, 2010 (April 1) estimates base	97,636	2,059,192
Population, percent change, April 1, 2010 to July 1, 2014	3.9%	1.3%
Population, 2010	97,618	2,059,179
Hispanic or Latino, percent, 2010	56.8%	46.3%
White alone, not Hispanic or Latino, percent, 2010	37.5%	40.5%
Households, 2010-2014	38,670	764,684

Per capita money income in past 12 months (2014 dollars), 2010-2014	\$21,782	\$23,948
Median household income, (2014 dollars) 2010-2014	\$40,658	\$44,968
Persons below poverty level, percent	23.9%	21.3%

According to the MVEDA, the Las Cruces area has an economy driven by aerospace research and development, through the work done at the NASA White Sands Test Facility and White Sands Missile Range, as well as several private companies and public/private partnerships located in the area. It has an ever-increasing base of private employers and light manufacturing facilities, including two solar energy manufacturing firms, a biotechnological energy company, and research companies. Located nearby is the developing Spaceport America and the Union Pacific Intermodal Center. Along with the traditional agriculture base of the community, all these unique factors make the Las Cruces area an ideal place for business opportunities.

MVEDA has identified seven target industries based on the regional assets, these include:

- Manufacturing & Logistics – because of the close proximity and easy access to the maquila plants in north-central Mexico.
- Aerospace – due to rapidly expanding opportunities in commercial spaceflight and demand for Unmanned Aerial Systems.
- Renewable Energy – with an average of 340 days of sunshine and plenty of available land, solar energy projects and other renewable energy opportunities are available.
- Business & Financial Services – the area has a high percentage of bilingual (English-Spanish) population and competitive business costs.
- Technology – NM State University and other technology businesses in the area make it desirable to increase the technology base.
- Value-Added Agriculture – a large number of food crops, food processing and bio-fuel exist and allow for new opportunities.
- Digital Media – degree programs at area universities and community colleges train a workforce for film, digital media, and gaming.

Each of these target industries, as well as the existing economic base will benefit from the Las Cruces area improving its current traffic management system making the area more desirable to new industries and businesses that rely on a variety of transportation methods to move their products and attract skilled employees. Information on the economic make-up of the region can be found at the MVEDA website: <http://www.mveda.com/>.

Challenges Addressed by Project

The scope of the CLC Traffic Management Project encompasses the greater Las Cruces MSA. As this project affects the entire transportation network of Las Cruces and the surrounding area, all users of the transportation system, including motorists, cyclists, transit riders, and pedestrians benefit from the proposed traffic management improvements as outlined in the plan. It will also provide benefits to users of Interstate 10, a major east-west corridor; Interstate 25, which runs north from Las Cruces; and US 70 which provides connections to the Midwest United States.

Realizing the need to modernize the traffic signal system, the City of Las Cruces Public Works Department, Traffic and Street Operations staff completed an assessment of the existing signal system, identified needs, and noted that the primary deficiencies in the system are:

- Obsolete traffic signal management software that relies on dial-up connectivity.
- Lack of fiber optic infrastructure to implement ITS technologies and ATMS software.
- Inability for traffic engineers to communicate with traffic signals from a centralized location or remotely.
- Age of traffic signal hardware; some traffic signals are over 40 years old and cannot be expected to be viable much longer given the extreme wind conditions the area experiences.
- Traffic system vulnerability in the face of power outages and weather events.
- Inability to provide up-to-the-minute information to road users.

The CLC Traffic Management Project will strive to promote connectivity and, revitalization. The INTERCONNECT phase will lay the groundwork for long-term benefits to the residents of the area providing reliable transportation options to those currently underserved. There are several distinct populations within the area needing transportation services including seniors seeking medical care and other services; young adults attending the university, community college or technical schools; and individuals in the workforce needing to get to work/home in a timely manner. Currently there are transportation options for each of these populations, but due to a lack of infrastructure those options are not coordinated efficiently.

For example, we currently have a robust transit system combining the assets of the Las Cruces RoadRUNNER, the NMDOT Park & Ride, the South Central Regional Transit District and ZTrans. All of these agencies provide transportation to the region, but under a fully implemented ITS program, they could communicate better to provide real-time information to transit drivers, coordinate scheduling to ensure efficient timing at stops to eliminate wait-times for riders, and ensuring each of these services continue to be cost-effective options for transportation users. This type of connectivity helps individuals get to work/school/home and other services in way that makes public transportation a viable, affordable, and convenient option for them.

One of the benefits the City is looking toward with the full implementation of the CLC Traffic Management Project is helping to revitalize areas of the community with have been underutilized as residents and businesses move to the newly developed areas, as well to provide efficient transportation to infill designated areas. The City is working with neighborhood residents developing plans for revitalizing the commercial centers of these neighborhoods, and ensuring there is a safe, efficient transportation options, such as bicycle or pedestrian traffic are provided. One example of this effort is the Main Street Downtown project that has been underway for ten years and the potential of the area is now being realized. Accomplishments include the re-opening of the street closed during urban renewal, the creation of a Tax Increment for Development District, completion of a new public plaza, the growth of the Farmer's Market, multiple new businesses locating along the original Main Street, and the creation of the Mesilla Valley Intermodal Transit Terminal in the area. The Downtown Main Street is often closed for the Farmer's Market and special events, impacting traffic in the area. The City has a major project underway to convert the operations of the Downtown's two straddling roadways to refocus the roadway network on Downtown Main Street as a popular destination. Ensuring safe passage for

multiple forms of transportation in these revitalized areas and providing advance information on closures and events is critical; and having real-time information through the ITS will assist in these efforts.

Road construction has been and continues to be a consistent source of employment in the Las Cruces area. The City has undertaken the effort to improve streets throughout the community as defined in the 2012 Strategic Plan, and the CLC Traffic Management Project will take approximately 10-15 years to be fully implemented depending on funding. It will rely on qualified workers with wide-ranging skills to complete the project, and then maintain the system once it is fully operational.

Currently, the level of congestion at some of the major arterial intersections causes delays in the mobility of transportation users. The link below is for the Average Annual Weekday Traffic (AAWDT) volumes, which is based on traffic count data accepted by the NMDOT Traffic Monitoring System (TMS) as the standard in accordance with the New Mexico State Traffic Monitoring Standards (NMSTMS). The map is created by the MVMPO and each year at least one-third of all traffic sections of factor groups, which are grouped by functional classification of collector or better, will be counted. The highest volume roads sections in the Las Cruces area range from approximately 14,000 to over 38,000 vehicles per weekday. Details of the map can be found on this link: <http://mesillavalleympo.org/wp-content/uploads/2016/01/traffic-flow-2015.pdf>.

Crash data were obtained in the project area for last three-year period from the City of Las Cruces Police Department and is further defined in the Benefit Cost Analysis. In 2015, there were a total 4,282 accidents in the Las Cruces MSA.

Other data regarding current transportation issues can be found in the Transport 2040-Metropolitan Transportation Plan Update, and can be found at this link: <http://mesillavalleympo.org/wp-content/uploads/2016/01/mtpupdate2015finaladopted.pdf>.

Transportation System and Services

Road RUNNER Transit:

As the transit provider operated by the City for Las Cruces area, RoadRUNNER Transit provides 9 fixed routes, a complementary paratransit service, as well as four contracted transit routes for New Mexico State University and Doña Ana Community College.

RoadRUNNER Transit (RoadRUNNER) is a division of the City of Las Cruces (City) that provides fixed-route bus service and Dial-A-Ride paratransit service within the Las Cruces area, which includes Mesilla Park and Mesilla, New Mexico. Regionally, there is the NMDOT Park & Ride transit program that operates buses for commuters between El Paso, Texas; Anthony; Las Cruces; and Alamogordo, all in New Mexico. ZTrans operates transit routes from Las Cruces to Otero County locations to the east and the South Central Regional Transit District operates transit buses that travel north and south in the county. Each of these regional transit operations has stops at the City's Mesilla Valley Intermodal Transit Terminal (MVITT) to allow riders to change service providers, thus allowing for efficient transportation options for regional riders.

RoadRUNNER consists of nine fixed routes operating Monday through Friday from 6:30am to 7:00pm, and on Saturday from 9:30am to 6:30pm. There are four additional routes that service New Mexico State University (NMSU) and Doña Ana Community College (DACC) operating on weekdays. RoadRUNNER does not operate on Sundays or major holidays. RoadRUNNER drivers report that long signal wait times and poorly coordinated signals often negatively impact their ability to keep their routes on time. RoadRUNNER Transit has implemented a Computer-Aided Dispatch/Automated Vehicle Location system that allows for more efficient scheduling and real-time bus information for users. A mobile app for bus users is in the planning stages.

In November 2013, the MVITT opened in downtown Las Cruces and serves as the primary transit hub in Las Cruces by providing customers with a safe and convenient off-street transfer location for local and regional transit services. The facility has the capacity for future growth of the system. For RoadRUNNER there are also transfer points at the Mesilla Valley Mall, located centrally on the east side of Las Cruces; and at the Venus Transfer Point, located off US Hwy 70 on north-east side of the City. Most alignments consist of bi-directional alignments and one-way loops operating at 60-minute headways.

More information on the RoadRUNNER Transit operations can be found at: <http://www.las-cruces.org/departments/transportation/transit>.

In 2015, the consulting firm of Nelson/Nygaard in collaboration with the RoadRUNNER staff and Mesilla Valley Metropolitan Planning Organization (MVMPO) staff developed an updated Short Range Transit Plan (SRTP), which was adopted by the Las Cruces City Council in March 2016. The consultants considered the demographics of the area including major work and educational centers, socio-economic factors, and population density. Also considered was the evaluation of existing bus routes, input from drivers and the public, as well as ridership and fare revenues. This plan recommended system route restructuring and service expansion, thereby defining the need for additional funding to replace aging buses and provide buses for additional routes. The plan can be found on the MVMPO website at: <http://mesillavalleympo.org/wp-content/uploads/2016/01/roadrunner%20srtp%20-%20final%20report.pdf>.

South Central Regional Transit District (SCRTD):

The mission of the South Central Regional Transit District (SCRTD) is to provide the public with a safe and efficient regional transportation system. Transit services promote independent living for the frail, the elderly, the disabled, and those without access to automobiles by providing essential links to a variety of medical, social, and other services, and the district recognizes the need to improve mobility options for this growing segment of the population. The SCRTD provides transit options for Doña Ana County residents with rural transit routes that serve the rural southern Doña Ana County area and connect those individuals to the Las Cruces MSA and Otero County. Each route has stops at the Mesilla Valley Intermodal Transit Terminal so riders can connect to the RoadRUNNER Transit buses to move around Las Cruces, <http://www.scrtd.org/>.

ZTrans:

Ztrans is the public transportation provider for the Tularosa Basin and surrounding areas. ZTrans has been in operation since 2001 and provides service to Alamogordo, Holloman AFB, La Luz,

Tularosa, Mescalero Apache Reservation, and Las Cruces, NM. ZTrans also has stops at the MV Intermodal Transit Terminal for the convenience of riders, <http://ztrans.org/>.

