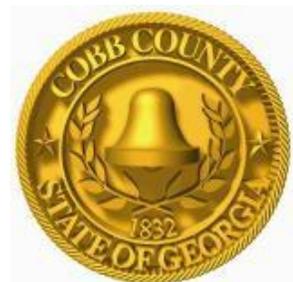


Atlanta Regional Commission Submission for Funding: Advanced Transportation and Congestion Management Technologies Deployment Initiative



ATLANTA REGIONAL COMMISSION

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VOLUME 1 – TECHNICAL APPLICATION

a) Cover Page

Project Name	ConnectATL: Advancing transportation technology in the Atlanta Region to create a comprehensive travel data exchange platform.
Eligible Entity Applying to Receive Federal Funding	Atlanta Regional Commission (ARC)
Total Project Cost (from all sources)	\$8,750,000.00
ATCMTD Request	\$4,375,000.00
Are matching funds restricted to specific project component? If so, which one?	Yes Up to \$350,000 for regional data sharing V2X platform. \$2,448,000 for City of Atlanta Installations \$2,112,000 for Gwinnett County Installations \$3,840,000 for Cobb County Installation
State(s) in which the project is located	Georgia
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 	This project is not currently programmed in any of the documents listed.
Technologies Proposed to be Deployed (briefly list)	Regional data exchange platform, V2X communication via DSRC and LTE, transit vehicle signal prioritization, transit traveler information, and regional mobility mobile application.

b) Project Narrative

Project Description

1. *Introduction, Description, and Proposed Technology*

Atlanta is one of the world's most dynamic metropolitan areas, competing globally on the strength of its resilience, diverse population, robust economy, cultural assets and attractive lifestyles. This is why the ARC Board believes that the Region can "Win the Future," in part, by building world-class infrastructure and fostering the application of 21st century technology to the transportation system.¹ Couple that with the fact that traffic fatalities have risen by 33% in the past two years, with 65% of them involving the driver's failure to maintain their lane,² and it is easy to understand why ARC staff has begun to push the Region in the direction of transportation technology innovation, including recently facilitated a focus group session with Autonomous Vehicle Alliance (AVA) members, who advocate that the public sector must develop data standards and data sharing protocols.

As if safety and the pressure from the technology sector were not enough motivation, there were also recent local incidents and activity that have highlighted the need for more comprehensive integration of advanced technology into transportation system planning, design, and operations: the I-85 bridge collapse in the City of Atlanta; the soon-to-be opening of the Mercedes Benz - Atlanta Falcons/Atlanta United NFL/MLS Stadium in the City of Atlanta, the opening of the new SunTrust Park - Atlanta Braves MLB stadium in Cobb County, new local funding for transit, the I-75 northwest corridor managed lanes, and the extension of the Georgia Express Lanes on I-85 in Gwinnett County. The Region can no longer afford to resort to traditional measures and strategies.

Traditional technological investment in metro Atlanta consisted of wide-ranging ITS/ATMS deployment, which began in earnest in the early 1990s, as the Region prepared for the 1996 Centennial Olympic Games. Most of this investment was led by the Georgia Department of

¹ [The Atlanta Region's Plan Policy Framework](#), adopted in 2014, identifies world-class infrastructure as one of three main regional objectives.

² Georgia DOT – ["Drive Alert. Arrive Alive" public awareness campaign](#).

Transportation (GDOT), which now owns the overwhelming majority of ITS/ATMS infrastructure in the Region. GDOT has already migrated to Georgia's next generation of ITS/ATMS deployment by implementing the Regional Traffic Operations program (RTOP),³ dynamically priced managed interstate lanes, dynamic auxiliary lanes, variable speed limits, and freeway ramp meter deployment.

Additionally, local governments, such as Cobb and Gwinnett Counties, were also early adopters of ITS/ATMS in the Atlanta Region. These two suburban counties contain several regionally significant destinations, as well as vital components of the transportation roadway infrastructure in Georgia (e.g., key interstates and arterials, Georgia Express Lanes, and public transit). This historical investment, as coordinated through the regional transportation planning process, as well as the Congestion Management Process (CMP), has garnered national and international recognition within the Transportation System Management and Operations (TSM&O) professional community. ARC realizes that if Atlanta aspires to become a "Smart City" and local communities aspire to become "Connected Communities" then transportation-related "big data" and widespread interoperable data connectivity (otherwise known as the Internet of Things or "IoT") must exist to optimize the existing and future TSM&O infrastructure. ARC also realizes the positive impact for currently disadvantaged residents in our region to have improved access to employment, education, healthcare, and other essential services which will give them a fighting chance lifting themselves out of poverty and/or unhealthy situations.