New Mexico State University (NMSU):

NMSU is a land grant university with an enrollment of approximately 15,000 students (Fall 2015) and employs over 3,700, making it one of the largest employers in the region. NMSU is located on the southern end of the City and is host to many events that bring an influx of travelers from El Paso and southern New Mexico to the area, significantly impacting traffic. Such events include: major concerts, special events, competitions, and sporting events held at the Pan American Center and Aggie Memorial Stadium on the NMSU Campus. Also, traveling and local arts events, including symphony, international dance, ballet, band, and theater are held at one of two performing art venues at NMSU. There is a large number of pedestrians and bicyclists utilizing the University Corridor and their safety is a major concern to the City and NMSU. In addition to improving traffic flow for special events, NMSU will benefit from the INTERCONNECT phase during peak traffic times throughout the day for classes as the intersection signals can be adjusted in real time to alleviate traffic congestion and assist with pedestrian traffic.

Deployment Plan

The need for the CLC Transportation Management Project was identified in the Las Cruces Regional ITS Architecture Plan developed in cooperation with the MVMPO, NMDOT, and regional stakeholders, which was most recently updated in August 2014. This plan was created to aid in transportation planning and ensures all proposed ITS projects are consistent with regional ITS architecture. Projects that are identified in the Architecture link the needs of the region with existing or planned ITS projects in the region. This collaborative approach to planning makes certain other stakeholders can utilize and benefit from any proposed projects.

Identified in the needs and services section of the Architecture as high priorities that the INTERCONNECT phase addresses are:

- Need improved incident detection, management and coordination
- Need to reduce delays due to accidents or construction
- Need to improve traffic congestion mitigation
- Need to improve traffic mitigation on the east-west corridors
- Need to improve traffic signal interconnect and coordination to improve mobility
- Need for remote monitoring for infrastructure and at intersections
- Need to improve traffic safety
- Need to reduce delays due to accidents or construction
- Need real-time roadway and traffic conditions information

Medium level priorities benefiting from this project include:

- Need to enhance communication and information sharing between regional agencies
- Need to interconnect with neighboring regions (such as El Paso, TX)
- Need to know delays on major routes
- Need to improve vehicle routing and detours/information

- Need special event traffic information
- Need to collect transportation information for use by planners

The Architecture identified several projects which will integrate with one another and existing systems are included in the INTERCONNECT phase. The primary projects include: the CLC CENTRACS System Deployment; the CLC Communications Network Upgrade; and the CLC Traffic Signal Upgrades. Each of these projects has been deemed “short”, meaning timeframes that indicate action to be taken in a 4-year time period following the update of the Architecture. The Architecture and related details can be found at, <http://www.consystem.com/lascruces2014/web/index.htm>.

The INTERCONNECT Phase includes the design and construction of the fiber optic infrastructure and intersection connectivity, as well as detection, traffic monitoring, and adaptive timing technology equipment at each intersection. The project has five segments to ensure the project is expedited in an efficient and time effective manner. The segments are: 1) design; 2) construction and installation of the fiber optic infrastructure; 3) the installation of the controllers and switches at each intersection; 4) the detection, traffic monitoring, and adaptive equipment installation; and 5) testing of the system. These segments are detailed below:

1. Design: Overall design of INTERCONNECT to provide integration with traffic management system including surveying and research of existing infrastructure, development of the preliminary and final design, and creation of construction documents.
2. Construction and Installation of INTERCONNECT Infrastructure: Furnish and install a fiber optic cable system on selected major corridors throughout the City including testing and labeling; start-up and commissioning; and remediation of existing infrastructure such as conduits, hand holes, trace wire, pull-boxes, and splice closures.
3. Installation of Controllers & Switches at Intersections: Furnish and install controllers and switches on selected intersections throughout the City to integrate the traffic signal system with ATMS at the Traffic Control Center.
4. Installation of Detection, Traffic Monitoring, and Adaptive Timing Equipment: Install the state-of-art detection, traffic monitoring, and adaptive timing equipment on selected intersections throughout the City to integrate the detection system with ATMS.
5. Testing and Implementation & Software Expansion: After completion of installation of INTERCONNECT, controllers & switches, and detection system; the City will perform the overall testing of new traffic management system to assure there is established communication between the ATMS and all field equipment. This also includes the purchase and installation of an expansion to the current software to accommodate all current signals and allow for additional signal expansion in the future.

Utilizing the NMDOT Systems Engineering process for ITS, this project is considered a low-risk ITS project, indicated by the fact the INTERCONNECT phase meets the following risk factor criteria:

- It is a single jurisdiction, single mode
- Utilizing proven software – the existing ATMS
- Utilizing proven, COTS hardware and communications
- The phase has no new interfaces
- The system requirements are well defined and documented
- The operating procedures for the use of the project are well documented
- The phase uses only stable technologies

Map of the project location and its connection to existing transportation infrastructure is shown in Exhibit A, attached in the appendix titled, “City of Las Cruces Traffic Engineering Fiber Map”. This map shows not only the current signal system, but also the proposed fiber optic infrastructure that will be a part of the INTERCONNECT phase.

Challenges to Deployment

There are several challenges to the deployment of this project which have been taken into consideration in the design of the project. The major challenge is the ever-changing technology that continues to evolve and improve at a rapid pace. Understanding that the technology that is implemented in this project may be obsolete in a short time, the project has been designed to allow for upgrades that will keep pace with new technology. The benefit of continued improvement to technology is the cost of fiber optic cables continues to go down as competition in the field increases.

Some the other risks that are anticipated with the project include unknown conditions of (E) pathway and infrastructure. Increased contingency and extra time for the existing pathway and/or infrastructure will mitigate this risk.

Another challenge that will be taken into consideration as the design work begins is the collaboration needed with other departments within the City and with stakeholders in the project. Some of those departments include the Project Development section of the Public Works Department and the Utilities Department to coordinate any street infrastructure issues that need to be addressed during the project. Additionally, coordination with the City’s IT Department will be needed to ensure connectivity is optimized and to assist with the technology to be implemented to determine compatibility with the existing traffic management system already installed at the Traffic Management Center.

Finally, deployment may be delayed or require changes to the initial design if extensive street or utility infrastructure issues arise while the fiber optic cabling is being installed. Unfortunately, many of the streets in Las Cruces are very old. Finding nonfunctioning, abandoned, or broken infrastructure is a reality of doing any improvements to the streets system. The project is designed to only go to a depth of two feet to install the fiber optic conduit, which should avoid most infrastructure problems. Understanding the potential for these issues, however, will allow for contingency planning to address them.

System Performance Improvements

Safety: According to the Federal Highway Administration, intersection safety is a national, state, and local priority. “Intersections are planned points of conflict in any roadway system. In the United States, over the last several years an average of one-quarter of traffic fatalities and roughly half of all traffic injuries are attributed to intersections.” The INTERCONNECT phase will provide the City with a comprehensive program to improve the functionality of the City and the surrounding area’s intersections leading to a reduction in intersection crashes and secondary crashes via real-time incident management system capability. When this phase is implemented, working in conjunction with ITS software already in place, the City will be able to allow for emergency preemption of traffic signals, thus improving emergency response times and potentially reducing fatalities.

The INTERCONNECT phase will address the need for better signal coordination, the ability to manage signals remotely from a single location, and adapt to changing conditions. Thereby allowing the system to respond to emergency situations, extreme weather events, natural disasters or even such large-scale activities such as college athletic games and entertainment events. As the project will be inclusive of the entire transportation system, it will improve its reliability for motorists, transit users, pedestrians, cyclists and the safe and efficient transport of freight. The CLC Traffic Control Center has already been equipped with a generator and other emergency preparedness features to ensure the Center’s continued ability to respond in emergency situations.

Las Cruces has received a bronze award as a bicycle friendly community and New Mexico State University has received a bronze award as a bicycle friendly university from the League of American Bicyclists. This indicates that Las Cruces has met a specific level in the 10 building blocks of a bicycle friendly community, only two other communities in New Mexico have been designated as such, <http://bikeleague.org/bfa/awards>. Having the capacity to provide safe bicycle routes helps individuals move around the community accessing the services they need through further implementation of bicycle detection at intersections. The ITS will increase the safety levels of the community’s bicyclists by making intersections easier to navigate and allow for full implementation of bicycle detection at major intersections. Bicycling Suitability Map from the MVMPO describes the many areas of the Las Cruces MSA that provide bicycle lanes and the suitability of the other roads for bicycling, <http://mesillavalleympo.org/wp-content/uploads/2016/01/bicyclesystemprioritiesplan.pdf>.

When fully connected, ITS technologies have the ability to deliver transformative benefits to road users, transportation agencies, and the general public. Safety benefits are well-documented and include the reduction of fatalities and injuries on roadways. Some of the benefits are achieved through the reduction of delay and congestion which impacts crash rates. Through the control that ITS infrastructure provides, the City can manage the system in such a way to make necessary changes more effectively and quickly and to respond to the varying dynamics in changing traffic environment. This transfer of critical information and better control of the system reduces crashes and fatalities for all road users as a whole.

The City will maintain the system using local resources from its General Fund Budget. It is expected that the modernized signal system will be less expensive to maintain and take fewer staff

resources than are needed currently to make manual signal timing adjustments in the field. A discussion of the maintenance costs and staff to manage the Traffic Control Center are discussed in the Benefit Cost Analysis.

Environmental Sustainability: Las Cruces is not a non-attainment area and does not receive Congestion Management Air Quality funds. The City does not routinely collect information on vehicle emissions or vehicle miles traveled, but an estimate of these measures is created every time the Metropolitan Transportation Plan Update – Transport 2040 is updated by the MPO, or every five years. By using these estimates, and looking at data from similarly sized cities that do collect emissions information, improving the efficiency of the transportation system is expected to reduce emissions by reducing idling times through improved traffic flow. Thus, this phase will potentially improve air quality and prevent Las Cruces from becoming a non-attainment area in the future. The reduction in idling times not only has a proven positive effect on air quality, but it also reduces fossil fuel usage. Further data on the environmental improvement attained through the INTERCONNECT phase is detailed in the Benefit Cost Analysis.

ITS technologies allow road users to benefit from real-time, multimodal information that ultimately provides opportunities to identify efficient and eco-friendly decisions when choosing traveled routes and deciding between modal opportunities. If congestion is managed and information is made available to road users, there is an opportunity to choose a different route, reschedule a trip, utilize a bicycle, walk, or take advantage of public transportation. These benefits from a reduction of fatalities, injuries, and accidents also has financial benefits associated with the elimination of costs related to those events. The control provided to transportation agencies through well-connected ITS infrastructure provides the tools necessary to manage the facilities more efficiently and results in a savings of fuel, thereby reducing greenhouse gas emissions and reducing the environmental impact overall on air and water quality from pollutants because congestion causes additional delay and emissions. Some specific modifications made possible through ITS technologies include transit priority, signal timing optimization and efficient implementation, responding to incidents, adapting to changing weather patterns, managing corridors, real-time alerts for road users, reducing congestion, and increased road user convenience.

Innovation: The CLC Traffic Management Project is all about innovation, as it will result in a region-wide implementation of a traffic management system based on Intelligent Transportation System technology and principles. As discussed previously, the project has been identified and planned for in the Las Cruces Regional ITS Architecture Plan. All aspects of the INTERCONNECT phase were deemed to be short term priorities for the regional, indicating the need for action within a 4-year timeframe.

The phases of the project already completed or in process have utilized innovative funding sources to include: ARRA funds for Transit Automated Vehicle Location development: RoadRUNNER Transit is in the process in implementing a Computer-Aided Dispatch and Automated Vehicle Location system for the Las Cruces transit and paratransit system that will be integrated with the CLC Transportation Management Project. As a continuation of a long-term successful partnership, NMDOT has purchased the first module of Centracs ATMS for the City as part of the completed US 70 rehabilitation project.

For the fiber optic infrastructure, State severance tax bonds have been allocated by local state Senators in the amount of \$825,000 for the central traffic control center and fiber optic infrastructure. The City had also allocated a total of \$640,000 from fines collected by its red-light camera program for traffic signal battery backups and the first local installation of fiber optic cables needed to implement more advanced adaptive signal timing software. Additionally, the City has used its own resources, personnel and finances, for the initial transportation system needs assessment and for the installation of battery backup systems, malfunction management units, camera detection systems and limited signal preemption deployment.

Improving the City’s transportation facilities involves not only the replacement of roads but also involves implementing and utilizing information technology. ITS allows intelligent design and innovation to be integrated into facilities to maximize the acquisition and dissemination of information, manage data, increase the effectiveness of traffic management, improve safety, and reduce environmental impacts. ITS allows for performance improvements through innovative applications that manage congestion such as centralized signal control, real-time messaging, prioritization, and monitoring. It is expected that the traffic system will operate more efficiently and will provide the ability for innovative asset management by monitoring and maintaining the transportation network in such a way to provide the best possible service to road users. Implementation of ITS technologies further allows for long-term staffing opportunities to individuals with advanced skills and higher degrees to design, manage, and maintain the system.

Safety, Mobility, and Environmental Benefit Projections

The City of Las Cruces Intelligent Transportation Systems INTERCONNECT Implementation phase will yield a significant long-term impact for the Las Cruces MSA, which relies on the corridors for workplace commuting, access to employment centers, freight passage, and the overall livability of this inter-regional corridor.

Long-Term Outcomes: ITS INTERCONNECT Implementation project will benefit a broad range of transportation system users, including:

- Motorists and motor carriers in the Las Cruces MSA and south central New Mexico region
- Local residents impacted by noise and air pollution from current numbers of idling vehicles
- Travelers

Furthermore, the project is expected to bring significant long-term benefits to the south central New Mexico area: the benefit-to-cost ratio, using a discount rate of 7%, has been calculated to approximately 19.6:1, the project is expected to provide a 1960% return on investment when implemented using these grant funds. All calculations were done without the inclusion of staff time provided as in-kind match.

Table below includes a summary of the benefit/cost analysis for the project.

Project Component	Cost	Benefit
Construction Costs	\$ 8,310,575	
Maintenance Costs	\$ 7,440,000	
Total Project Costs	\$15,775,575	

Net Present Value @7%	\$11,002,759	
Economic Competitiveness		
Travel Time Saving		\$408,782,976
Energy Saving		\$ 24,467,136
Environmental Sustainability		
Reduced CO Emissions		\$ 73,504
Reduced NOx Emission		\$ 587,990
Reduced VOC emission		\$ 141,063
Safety		
Reduced Accidents		\$ 84,856,137
	Total Benefits	\$518,908,806
	Net Present Value @7%	\$215,542,565
Cost/Benefits Realization		
Total Project Cost and Benefits	\$11,002,759	\$215,542,565
Benefit/Cost Ratio		19.6:1

The primary benefits to the project include:

- Less vehicle-hours of delay during incidents because of improved operation efficiency
- Improved air quality as a result of the reduced vehicle-hours of delay
- Fewer accidents because of the improved real-time coordinated traffic timing plan
- A reduction in annual street maintenance costs and replacement cost of infrastructure (not calculated)

Methodology and Tools for BCA: The Benefit-Cost Analysis for this project has been prepared per the TIGER BCA Guidance 2014; TIGER BCA Resource Guide, updated 3/27/15; and with basic parameters for improvement per the FHWA-JPO-11-140, Intelligent Transportation Systems Benefits, Costs, Deployment, and Lessons Learned Desk Reference, September 2011; City of Las Cruces Police Department Accident Data; and Las Cruces Metropolitan Planning Organization 2015 Traffic Flow Map. The estimates were based on outputs from the base year (2017) and future years. The FHWA Tools for Operations Benefits/Cost (TOPS-BC) version 1.2 has been used to calculate the benefits for each area except for reduced air pollution. The two reference files used in the calculation of the benefits are attached as appendices to the application.

Project Cost: The table below presents the construction cost by phase and the costs for maintenance and operations. These costs include all staff time provided as in-kind match.

Construction Costs	
Phase	Cost
Planning, Contract Administration	In-Kind Match – City Staff
Design	\$ 522,406.00
Installation of Fiber	\$ 6,007,669.00
Installation of Controllers and Switches	\$ 425,910.00
Installation of Detection System and PTZ/Radio	\$ 1,451,910.00
Testing and Implementation & Software Expansion	\$ 25,480.00
Total	\$ 8,433,375.00

Annual Maintenance and Operation Costs			
City Staff Cost	5 staff	\$52,000/year per person	\$ 260,000
Operation & Maintenance		\$50,000	\$ 50,000
Total O&M Costs			\$ 320,000

Economic Competitiveness: In 2015, an average of over 11 accidents per day occur on major corridors in the Las Cruces MSA and implementing the ITS system will reduce approximately 10% travel delay for vehicles and trucks. A similar ITS system is currently in place on I-70 in Denver and case studies have indicated that it results in at least 10% of drivers altering their travel plans to avoid the traffic delays caused by accidents. Subsequently, fewer vehicles result in smaller backups behind an accident and a reduced amount of time to clear congestion once the incident is cleared. This translates to significantly less overall vehicle delays and fewer idling emissions. Based on recent implementation of a new timing plan after the City completed the installation of fiber optic cable on the Lohman corridor, we observed approximately 18% travel time improvement and we used 15% improvement for calculation.

Using FHWA Tools for Operations Benefits/Cost (TOPS-BC) to estimate economic impacts, the project will result in monetary benefits due to reduced congestions and idling time. The table below presents the hourly wages rate used to calculate travel time savings. The calculated benefits of annual travel timing savings that result from operation efficiency improvement is \$15,382,603.

Description	Dollar Value of Person Hour (per hour) *
On-the-Clock Auto	\$ 33.43
Other Auto	\$ 16.72
Truck	\$ 33.43

* per TOPS-BC

Environmental Sustainability: The environmental benefits of the project make a strong contribution to the sustainability of the region by relieving congestion and reducing fuel consumption and emissions through reductions in motorist delay. The values for calculating the benefits of reductions of CO, NOx, and VOC per ton and energy saving per gallon of fuel are shown in the table below. The average annual air quality improvement benefit is calculated at \$40,128.

Type of Pollutant	Value of Air Quality Improvement (\$/Ton Reduced)	Total Air Quality Benefit Net Present Value
CO	\$ 41.04	\$ 31,280
NOx	\$1,907.85	\$ 315,461
VOC	\$7,520.91	\$ 70,069
Total		\$ 417,810
Energy Saving	Average Cost per Gallon*	Total Benefit Net Present Value
Fuel	\$4.38/Gallon	\$10,212,746

* excluding taxes per TOPS-BC

Safety: The implementation of ITS will improve safety and reduce approximately 2% of accidents at the signalized intersections based on the FHWA Tools for Operations Benefits/Cost (TOPS-

BC). Crash data were obtained in the project area for last three-year period from the City of Las Cruces Police Department and 2015 accident data was used as the basic for the calculation predicting the expected number of crashes in the future. In 2015, there were a total 4,282 accidents in the projected area. In total, the safety benefit is calculated at \$84,856,137.

Vision, Goals and Objectives for Technology Deployment

The vision for the ITS phase of the City's Traffic Management Project is to improve the existing traffic system for all users, including vehicles, bicycles, and pedestrians. Deployment of the technology will maximize the acquisition and dissemination of information, manage data, increase the effectiveness of traffic management, improve safety, and reduce environmental impacts.

The goals of this phase are to reduce travel times, improve traffic signal coordination, and reduce vehicle emissions. The goal includes providing real-time traffic advisory information and an intelligent transportation system that will optimize transportation system efficiency and increase mobility for users throughout the Las Cruces MSA.

Objectives of the technology deployment will to focus on designing and integration of ITS technologies that are geared toward centralized signal control, traffic monitoring, enhanced communications, prioritization, and traffic safety. These improvements to the traffic system will provide the ability for innovative asset management by monitoring and maintaining the transportation network to the benefit of the City and road users.

Partnering Organizations

The City of Las Cruces, New Mexico:

The City of Las Cruces, New Mexico (City) has an elected Mayor and six elected Councilors representing each of the six districts of Las Cruces. City Administration is comprised of a City Manager, and two Assistant City Managers: Chief Operations Officer and Chief Administrative Officer. City management, along with the City Council, have defined twenty-five goals that represent key priorities for the Council and Staff on behalf of the community. They include economic development, funding strategies, community revitalization efforts, sustainability initiatives, and organizational excellence. These are defined in the 2012 Strategic Plan, which can be viewed through the link below. The document also outlines the 2012-2013 Plan Accomplishments and includes the beginning of the ITS improvements (page 10), <http://www.lascruces.org/~media/lcpublicwebdev2/site%20documents/article%20documents/administration/strategicplan2014-1019finalrevised.ashx?la=en>.

Mesilla Valley Metropolitan Planning Organization (MPO):

The MPO is a multi-jurisdictional planning agency for south-central New Mexico. The MPO is responsible for multi-modal transportation planning in Las Cruces, Mesilla, and part of Doña Ana County. Federal regulations require the designation of an MPO to carry out coordinated, continuing, and comprehensive transportation planning for urbanized areas with a population of more than 50,000. The MPO annually establishes project priorities for consideration by the NMDOT when programming transportation funds. The MPO is responsible for planning all

aspects of the transportation system including roads, bicycle, pedestrian, public transit, and the airport.

A Joint Powers Agreement for the Mesilla Valley MPO exists between the City of Las Cruces, Town of Mesilla, and Doña Ana County. With input from the local citizens and business owners and under the guidance of the MPO Policy Committee (comprised of 9 elected officials to include: 3 City of Las Cruces Councilors, 3 Doña Ana County Commissioners, 3 Town of Mesilla Trustees, and the NMDOT District One Engineer) the MPO develops and maintains the Metropolitan Transportation Plan (MTP) and the Transportation Improvement Program (TIP). Detailed information on the MPO and the MPO plans, maps, and statistical information is available at: <http://mesillavalleympo.org/>.