The novelty of this project consists of ***developing a regional data exchange platform*** that will consume "big data" that is collected on different functionally classified roadways, located in different area types of the Region. The project will also involve deployment of current and pioneering traffic sensor/detection technology in the targeted areas of the Region. After deployment, there will be a post-integration phase to integrate the derived data into a single exchange platform. The goal of the exchange platform is to be able to publish useful data to connected people, vehicles, and web applications. The exchange platform will enable

³ [RTOP](#) is a multi-jurisdictional, cutting-edge signal timing program with the goal of improving traffic flow and reducing vehicle emissions through improved signal timing. Georgia DOT has provided additional signal timing experts focused solely on Atlanta's busiest arterial roadways. RTOP also assists local jurisdictions to quickly find and repair problems. Once completed RTOP will be able to remotely monitor all corridors which will allow quicker response times to repair signal problems.

governments, businesses, and commuters to make smarter decisions. Accordingly, it will lay the foundation for establishing data standards and sharing protocols that will enable a uniform cross-jurisdictional approach to system management as well as eventual bi-directional communication to connected/autonomous vehicles (CV/AV). While ARC does not own, or operate transportation assets, there is no more capable organization than an MPO, to effectively facilitate a regional approach for establishing a comprehensive set of data and communication standards, in support of advanced technology deployment throughout the entire Region.⁴

Specific elements of this project include:

- Purchase and installation of ITS/ATMS detection devices along specified corridors including:
 - Intelligent nodes (Smart Lights)
 - Traffic Signal Technology
 - Active transportation
 - Transit Signal Priority
 - And, Demand response transit;
- ITS/ATMS traffic signal operations technology/software installation;
- Deployment or enhancement of communication network (fiber or LTE) to connect traffic detection to traffic control center/back office;
- Deployment of communication network infrastructure (Dedicated Short Range Communication, Bluetooth, TPMS) to connect V2I;
- Incident detection and communication equipment and software and integration with social media platforms;
- Design and development of “CarPlay” and other traveler information communication infrastructure applications and firmware;
- Data exchange (software) to publish the data out to different levels of users
- Data exchange use case development and research (detection technology comparison models; analytics; emissions analysis; predictive model development);
- Stakeholder engagement with automobile original equipment manufacturers (OEMs)
- Institutional analysis and concept development for long-term public-private-partnership (P3) data exchange model
- Integrated Corridor Management (ICM) business practices and case study;
- Recommendations for updating the Regional ITS Architecture

⁴ According to the [ARC 2016 Strategic Framework](#), ARC’s mission is to advance the national and international standing of the Region by leveraging the uniqueness of its evolving communities, anticipating and responding to current realities, and driving a data-driven planning process that provides a high quality of life, balancing social, economic and environmental needs of all our communities.

Jurisdictional and geographic specific information relating to these objectives are provided in more detail, further in the Project Description.

2. Entity Description

ConnectATL is a partnership among the Atlanta Regional Commission (ARC), the City of Atlanta, (CoA), Cobb County, and Gwinnett County, dedicated to developing one of the nation's first region-wide transportation data exchange platforms, by leveraging existing ITS infrastructure. It is worth noting here, that GDOT has agreed to make its ATMS/511 system (NaviGator I and NaviGator II) available (as an in-kind contribution to the project) for integration into the data exchange platform described above.

The Atlanta Regional Commission will be managing the grant on behalf of the ConnectATL partnership, which includes the following agencies:

- City of Atlanta – Atlanta Information Management and Public Works Departments
- Cobb County Department of Transportation
- Gwinnett County Department of Transportation

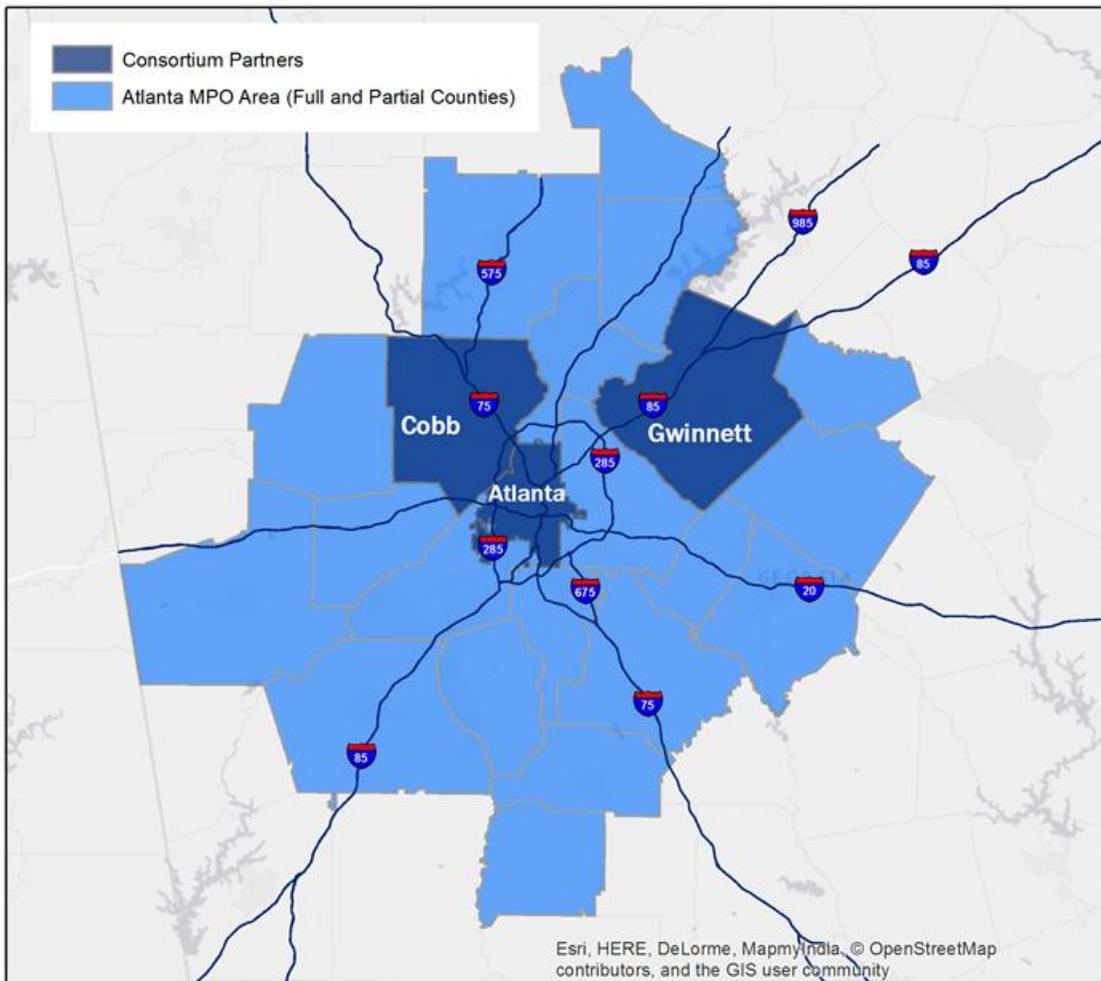
All three local governments are members of the Atlanta Regional Commission, the Metropolitan Planning Organization (MPO) for the Atlanta Urbanized area. Each jurisdiction has representation on the Board, pays dues, and engages in various committees on issues such those associated with Aging, Community Development, and Transportation.