New Mexico Department of Transportation (NMDOT) District One:

Las Cruces is within NMDOT District One and some roads in NMDOT's jurisdictional control lie within the City of Las Cruces limits. The two entities enjoy a mutually beneficial partnership on many construction projects. NMDOT has provided the City with state-of-the-art Centracs Advanced Transportation Management System (ATMS) software as part of a recent construction project. The ATMS comes with software, workstations, 100-intersection license capacity, a server, and 10-intersection integration (among other things) and is valued at approximately \$180,000. However, the City has limited fiber optic infrastructure which is necessary to fully implement this software, which curtails its potential benefit as a traffic management tool. With the funding from this grant opportunity, the City can complete the INTERCONNECT phase throughout the area to completely utilize this traffic management tool. This project will provide benefits to NMDOT District One by improving the overall transportation system, including roads and other transportation infrastructure that NMDOT owns but that are within the Las Cruces Streets and Traffic Operations Department's purview. It will also allow for data sharing with NMDOT to provide traffic coordination with other State's regional TOC and the Statewide TMC through NMRoads, the official road advisory system for the state of New Mexico. A cooperative agreement has been entered into with NMDOT relating specifically to the ITS Integration Program.

NMDOT also operates a regional transit Park and Ride program that has two routes: Las Cruces-El Paso, TX and Las Cruces-White Sands Missile Range, NM. The routes run on all weekdays, excluding holidays, and have a limited number of stops on each route. Each route has stops at the Mesilla Valley Intermodal Transit Terminal so riders can connect to the RoadRUNNER Transit buses to move around Las Cruces. More information can be found at: http://www.dot.state.nm.us/en/Park_and_Ride.html.

State of New Mexico:

The New Mexico State Legislature (NM Legislature) has provided funding over the last four years to assist in the implementation of the CLC Traffic Management Project through the State Capital Outlay Program for Local Governments. Several state senators, representing portions of Las Cruces and Doña Ana County, have been and continue to be supportive of this project. The NM Legislature has allocated a total of \$825,000 of state severance tax bond funds for development of a Traffic Control System for Las Cruces. Grant agreements are entered into when funds are

appropriated for specific projects. Should additional appropriations be received for the Traffic Management Project during the course of this project, those agreements will be executed.

Town of Mesilla:

The CLC Streets and Traffic Operations Department maintains three traffic signals within the Town of Mesilla which will benefit from this project and has a formal agreement to maintain the signals. Mesilla sits to the southwest of Las Cruces and the two communities share many roads and infrastructure. An agreement has been executed between the City and Mesilla regarding the maintenance and upkeep of the signals.

Doña Ana County:

The CLC Streets and Traffic Operations Department maintains one traffic signal within Doña Ana County and has a formal agreement to maintain the signal. Because our borders are contiguous the City and County coordinate traffic management issues to ensure safe, efficient travel throughout the MSA. An agreement has been executed between the City and County regarding the maintenance and upkeep of the signals.

Each of the entities that are partnering agencies are strongly in support of the overall Traffic Management Project and specifically the ITS INTERCONNECT phase to increase safety and mobility for the residents of the MSA. NMDOT has that “to upgrade signals within its jurisdiction to provide one consistent system that will work toward achieving quality of life and environmental sustainability goals emphasized in MAP-21. Having one system to operate all signals in the Las Cruces area would provide for better traffic flow thereby working toward reducing or minimizing emissions from idling vehicles, provide for better emergency response times, and add efficiency to the transit system.”

Local and Regional Advanced Transportation Technology

One High-Intensity Activated Crosswalk (HAWK) system has already been installed and another is currently being designed along the University corridor to further improve safety for high pedestrian volumes along this busy arterial. The improvements are expected to enhance traffic flow and provide multi-modal benefits. The project is being completed at the request of New Mexico State University (NMSU) to address pedestrians’ safety and provide safer alternatives for students to cross beyond the existing signal systems.; and is being funded by the New Mexico State Legislature. This project is part of our leveraging for the larger INTERCONNECT project to increase safety along this corridor. Because the proposed location of the HAWK system on University Avenue is within the City’s right-of-way, the City is the fiscal agent and will coordinate the process including location selection, design, and construction in cooperation with NMSU. HAWK systems have been found to have greater than 95% compliance rate from motorist, reducing pedestrian crashes by up to 69% and reducing total roadway crashes by up to 29%. To address potential negative impacts to traffic flow, the HAWK systems will have INTERCONNECT communications with adjoining signals so the corridor can be optimally timed once the INTERCONNECT project has been fully implemented.

The City has one additional HAWK system that was installed during a recent renovation of one of the City’s high school. This system is located on El Paseo Road immediately in front of Las Cruces

High School. Since the school straddles El Paseo, this was put in place for increased safety of students crossing the street to get to parking areas and other school buildings.

One of the strategic reasons the Centrac ATMS was chosen was because NMDOT uses the same system. This allows for better communications and integration with the NMDOT’s state-wide system, particularly since the City maintains several NMDOT signals. The City and NMDOT have also entered into a Cooperative Agreement relating to the ITS Integration Program. This agreement provides a mechanism for the City and NMDOT to share resources and fiber optic infrastructure to the benefit of both agencies and that of the public. It also established joint efforts to organize, plan and determine how best to operate planned technologies and infrastructure.

Schedule for Deployment

The INTERCONNECT phase will lay the foundation for future Transit Signal Priority (TSP) technology to be utilized by transit operators to improve service reliability and operating speeds. TSP systems minimize transit vehicle delays at signalized intersections through the use of technologies that detect transit vehicles and alter signal timings to expedite the transit vehicle. TSP strategies provide priority opportunities within a coordinated traffic signal system, thereby minimizing impacts to other roadway users.

The CLC Traffic Management Project estimates that full modernization of the traffic signal system will cost approximately \$21,000,000. Several phases or partial phases of the overall plan have already been completed and funded through various sources. The INTERCONNECT phase of the plan we are requesting funding for includes:

PROJECT PHASE	TOTAL COST	% ATCMTD	% CITY FUNDS
Design Phase	\$522,406	50%	50%
Construct/Install Fiber Optic	\$6,007,669	50%	50%
Install Signal Controller/Switches	\$425,910	50%	50%
Install Equip at Signals	\$1,451,910	50%	40%
Testing of Equipment/System – Expand Software	\$25,480	0%	100%
TOTAL DOLLARS:	\$8,433,575	\$4,203,948	\$4,229,428

The INTERCONNECT phase funding being requested includes the fiber optic infrastructure and detection equipment. The City of Las Cruces is committed to funding the required 50% match through the utilization of gross receipts tax proceeds for a total of \$3,500,000. General and/or reserve funds and in-kind staff time will be utilized for the remaining match. All grant and matching funds will be used for the INTERCONNECT phase of the CLC Traffic Management Project. The cost estimate was based on historical cost data for similar projects. It includes an overall 5% contingency except the cost of installation of fiber through (E) pathway (10%

contingency included) and no contingency was estimated for the testing, implementation and software expansion phase.

The phases of the larger CLC Traffic Management Project plan already completed or in process are generally a result of other construction projects occurring where it made sense for the City to complete the fiber optic infrastructure at the same time. They include the following:

PROJECT PHASE	TOTAL COST	PERCENT COMPLETE	FUNDING SOURCE
Centracs ATMS Software	\$180,000	100%	NMDOT Construction Project – Main St.
Traffic Mgt Center Construction	\$275,363	100%	NM State Legislature to City
Fiber Optic Walnut - Roadrunner	\$65,000	100%	City of Las Cruces Funds & NM State Legislature
Fiber Optic Lohman-Sonoma	\$689,631	100%	City of Las Cruces Funds & NM State Legislature
Fiber Optic Triviz-Don Roser	\$65,000	95%	NMDOT Construction Project – Missouri Bridge
Fiber Optic US 70 Solano-Del Rey	\$328,568	100%	City of Las Cruces Funds & NM State Legislature
Fiber Optic Boutz-Farney	\$175,000	100%	LC Public Schools – LCHS Construction
Fiber Optic Willouby-City Hall	\$134,158	7%	NM State Legislature to City
Fiber Optic Hickory-I-25	\$40,000	100%	NMDOT Construction – Ave de Mesilla Bridge
TOTAL	\$1,952,720		

The use of these funds has helped the City move forward to the complete project, but many of these funding sources are no longer available or will be limited in the future. For example, some portions of the project were paid for from the STOP Red Light fund, fines collected by the City’s red-light camera program. These funds are no longer available due to the termination of the program. Additionally, capital outlay funds from the NM Legislature look less likely in the near-term due to reduced oil income and the financial state of the State. During the 2017 Legislative Session, no capital outlay funds were awarded to municipalities throughout the State for any capital projects. While the City is still committed to completing the CLC Traffic Management Project, it cannot bear the entire cost, and needs to find additional sources of funding to leverage what is available from the City.

At this time, no other federal funding is being pursued for this project. With this funding and the City’s commitment, the City of Las Cruces will be able to complete a major phase of the overall modernization of the traffic system and ensure the ITS software provided by NMDOT is fully utilized.

The overall conceptual/preliminary planning has been completed and it is expected the design criteria will be based on the CLC Design Standard for Fiber Optic Cable Installation and the NMDOT specifications for traffic control equipment. The INTERCONNECT phase will consist of a design-build delivery method and therefore will not have different aspects of design. There will be a single Design Phase that will take approximately 8 to 12 months to complete. An engineering firm will be used to confirm property and ROW ownership with the CLC Land Management Office as part of the Design Phase. It is not expected that there will be a great number of certifications or reviews that will need to be done based on the delivery method of design/build. The project will work in conjunction with NMDOT to ensure all necessary and applicable reviews, approvals, and certifications are done in advance of the start of construction and the final execution of the grant agreements.

The INTERCONNECT phase timeline is listed below:

PROJECT PHASE	COMPLETION ESTIMATE	COMMENTS
Kick-Off Meeting with DOT	Month 1	At mutually-agreed-upon location
Monthly Progress Reports	Submitted Monthly	Document activities performed, anticipated activities, and any changes to the schedule or issues
Design Phase	8-12 months	Begin upon notification of award
Annual Report to the Secretary	End of Each Year	
Construct/Install ITS INTERCONNECT	Year 1 & 2 of Grant Period	Begin after design phase & grant agreement is in place
Install Signal Controller/Switches	End of Year 2 through Year 3 of Grant Period	
Install Detection Equip at Signals	Year 3 of Grant Period	
Testing of Equipment/System – Software Expansion	Year 4 of Grant Period	

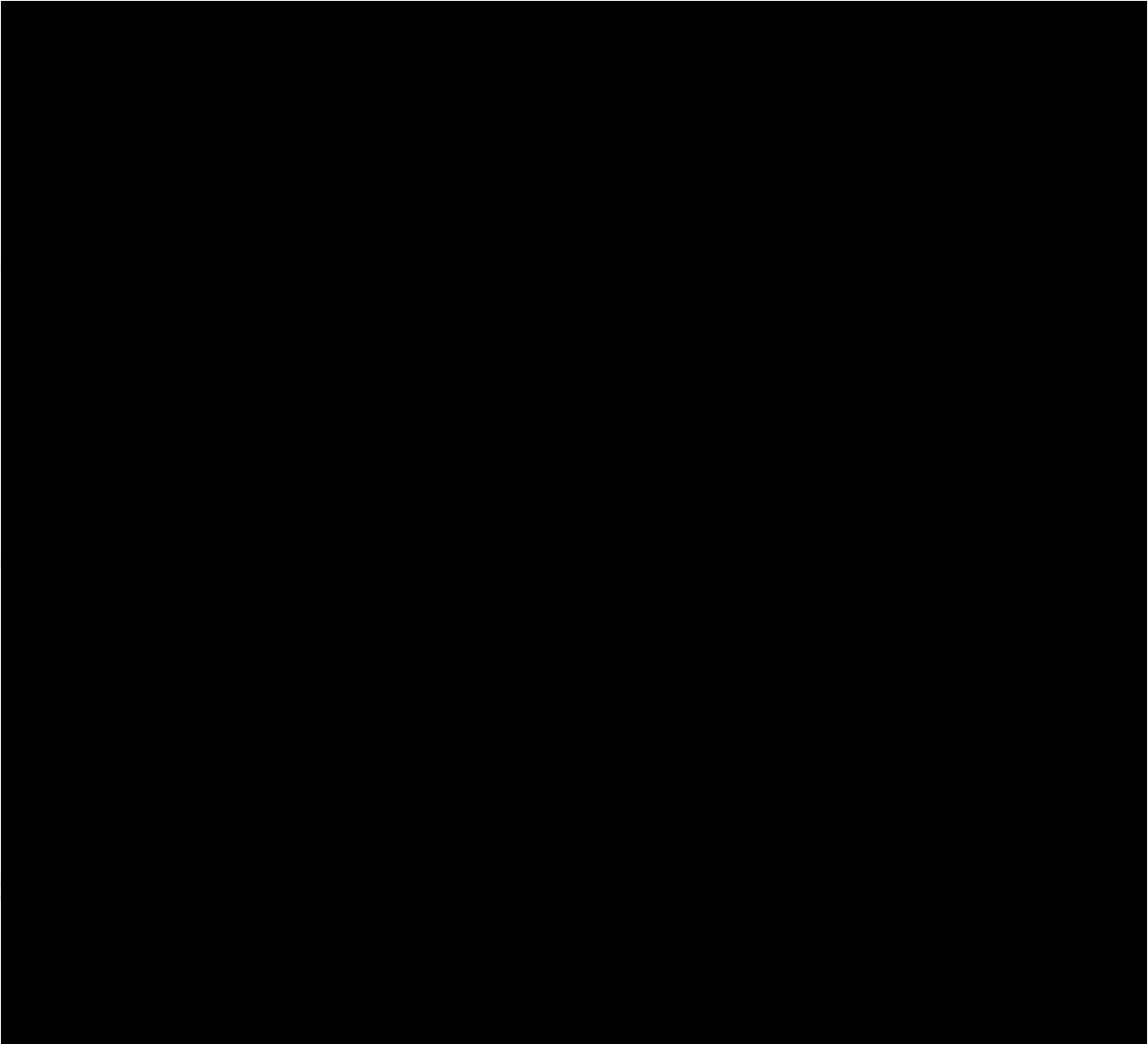
During the Design Phase, the Construction Phase identifying the individual fiber optic runs, with their related timeline, will be developed. The installation order of the Signal Controller/Switches and the Detection Equipment at Signals will be developed during the Design Phase as well.

The City of Las Cruces appreciates this opportunity to submit our findings and establish an indication of our willingness to provide significant benefits to all parties who would be impacted by the ITS INTERCONNECT Implementation Phase. The City is fully committed to the implementation of this project as established in our work to analyze costs and benefits, identify the projects in our Capital Improvement Program, and efforts to seek funding for the entire CLC Traffic Management Project. The City’s analysis, as well as research of other agencies analysis, shows that the project will improve safety, increase economic competitiveness, and improve environmental sustainability. The benefits of this type of project to the City, residents, and road

user have been shown to be highly beneficial with BCA ratio of nearly 20 to 1; therefore, this is the impetuous for the City's motivation to move forward with this project.

STAFFING DESCRIPTION

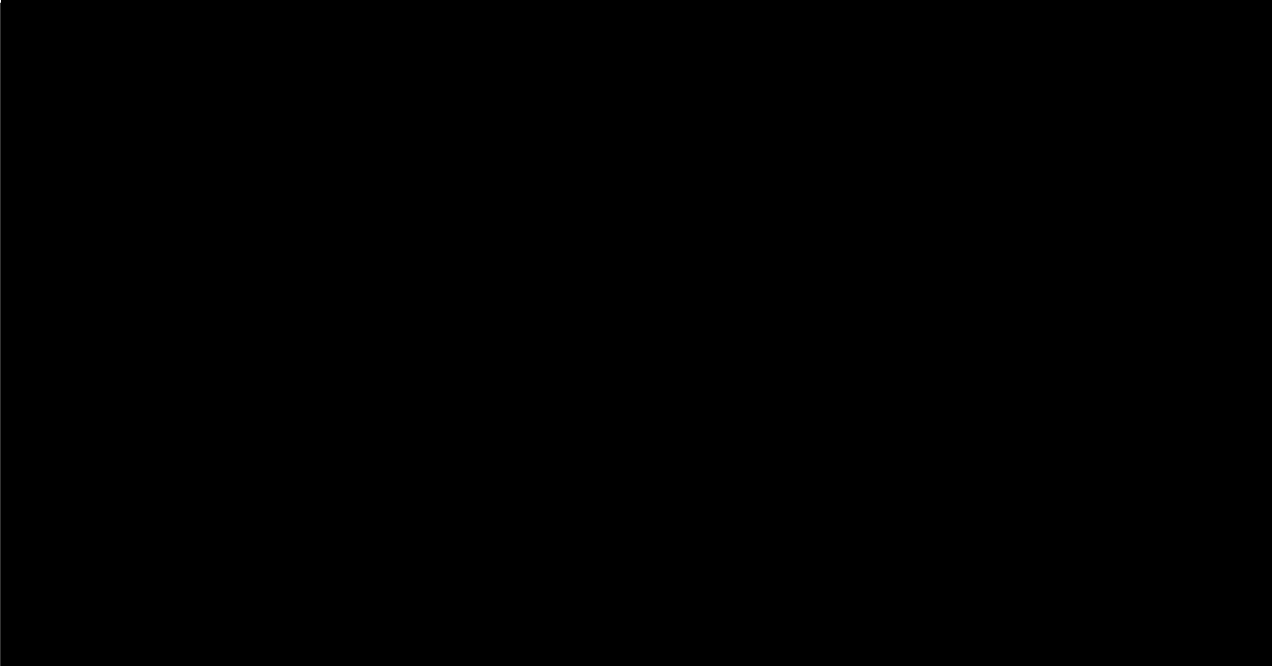
Project Management



Arbor

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The Streets and Traffic Operations staff will work on the project as well. They will install signal switches and detection equipment at signals and complete the testing and software implementation.

The City has maintained a grant portfolio of approximately \$30,000,000 for the past five years, completing projects on a timely and cost-effective basis. The Finance Department provides Financial Analysts who specialize in grant financial management practices who provide the financial reporting and draw down billing on all grants. Each Analyst is devoted to a limited number of departments to offer services that are subject matter specific. For example, the Financial Analyst handling the Streets and Traffic Operations Department grants, also handles the other Public Works Department grants.

Primary Point of Contact

The City of Las Cruces requires all grant applications to be submitted under the authority of the City Manager or his designee. Grant applications are submitted through the Grants Administration section of the Economic Development Department; and specific knowledge regarding the details of the project would be provided by the administrator of the Streets and Traffic Operations Department. Questions regarding the grant application should be directed to the Grant Specialist or the Streets and Traffic Operations Administrator.

The City Manager for Las Cruces is:
Stuart C. Ed, City Manager
Administration, City of Las Cruces
700 N. Main St., Las Cruces, NM 88001
575-541-2076
scd@las-cruces.org

The Grant & Contract Compliance Specialist for this project is:
Amy J. Bassford, Grant & Contract Compliance Specialist