ARC is the regional planning and intergovernmental coordination agency for the 10-county Atlanta Region. Since 1947, ARC and its predecessor agencies have helped focus the Region's leadership, attention and resources on critical issues. The agency serves as a regional convener, bringing diverse stakeholders to the table to address the most important issues facing metro Atlanta. ARC offers leadership development programs to residents who want to make a difference in the Atlanta Region. On any given day, ARC works with local jurisdictions and various regional partners to:

- Plan new transportation options
- Encourage the development of livable communities
- Wisely manage precious water resources
- Provide services for the Region's older and disabled populations
- Help businesses recruit and train the workers they need
- Provide data to help inform leaders and decision-makers
- Coordinating with local first responders in preparing for a secure Region

3. Geographic Area Description

The data sharing platform will include CoA, Cobb County, and Gwinnett County. However, it is important to keep in mind that the work of the grant will take place in the context of the 20 county Metropolitan Planning Area, providing relatively rapid scalability through the potential integration of data streams from GDOT's broader network of sensors. The data sharing platform will leverage data from existing smart infrastructure and the additional smart infrastructure resulting from the ATCMTD grant. Below is a map highlighting the three jurisdictions, and a brief description of each:



City of Atlanta

The City of Atlanta is the State Capitol of Georgia and its largest City with a 2016 population of 472,522 and a geography of 134 square miles.⁵ As the central City of the Region, it includes multiple employment centers and one of the largest concentrations of universities and colleges in the United States. Atlanta serves as hub for multiple modes of passenger and commercial travel including air, rail, freight bus, and personal vehicles. With the intersection of 4 interstates (I-75, I-85, I-20, I-285), it is one most important places for Interstate travel in the United States. Over 690,000 people work in the City including strong concentrations of jobs in the high-tech employment sectors, many of which are located along critical arterials that already include multi-modal travel opportunities.⁶ These critical arterials already experience high levels of congestion, and with little opportunity for system capacity expansion, they represent great opportunities for leveraging technology to optimize mobility- simultaneously reducing travel congestion and negative environmental impacts.

As part of the ConnectATL consortium, the City of Atlanta will focus on North Avenue, which is one of those critical arterials that can serve as a testing ground for system optimization. The North Avenue corridor project, from Northside Drive to Freedom Parkway, includes the Intelligent Node (Smart Lights) portion of the deployment. The Smart Lights portion of the deployment includes also includes Buckhead Loop, Joseph E. Lowery Boulevard, MLK Jr. Drive, and the Government complex around City Hall. The Traffic Signal Technology portion of the deployment include the Mercedes Benz Stadium, Georgia World Congress Center, Philips Arena, and Centennial Olympic Park.

Cobb County

Cobb County is located approximately 10 miles northwest of the City of Atlanta and is a gateway to the metropolitan Atlanta region via I-75 and I-575. Cobb County is Georgia's third most populous county with a current population of 748,150.⁷ The County's roadway system includes more than 2,400 miles of road and over 553 signalized intersections with 170 functioning as

⁵ https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk#

⁶ <https://qwiexplorer.ces.census.gov/exp-r/fd30d.html?st=GA&v=line&fc=true&t=ac0&extra=x%3D0%26g%3D0>

⁷ https://factfinder.census.gov/bkmk/cf/1.0/en/county/Cobb_County_Georgia/ALL

adaptive signals.⁸ Additionally, Cobb County operates the second largest transit system in the state; CobbLinc. The most recently published NTD data shows the transit system to have provided 3.5 million trips in 2014.

An impressive string of community assets are found in the Cobb County project corridor. As Georgia's third-largest university, Kennesaw State University (KSU) student enrollment has increased from 12,537 in 1996 to 32,000 in 2014. Students, prospective students and the community at large will gain improved access to this critical regional asset through the proposed project. Students, many of which as millennials, attending KSU and Life University have a desire to connect in their community in a multimodal manner. Improving both transit and vehicle travel times along Cobb Parkway improves the quality of life for all users.