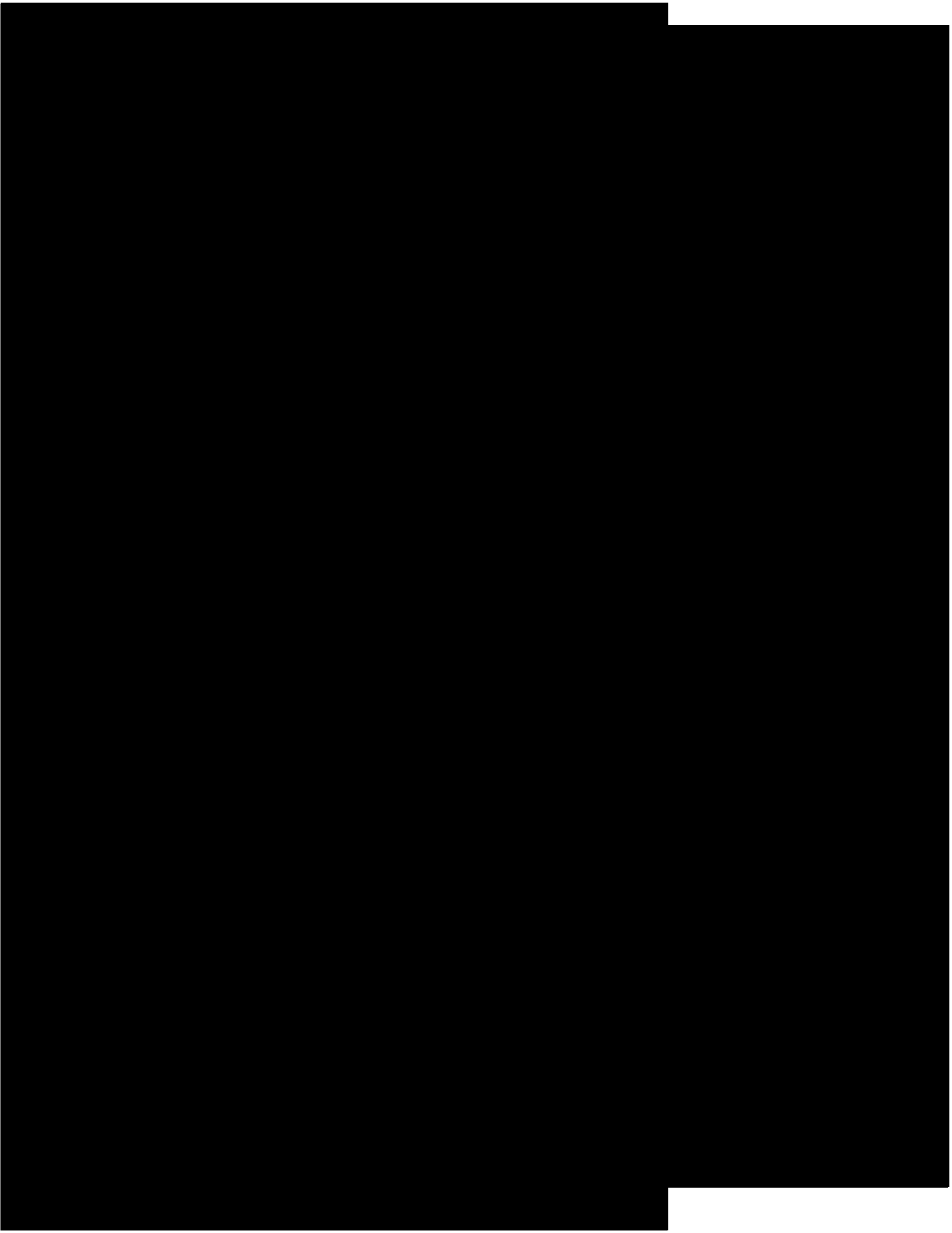
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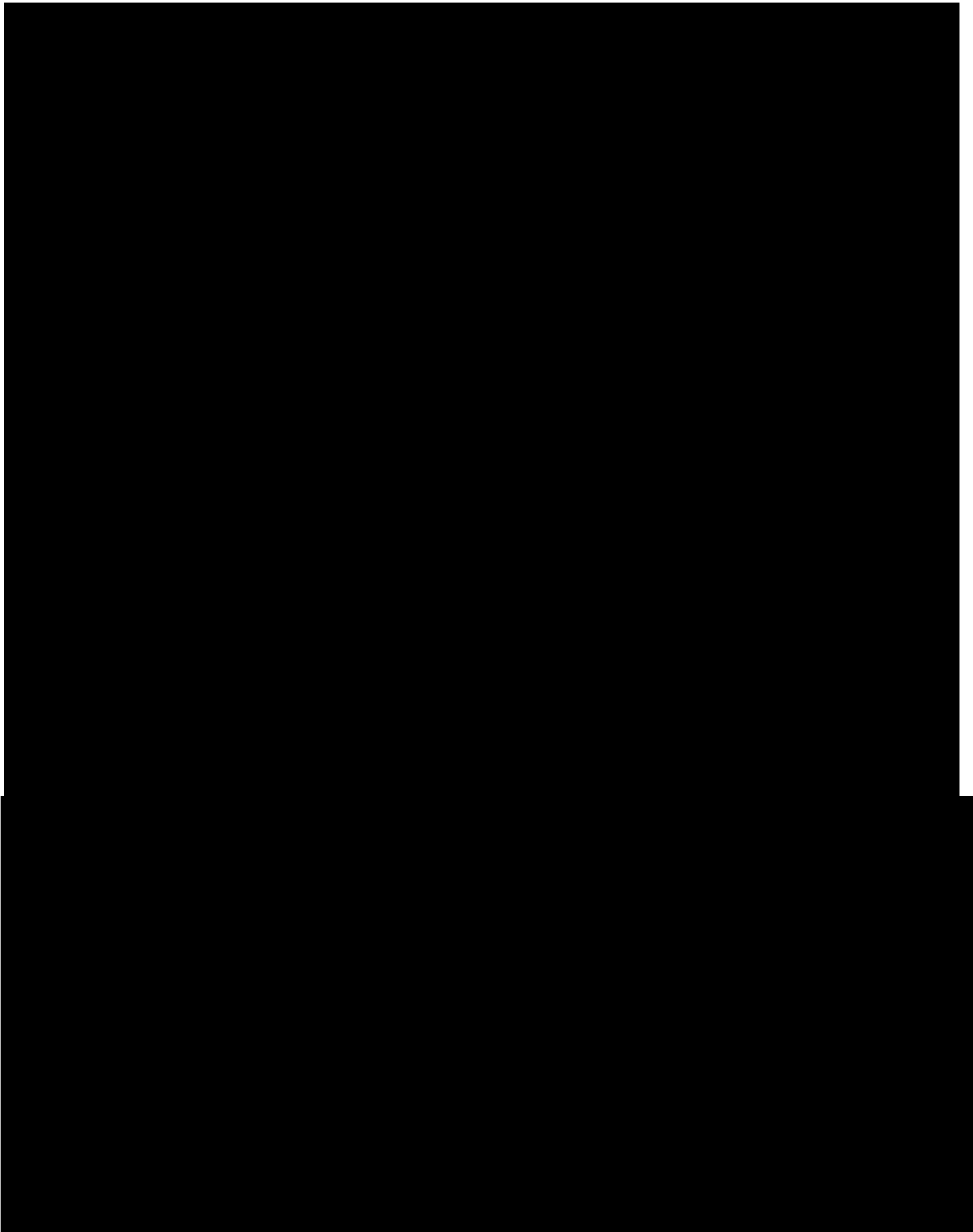
The Streets & Traffic Operations Administrator is:
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575-541-2508
wroman@las-cruces.org

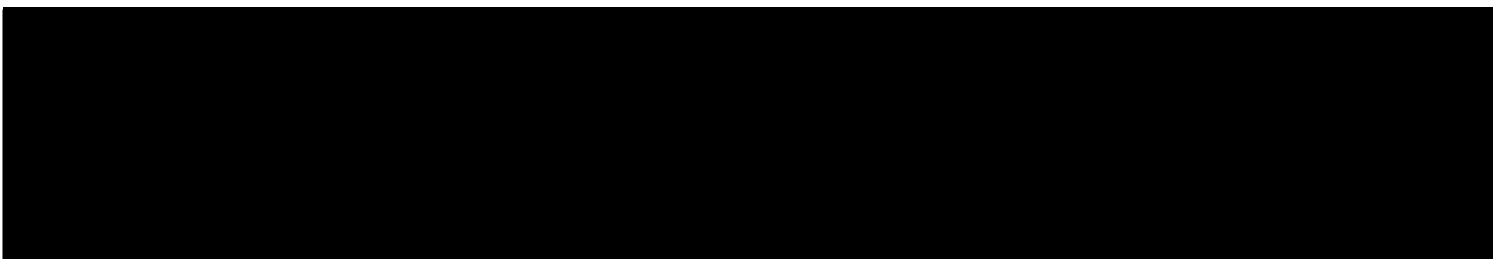
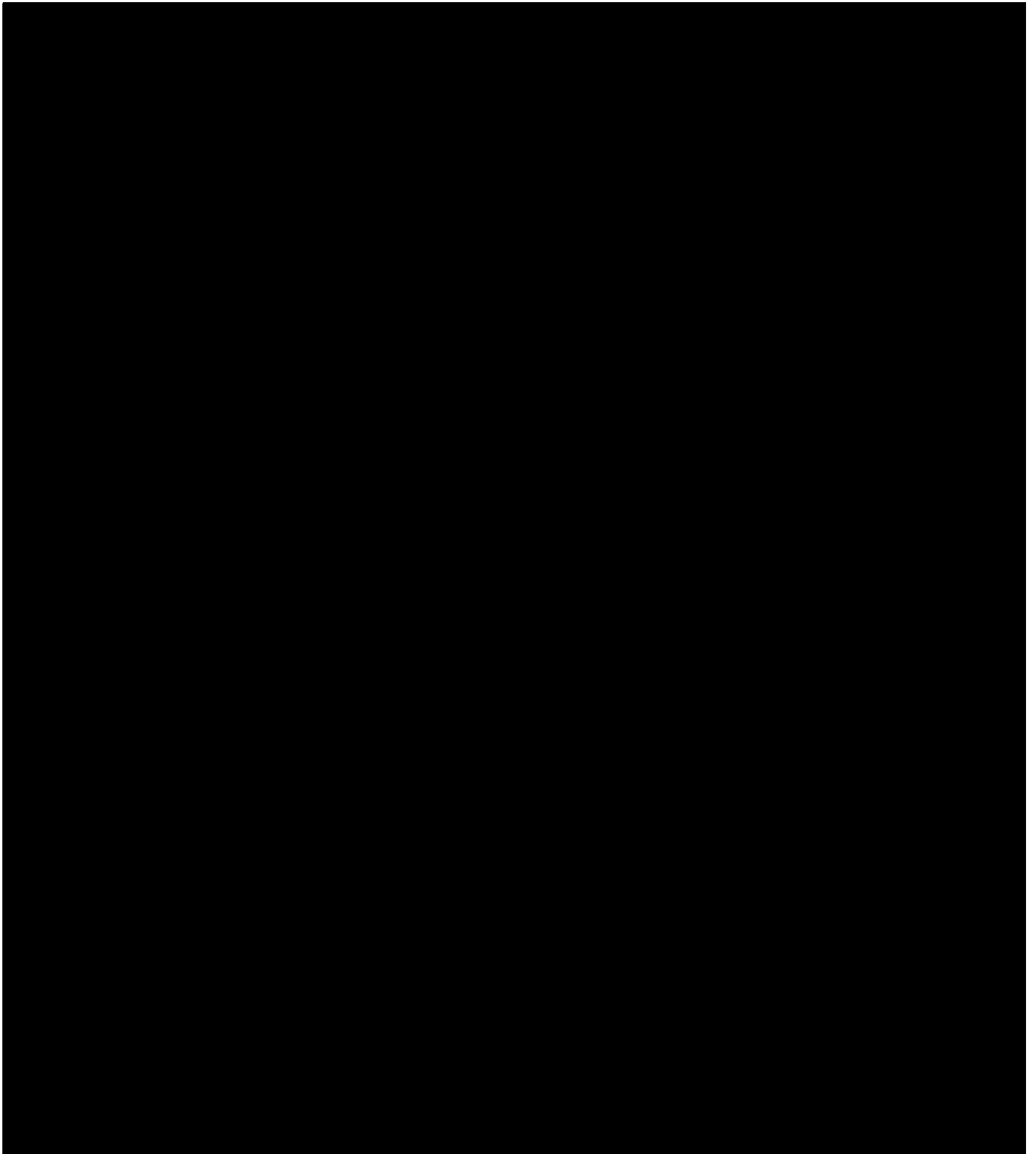
APPENDICES

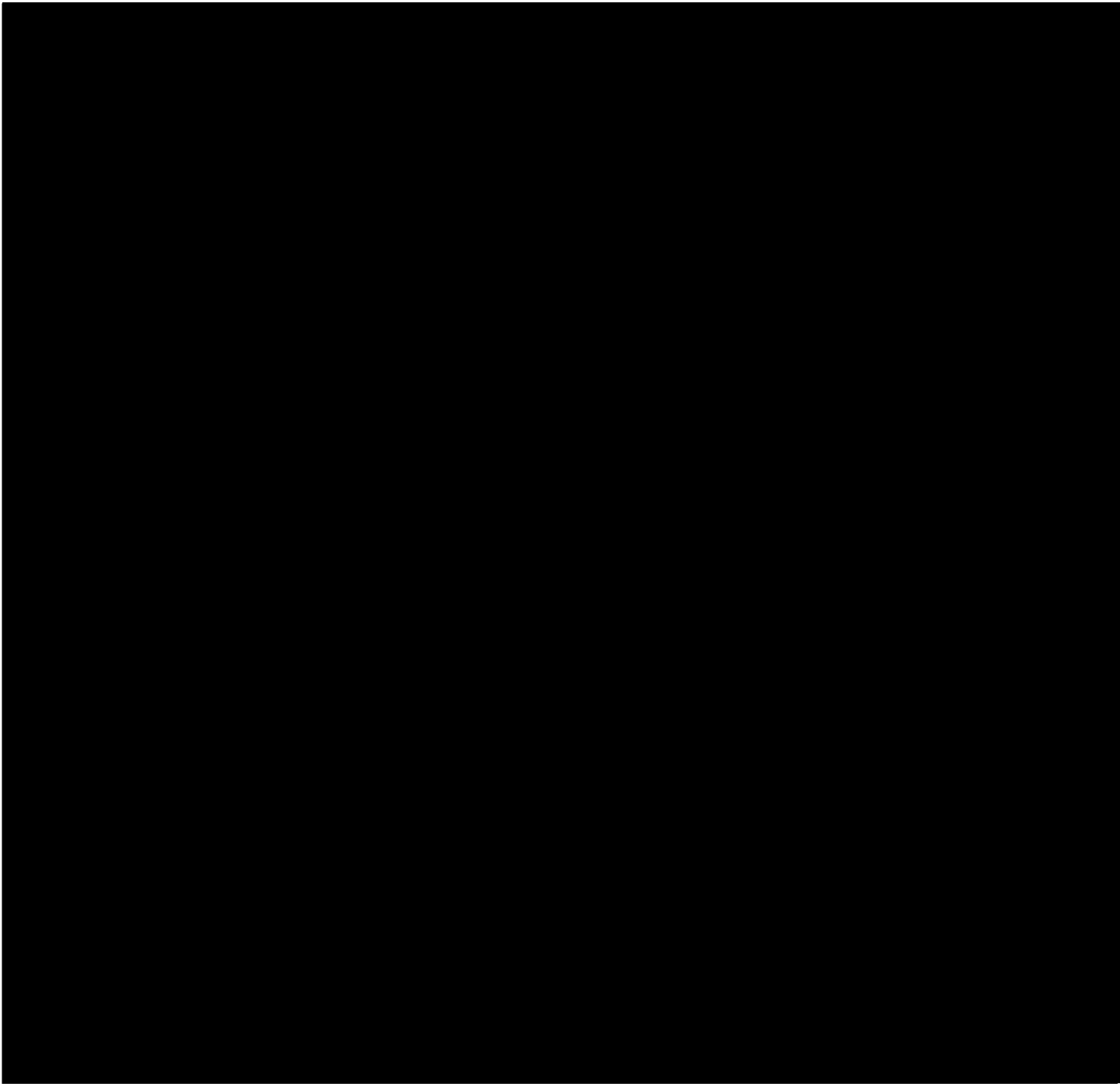
The following appendices can be found attached to the application. All are titled and described as follows:

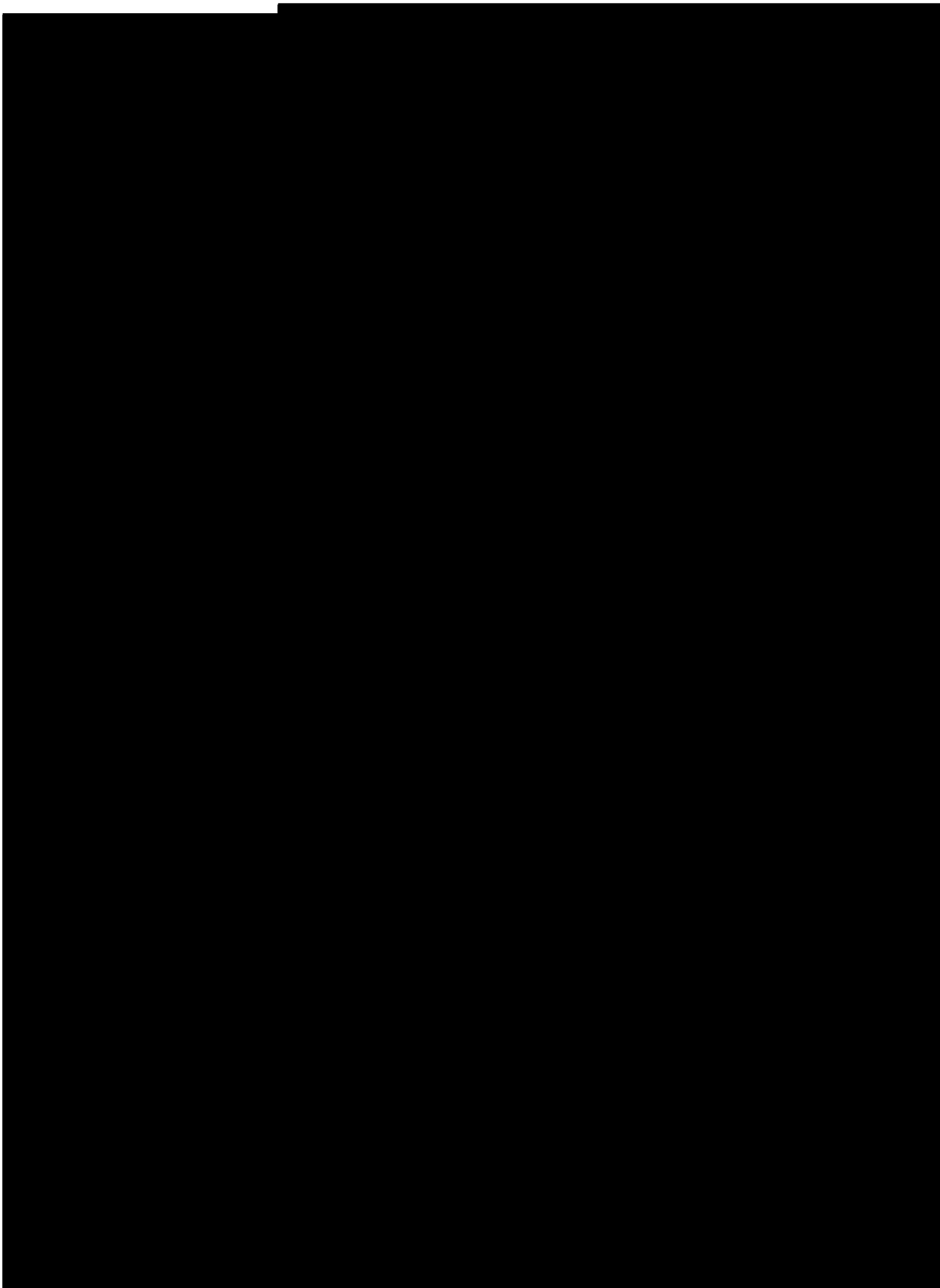
- Resumes of the Project Management Team
- Traffic Engineering Fiber Map – titled “Map”
- BCA Summary – utilizes all worksheets from “Sustainability” through “Existing 5-year Accident Data” – titled “BCA Summ”
- BCA Benefits for Travel Time, Energy, and Safety – utilizes the “Signal Coord” worksheet – titled “BCA Data”