Gwinnett County

Gwinnett County is located approximately 30 miles northeast of the City of Atlanta via I-85. Gwinnett is Georgia's second most populous county with a current population of 907,135.⁹ Gwinnett County is home to Georgia Gwinnett College and provides easy access to the University of Georgia via University Parkway/GA Highway 316. The total area is 437 square miles and the typical development pattern has been growth from west to east, radiating out from metro Atlanta. A wide variety of housing choices is available and there are approximately 445,000 jobs in Gwinnett County. The County's roadway infrastructure system includes more than 2,500 miles of road and over 700 signalized intersections.¹⁰ The County's transit system, Gwinnett County Transit, provided 1.7 million trips in 2014.¹¹

4. Real World Issues and Challenges

As part of The Atlanta Region's Plan development process, ARC completed a comprehensive Regional Assessment which highlighted five overarching transportation challenges faced by the Region: 1) funding, 2) congestion, 3) accessibility, 4) safety and 5) equity. The recommendations

⁸ http://cobbinmotion.com/PDF/ECNA_FINAL_5.13.14.pdf

⁹ [https://factfinder.census.gov/bkmk/cf/1.0/en/county/Gwinnett County, Georgia/POPULATION/PEP_EST](https://factfinder.census.gov/bkmk/cf/1.0/en/county/Gwinnett%20County,%20Georgia/POPULATION/PEP_EST)

¹⁰ <https://www.gwinnettcountry.com/portal/gwinnett/Departments/Transportation/ComprehensiveTransportationPlan>

¹¹ <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/40138.pdf>

of The Atlanta Region's Plan Transportation Element are designed to aggressively target these challenges.

Significant portions of the Atlanta Region's transportation system were designed to accommodate a lower density development pattern, a formula which worked well to grow the Region's economy throughout the latter half of the 20th century. But that formula has become unsustainable and we are now at a pivotal moment in determining how the Region should continue to grow. Many of our suburban roads, now serving large subdivisions, were once tranquil country byways. These roadways were not designed for the way they are being used today. For example, too much traffic is being forced along narrow two-lane roads constructed in an era when traffic was light and slower moving. Many regional freeways are overwhelmed by commute traffic and trucks for large parts of the day and expanding capacity would be prohibitively expensive.

In recent years, calls for being more efficient in how and where financial investments are made in order to "get the biggest bang for our buck," have resulted in a leaner transportation program relying on objective data in the decision-making process. But multiple rounds of belt-tightening have not fully solved the problem. That's the situation the Atlanta Region finds itself in now: how do we maintain what we already have, while still accommodating continued rapid growth, all on a budget that isn't enough to accomplish either?

While it's undeniable that significant portions of the highway and street network do experience intense congestion on a routine basis, our Region's reputation might be somewhat overstated. Even though traffic is heavy at virtually all times, many roadways operate at or near the speed limit throughout most of the day. And even those roadways experiencing peak period congestion frequently have free flow conditions during the midday, evening and weekend periods. It's reasonable to make an argument that congestion would not be a major issue on many roads if it weren't for crashes, stalls, and reckless driving.

Parts of the Region lack a comprehensive network of surface streets that can siphon traffic away and around those hot spots, so the commuter has no choice but to endure that choke point. Even if 20 miles of a 25-mile commute occurred at the speed limit, it's those five miles of stop and go traffic that can double or triple the overall trip time and color this commuter's perceptions of how bad congestion was along the entire route.

With limited financial resources; declining ability to widen primary commute corridors; a large number of local jurisdictions through which on the ground solutions must be coordinated; and significant anticipated population and employment growth, the Region must identify and target the underlying cause of congestion and be open to a wide array of potential solutions, including in large measure, advanced transportation technology to enhance our system management and operations capacity at the inter-jurisdictional level. In other words, our Region needs to be strategic and innovative in designing ways to solve our congestion and safety concerns.

This grant application is intentionally cross-jurisdictional in nature so as to enable the Region to enhance its capacity to work across local geopolitical boundaries. The creation of a centralized platform to integrate system data from multiple sources – both in terms of sensor types and system owners – and return consistent analytics to the multiple parties responsible managing the system such that they can deliver coordinated responses to existing or imminent issues in the system is highly consistent with the strategic and innovate approach the Region has determined is needed.

5. *Description of Transportation Systems and Services Included in the Project*

This project includes A) development of a regionally connected data exchange platform that coordinates intelligent infrastructure information and B) corridor and area-wide deployments of smart infrastructure.

A. *Development of a regionally connected data exchange platform that coordinates intelligent infrastructure information*

The primary goal of this project is to leverage existing and expanded intelligent infrastructure throughout the region to produce data and analytics useful to connected vehicles, freight, fleets, and software applications in order maximize efficient travel in the Atlanta Region.

A regional data exchange platform shall be developed and implemented that synthesizes “big data” collected on different functionally classified roadways, and located in different area types of the region. This element will form the foundation of the ConnectATL initiative, providing overall data integration into a single data exchange platform. This will allow the interchange of data and useful analytics for citizens, businesses – including the goods movement community, government and web

applications. This effort will form a foundation for establishing data standards and sharing protocols that will enable a uniform cross-jurisdictional approach to system management as well as eventual communication to connected/autonomous vehicles (CV/AV). During the process, close coordination will occur with the Georgia Department of Transportation to ensure state data standards are met.

Other elements of the regionally connected data exchange platform include:

- Incident detection and communication equipment and software;
- Design and development of “CarPlay” and other traveler information communication infrastructure applications and firmware;
- Data exchange (software) to publish the data out to different levels of users
- Data exchange use case development and research (detection technology comparison models; analytics; emissions analysis; predictive model development);
- Stakeholder engagement with automobile original equipment manufacturers (OEMs)
- Institutional analysis and concept development for long-term public-private-partnership (P3) data exchange model
- Integrated Corridor Management (ICM) business practices and case study

B. Corridor and Area-Wide Technology Deployment

A core element of the project is the deployment of infrastructure to improve operational awareness in the Atlanta region while adding new capabilities to existing ITS tools. A foundation of this project element is to purchase and install ITS/ATMS detection devices along specified corridors. ITS/ATMS traffic signal operations technology/software will be procured along with the deployment or enhancement of communication network (fiber or LTE) to connect traffic detection to traffic control centers/back offices. Communication network infrastructure shall be deployed (Dedicated Short Range Communication, Bluetooth, TPMS) to connect V2I.

The system shall provide capabilities supporting 1) Emergency Response, 2) Rainfall Intensity Detection, 3) Motorist/Cyclist Communications, 4) Motorist/Pedestrian Communication, 5) Rear End Collision Warning, 6) Intelligent School Beacons and 7) Transit (bus) Priority at Intersections. Additional information regarding the infrastructure capabilities of the project include:

Emergency Response (ER)

Connected vehicle technology (vehicle-to-infrastructure) connects all the fire trucks and ambulances wirelessly from the vehicle to the intersection. In this way, the intersection knows which vehicles are approaching; the speed; and the status of the lights. Based on the rules preconfigured in the intersection, the intersection brings all opposing traffic to a halt (eliminating the risk of collision); flushes out the traffic that is ahead of the emergency vehicle and provides green lights “just in time” for the emergency vehicle to safely pass through the intersection.

Also, connected vehicle technology (vehicle-to-vehicle) communicates the position, direction, speed, and status of the emergency vehicle to all other nearby vehicles. This application will send an alert to the driver, such as “Emergency vehicle right” (or left/ahead/behind as appropriate) when the emergency vehicle is on approach. The driver can take appropriate avoiding action to make it easier and safer for the emergency vehicle to pass by.

Rainfall Intensity Detection (RID)

Crash rates increase during heavy rain. There are multiple causes for this effect, but key reasons are poor visibility and lower friction resulting in vehicles not stopping correctly at red lights. Weather instruments detect the rainfall intensity. If the rainfall intensity exceeds a threshold, then the traffic signal controllers will implement plans with extended yellow/all red intervals, which will reduce the risk of crashing during periods of heavy rainfall.

Motorist/Cyclist Communications (MCC)

Cyclists are referred to as Vulnerable Road Users (VRU’s) because most collisions between a vehicle and a cyclist will result in injury to the cyclist. The collision can occur because of a distracted driver, or a distracted cyclist who is not aware of a vehicle approaching from behind. Connected vehicle technology (vehicle-to-cyclist) communicates the speed and heading of the approaching vehicles to the cyclists, and the speed and heading of the cyclists to the approaching cars. The application alerts the

cyclist if there are speeding vehicles approaching, and warns the vehicle drivers if there are cyclists ahead.

The ConnectATL project will test active transportation count technology and data collection. The pilot project will provide an opportunity to test strategies and count technology before investing in a larger, region-wide program. The project can also have an immediate benefit in measuring the event-day impacts associated with walking and biking around special events venues and regional trail networks.

Motorist/Pedestrian Communication (MPC)

Connected vehicle technology communicates the speed and heading of the approaching vehicles to the pedestrians and the location of the pedestrians to the approaching cars. In addition, the status of a Rapid Rectangular Flashing Beacon (RRFB) or HAWK pedestrian signal in the corridor is communicated to the approaching vehicles. Connected intelligent traffic control device technology can alert the pedestrian if there are speeding vehicles approaching and warns the vehicle drivers if there are pedestrians or active crosswalks ahead.

Rear End Collision Warning (REWC)

A significant number of the collisions which occur are rear end collisions, where a vehicle simply drives into the vehicle in front of it. Typically, these collisions are caused by a distracted driver not paying attention to the vehicle in front. For each surrounding vehicle, the application calculates if the approaching vehicle can safely stop in time, based on the closing speeds of the two vehicles. If the algorithm determines that the approaching vehicle will not stop in time, then an audible alert is provided to the driver to alert to the danger ahead.

Intelligent School Beacons (ISB)

School beacons are a standard traffic device to warn vehicles and affect speeds around schools. Adding “driver feedback signs” to the school beacons has been shown to reduce the speeds of passing vehicles at the danger time when the children are arriving or leaving. In addition, radar measures the speed of the vehicles in the school zone, and

highlights which roads and schools suffer from the most high-speed drivers. In this way, the schools which need more enforcement from police, or other traffic calming measures, can be identified based on the data.