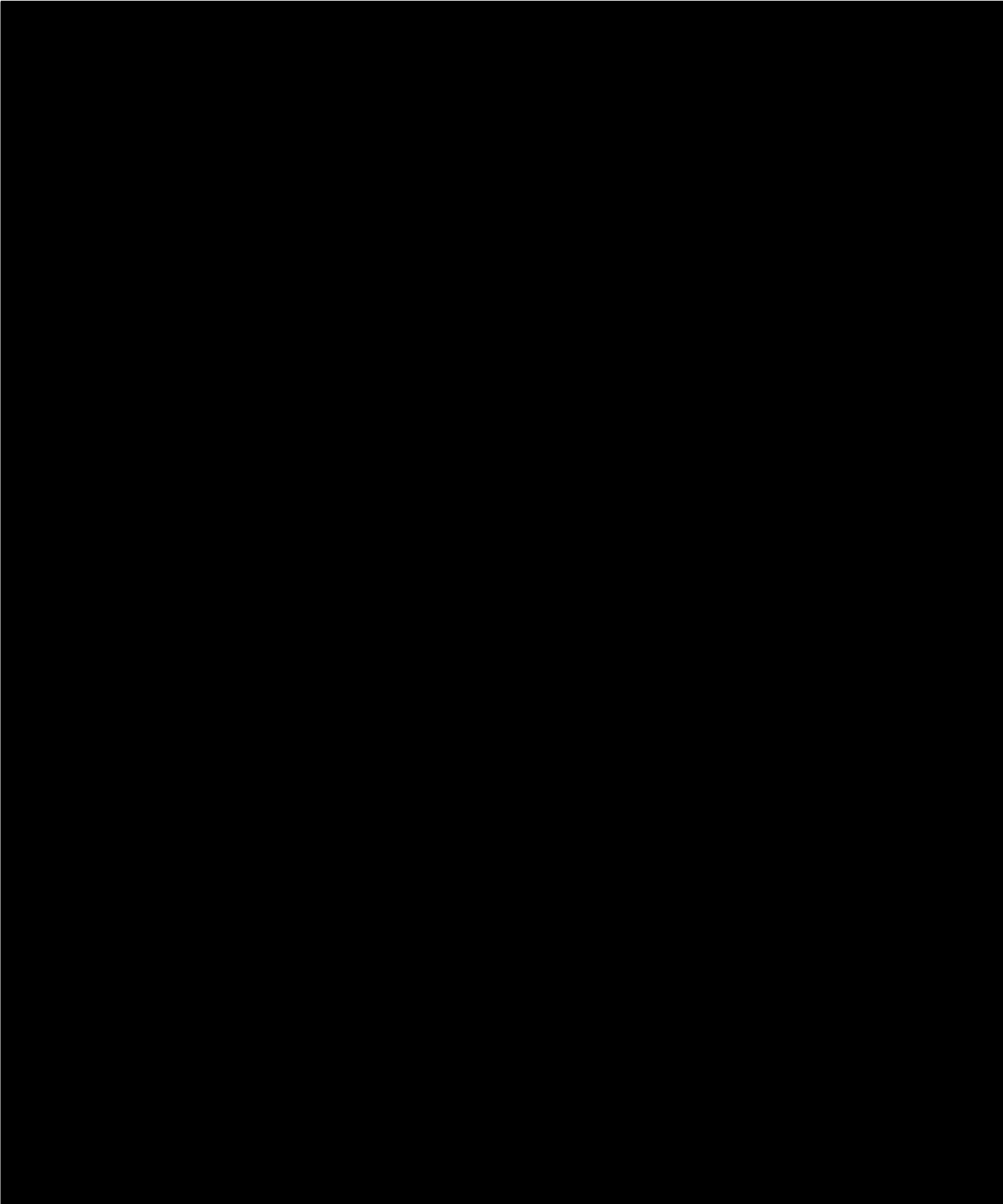


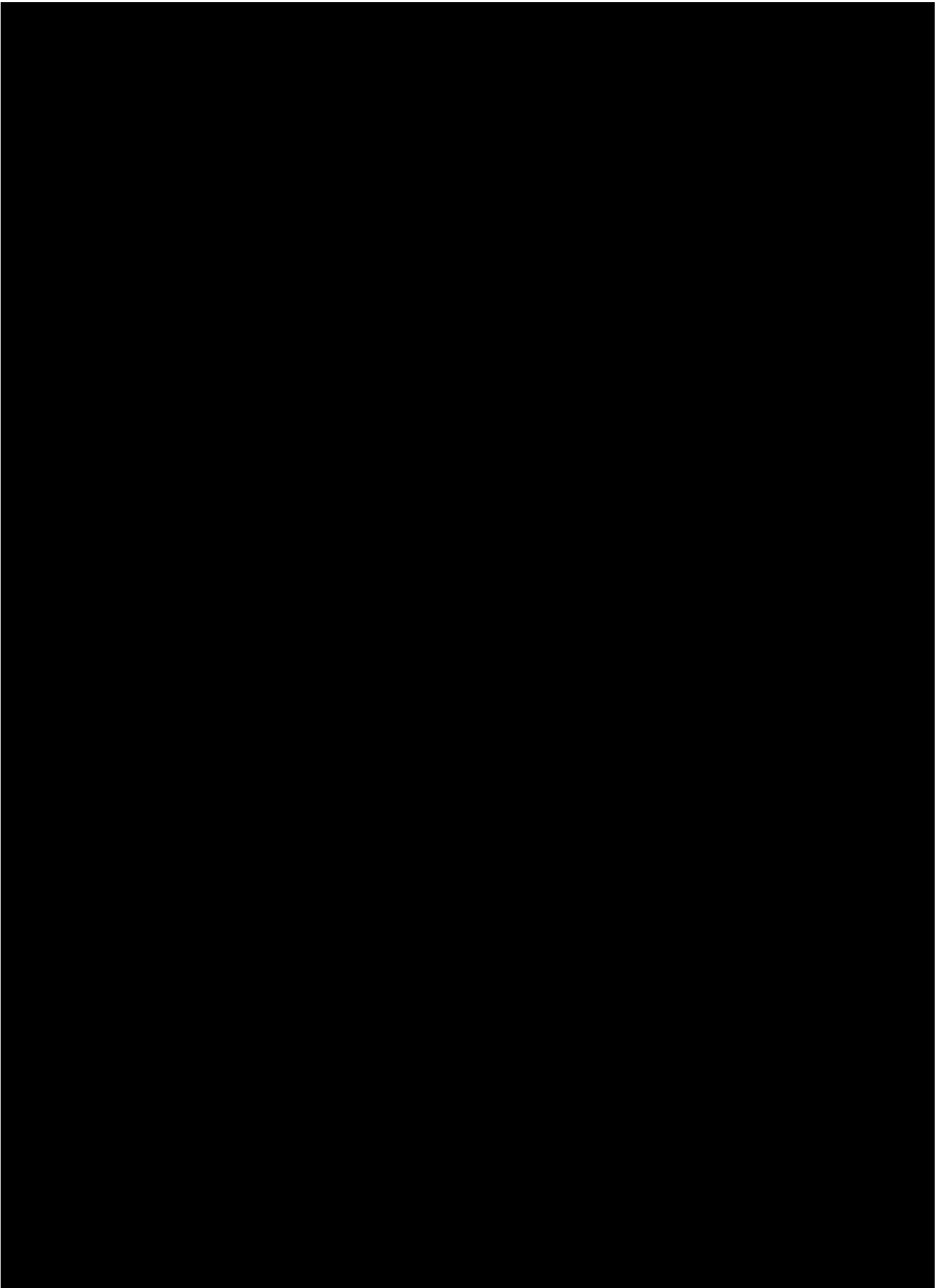


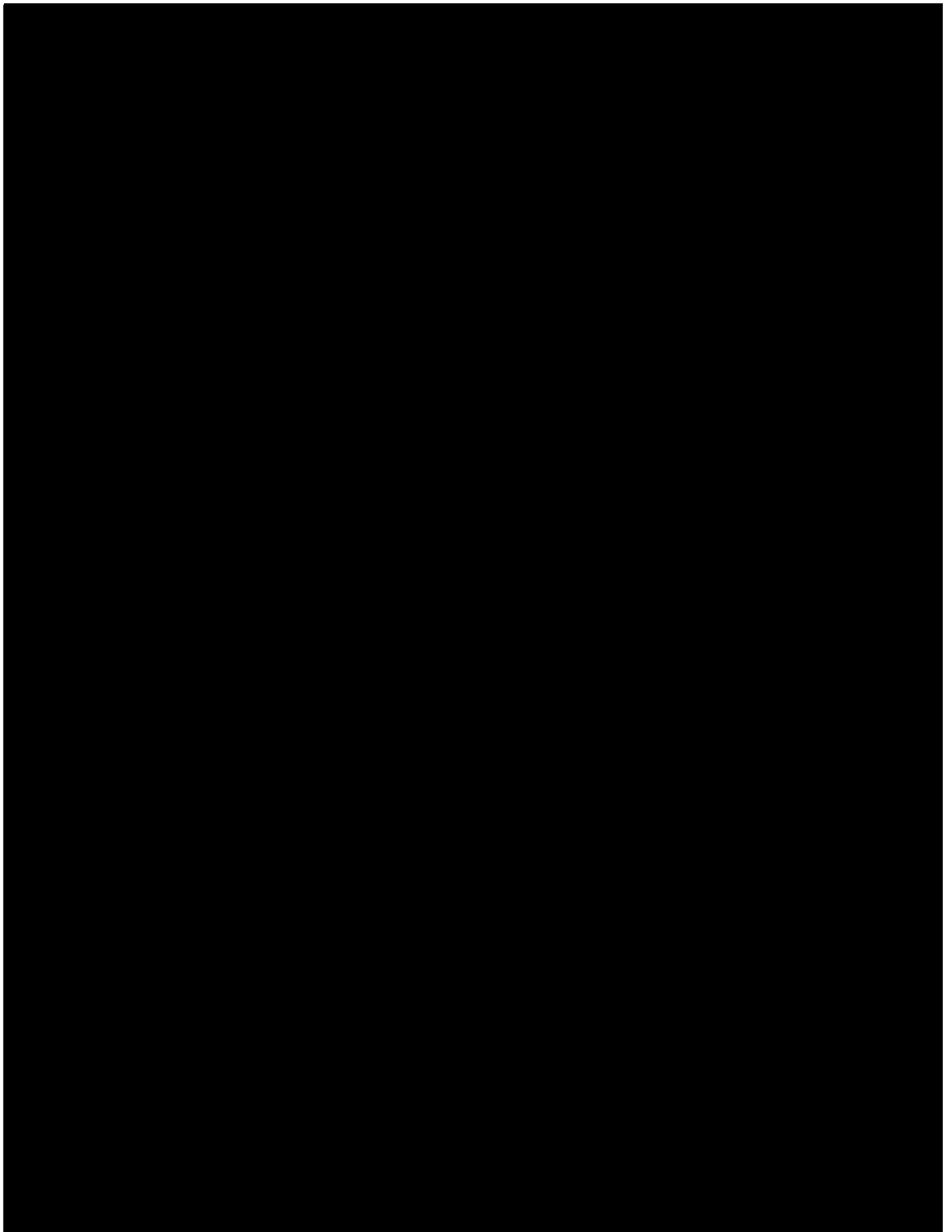








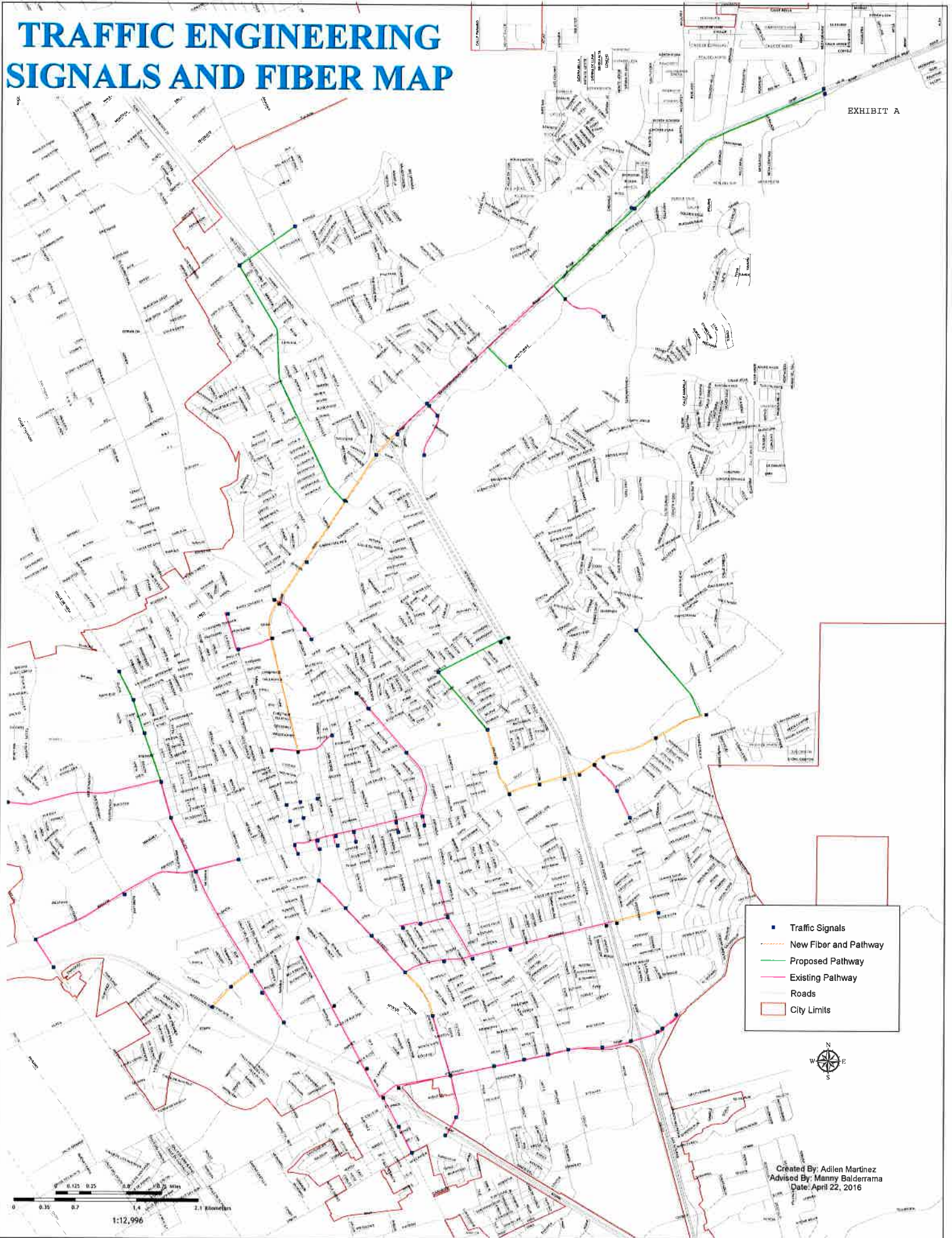






TRAFFIC ENGINEERING SIGNALS AND FIBER MAP

EXHIBIT A



- Traffic Signals
- New Fiber and Pathway
- Proposed Pathway
- Existing Pathway
- Roads
- City Limits



Created By: Adilen Martínez
Advised By: Manny Balderrama
Date: April 22, 2016

0 0.35 0.7 1.4 2.1 Kilometers
0 100 200 300 400 500 Feet
1:12,996