Connected vehicle technology (vehicle-to-infrastructure) also allows the receipt of messages from all school beacons, including the status of the signal and the reduced speed limit. If the algorithm determines that the vehicle is travelling too fast in the school zone, and the beacon is on, then an audible alert is provided to the driver to alert of the danger to the children.

Transit Priority at Intersections (TPI)

Transit vehicles are impacted by having to stop at traffic lights, in addition to their regular stops. This means that the travel time by transit is longer than by personal vehicle, which means that fewer people ride transit. Connected vehicle technology (vehicle-to-infrastructure) allows the position of the transit vehicle to be communicated to the traffic signals, and the traffic signals to communicate with surrounding vehicles. This message includes the status of the signal and timing of when the signal is going to change to the next state. The transit vehicle is wirelessly connected to the traffic intersection, which enables the traffic intersection to intelligently provide priority to the transit vehicle. This will result in the travel time for the transit being reduced, which will provide incentive for the public to use transit.

The system will adhere to industry standards, be an open system (not using proprietary technology), and leverage existing technology already in place. The open systems requirement allows movement between vendors and suppliers and provides a more cost-effective and sustainable solution.

The strategy is to use National Transportation Communications for ITS Protocols (NTCIP) 12115 as the basis implementation. NTCIP 1211 includes the management of multiple requests for priority or preferential treatment of different classes of vehicles, such as transit vehicles, emergency vehicles, and commercial fleet vehicles. NTCIP 1211 defines a method of granting priority to one signal while maintaining coordination with adjacent

intersections. NTCIP 1211 is intended to work in conjunction with the coordination object definitions and functions defined in NTCIP 1202, "Object Definitions for Actuated Signal Controllers."

The number of signals in the corridors includes adjacent signals in the grid which will be included in the connected intelligent traffic control device technology program.

Corridor and Area-Wide Technology Deployment Locations

Corridor/ Area	Termini	County/ City	Typical AADT	Transit Routes (Y/N)	# of Signals	Technology Applications*
North Avenue	Northside Drive to Freedom Parkway	City of Atlanta	34,400	MARTA service area	20	Traffic Signal Technology project; Intelligent Node (Smart Lights)
Buckhead Loop	Piedmont Rd to Peachtree Rd	City of Atlanta	56,700	MARTA service area	5	Intelligent Node (Smart Lights)
Joseph E. Lowery Blvd		City of Atlanta	17,600	MARTA service area		Intelligent Node (Smart Lights)
MLK Jr. Drive		City of Atlanta	8,750	MARTA service area		Intelligent Node (Smart Lights)
City of Atlanta Gov't Complex	Area-wide	City of Atlanta	Varies	MARTA service area		Intelligent Node (Smart Lights)
Cobb Parkway (US 41)	Kennesaw St, Univ. to Cumberland Activity Center	Cobb County	39,500	11 CobbLinc local bus routes	35	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
Cumberland Activity Center	Area-wide	Cobb County	Varies	CobbLinc service area	30	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
Town Center Activity Center	Area-wide	Cobb County	Varies	CobbLinc service area	25	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
SR 140/ Jimmy Carter Blvd/ Holcomb Bridge Rd	County line to county line	Gwinnett County	69,600	Gwinnett Transit Route 10, 20, 30 & 35	40	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
Sugarloaf Parkway	SR 124 to Peachtree Industrial Blvd	Gwinnett County	45,900	Gwinnett Transit Route 10 & 40	47	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
Pleasant Hill Road	County line to US 29	Gwinnett County	56,300	Gwinnett Transit Route 10 & 30	59	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
SR 20	SR 124 to Ozora Road /Cooper Road	Gwinnett County	30,300	None	15	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
Five Forks Trickum Road	Sugarloaf Pkwy to Rockbridge Rd	Gwinnett County	21,400	Gwinnett Transit Route 40	18	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)
SR 317/ Lawrenceville Suwanee Rd	US 29 to Peachtree Industrial Blvd	Gwinnett County	35,100	None	40	CV Applications (ER, RID, MCC, MPC, RECW, ISB, TPI)

6. Deployment Plan

Deployment of ITS/ATMS Technology:

The hardware that is required for the connected intelligent traffic control device technology program is off-the-shelf, and has been designed and engineered for low-friction delivery. The cabinets, switches, cameras, fiber-optic, and all other equipment are part of a product line readily available and in daily use. In this way, there will be no procurement or integration problems. These products and services can be procured through the Georgia state contracting process. On-going maintenance or replacement costs will be supported, either through local resources or with the allocation of federal funding, as promulgated through the regional planning process.

This component of the project is being designed by the local partners, but it will be done in close cooperation with GDOT. Compliance with applicable standards will be ensured through the Georgia Plan Development (PDP) and state and local permitting processes. ARC does not anticipate seeking any waivers from generally applicable standards. The local partners each have established standards for ensuring optimal life-cycling costing for ITS infrastructure and will be applying these to all relevant elements of the project. Additionally, the local partners will conform to current life-cycle standards guided by GDOT as appropriate in the design of pavement infrastructure, where applicable. ARC anticipates small, periodic additional costs associated with maintenance of new signal, sensor, and communication equipment.

ARC recommends that each corridor that will be instrumented with new ITS/ATMS infrastructure, should be maintained by the same standards as GDOT's RTOP, by assigning a dedicated corridor manager to monitor and review operational functionality and performance. Below is a table that shows the general system maintenance requirements for RTOP corridor managers.

GDOT Regional Traffic Operations Program (RTOP) Corridor Manager Maintenance Responsibilities

		RTOP Manager	Program Manager	Corridor Manager	Local Agency GDOT Lead	Local Lead	
System Maintenance	Issue reporting, tracking and management	Review and approve methods and format of reporting	Implement and maintain issue reporting, tracking and management system	Develop reports indicating system functionality and work orders to repair system components that are not functioning	Participate in development of issue tracking mechanism	Participate in development of issue tracking mechanism	
		Issue requirements and goals for responsiveness and functionality	Receive maintenance requests and issue work order to contractors	Notify local agency of issues that cannot be resolved by the program		Request Corridor Manager to repair communications, detection and surveillance (if Local Agency is unable to repair in a timely manner)	
	Maintenance	Review and approve forms and procedures proposed by Program Manager	Prepare and maintain forms and procedures for preventative maintenance	Provide oversight of maintenance repairs	Provide emergency response maintenance (indication failures, flash, knockdowns, etc.)	Provide emergency response maintenance (indication failures, flash, knockdowns, etc.)	
			Direct preventative maintenance efforts with Traffic Signal Technicians				Perform routine maintenance
			Procure materials from GDOT for preventative maintenance tasks				Perform preventative maintenance
	Operations Improvements	Regional monitoring and management system implementation	Review and approve plan for monitoring and system design	Prepare plan for monitoring and system design	Provide input to Program Manager as requested	Provide input to RTOP and Program Manager in order have local agency perspective in design of system and selection of monitoring plan	Same as GDOT Lead
Equipment Upgrades		Review recommendations for new equipment	Review and prioritize recommendations for new field equipment	Develop recommendations for signal equipment and communications upgrades which improve system operations and performance	<ul style="list-style-type: none"> Perform signal upgrades with cooperation of local agency 	Assist GDOT as needed	
		Authorize upgrades under project		Develop work order for signal upgrades			
		Negotiate upgrades through other methods					
Operational and safety upgrades		Review and approve plans for recommended operational improvements	Summarize recommendations and submit to RTOP Manager for approval	Develop recommendations for operational improvements (signing, striping, etc.)	Cooperate with GDOT on making improvements	Same as GDOT Lead	
	Where appropriate, initiate improvements through GDOT programs	Maintain plan to improve operations along corridor		Inform Corridor Manager of upcoming capital or operational projects that will impact corridor operations	Inform Corridor Manager of upcoming capital or operational projects that will impact corridor operations		

Deployment of Data Exchange Platform:

The data exchange platform will be a hardware agnostic software program comprised of application program interfaces, data analytic algorithms, etc. derived from open and/ or proprietary sources. This project includes an institutional analysis that will provide the Region with recommendations on long term ownership and maintenance strategies. With the support of private sector stakeholders and academia, ARC will also provide several use cases on what type of data should be published, depending on the type of user consuming it (person, personal vehicle/OEM, freight transporter, first responder, advertising/marketing clients, etc.).

7. *Challenges in Regulatory, Legislative, or Institutional Environments*

ITS/ATMS Technology Challenges:

There are no known or anticipated legal or policy obstacles to full deployment and all system interfaces are based on open standards for ease of data interoperability. Policy positions such as the USDOT's SAE J2735, which will assure that dedicated short range communication applications will be interoperable, allow and encourage the proliferation of connected vehicle technology. This standard, and other policy directives, support open standards for messaging, security, and other project elements.

Data Exchange Platform Challenges:

The biggest challenge to deploying a fully, interoperable data exchange platform, is most likely going to be associated with any proprietary nature of the platform's development, and any derived data outputs (e.g., data dashboards, archived big data, etc.). The key question will be if and how can the public sector be assured that it can have unfettered access to the real-time and historic data. Through this project, ARC will identify and formulate potential challenges to a fully-deployed, interoperable data exchange platform, with respect to federal, State of Georgia, and local regulations.

8. Quantifiable Performance and Benefits

The project will result in reduced traffic-related crashes, congestion, and costs by designing improved travel corridor intelligence for vehicles to communicate with infrastructure. Other benefits will relate to optimizing system efficiency and improving access to transportation services.

To analyze crashes, Gwinnett County utilizes a custom-built program. The Collision Diagramming and Reporting Extension (CDARE) program is an ESRI ArcMap extension which geo-locates each traffic crash onto a GIS street map. Crash attributes such as type (angle, sideswipe, rear end, etc.), day of the week, time of day, and pavement conditions (wet/dry) are positioned on the roadway network approximating the real-world circumstances of each crash. The total number of crashes and, more importantly, the types of crashes are revealed in a geographic format. Traffic safety engineers use this data to plan effective roadway improvements which address the actual deficiency. The CDARE program can be efficiently utilized for a large scale, detailed before-and-after crash analysis to show the effectiveness of the connected intelligent traffic control device technology program. The CDARE program can show that an intervention, such as a deployment of connected intelligent traffic control devices, not only reduced the total number of crashes but also reduced (or increased) a particular type of crash. This type of detailed data is vitally important to warrant the transferability and broad adoption of new technology, which is a goal of the ATCMTD initiative.

Reduction in regional VMT brought about through the implementation of the ATCMTD initiative will decrease the potential for crashes, improving public safety. Historic Crash Analysis (2010 – 2014) is as follows:

- Over the five-year study period, 1,602 total crashes occurred along the US 41 study corridor.
- The intersection of US 41 at Cumberland Boulevard had the highest number of crashes over the five-year period with 398 crashes.
- 61% of the crashes along the corridor were rear-end, 26% were angle, 10% were sideswipe-same direction, 2% were not a collision with a motor vehicle, and 1

percent were head-on. Rear-end crashes and angle crashes are typical at signalized intersections. Rear-end crashes are also indicative of traffic congestion.

Based on national statistics, bus transit is a safer mode of transportation compared to cars and light trucks with a fatality rate per billion passenger miles of 0.11 versus 7.28, respectively. Transit signal prioritization will result in more person trips by transit resulting in fewer overall crashes in the project area.

Improved transit service and land use policies and codes will result in a more compact, walkable urban form along the project corridor. For example, accommodating a greater portion of Cobb County’s growth in this manner protects the suburban-rural character of areas of the county with lower locational efficiency. This development pattern will likely result in reduced water quality and habitat impacts in the county. This project is consistent with the county’s Comprehensive Transportation Plan 2040 objectives to “enhance and serve redevelopment areas.”

ARC calculated the implementation of nine of the corridor projects for a variety of metrics using the ARC CMAQ calculation tool. This tool allows the estimate of performance metrics based on intersection delay, number of intersections and average traffic volumes. ATMS strategies were applied to these corridors. As illustrated below, congestion reductions in annual vehicles hours of delay – per corridor - range from 85,000 to over 846,000.

Significant benefits are also indicated for emissions reductions in both GHG emissions, PM and NOx.

System Benefits of Corridor Level Projects¹²				
Corridor	Reduction in Annual Vehicle Hours of Delay	Total Daily Reductions in GHG emissions (short tons/day)	Total Daily Reductions in PM Emissions (short tons/day)	Total Daily Reductions in NOx Emissions (short tons/day)
North Avenue	304,500	5.196	0.000420	0.010009
Buckhead Loop	97,500	1.664	0.000134	0.003205
Cobb Pkwy	460,833	7.864	0.000635	0.015148

¹² Estimates calculated using ARC’s “CMAQ Calculator,” developed by Cambridge Systematics. The calculator and supporting documentation can be accessed [here](#).

SR 140/ Jimmy Carter Blvd/ Holcomb Bridge Rd	431,500	7.363	0.000595	0.014184
Sugarloaf Parkway	428,640	7.314	0.000591	0.014090
Pleasant Hill Road	846,306	14.441	0.001167	0.027818
SR 20	122,438	2.089	0.000169	0.004025
Five Forks Trickum Road	85,185	1.454	0.000117	0.002800
SR 317/ Lawrenceville Suwanee Rd	317,000	5.409	0.000437	0.010420

9. Quantifiable Safety, Mobility, and Environmental Benefit Projections

See response provided, above, in Section 8.

10. Vision, Goals, Objectives

ARC and its grant partners envision an enhanced approach to transportation system operation and maintenance at the regional and local scales through the deployment of the proposed technologies. The critical first goal is to expand the existing web of ITS and ATMS deployments in the region. This expansion is foundational to the realization of the subsequent goal to build a system that is greater than the sum of its parts through the addition of a new layer of cross jurisdictional data standardization, analysis, and sharing of real-time and historic information that is currently not available in the Region.

The short-term objective for these investments is an incremental improvement in understanding how the system currently functions as well as an increase in the efficiency the system through improved active management. But the longer-term objectives are bolder.

Long-term, we hope to achieve two main objectives: predictive analytics and standardized data and communications protocols with connected and autonomous vehicles.

Creating a centralized repository of very large amounts of system performance data will enable ARC to conduct a series of big data analytics in which performance data is combined with weather data, roadway geometry, big event schedules, and a host of other data to identify patterns in system performance. When such pattern recognition is subsequently applied to real time data (weather, system performance, etc.) it would enable system managers to identify when conditions at a given location are becoming optimal for a typical

system failure and take measures to head that failure off by altering the way the system is functioning. This capacity would represent a significant improvement in the efficient operations of the system.

But we realize that eventually, it will be inadequate to merely communicate with the mechanisms that manage the system – traffic lights, ramp meters, etc. We acknowledge that within a relatively short time frame, it will be necessary for the system to be able to communicate with its users. This is the other objective we can begin to satisfy by creating a centralized data platform.

Creating such a platform will enable the development of standards around the system generated data: what data is reported; in what format it is reported, stored, and returned to consumers; protocols for how the data is communicated, etc. This standardization is fundamental to laying the groundwork for the vehicle to infrastructure and vehicle to vehicle communication necessary to maximize the potential of the deployment of connected and autonomous vehicles.

Through the implementation of this grant, ARC will work closely with system managers and likely data consumers (mobility application developers, vehicle manufactures, etc.) to develop these data standards. We believe that a collaborative and iterative approach to standard development is key to arriving at a set of standards that are scalable across local jurisdictions, states, and use cases for the data. This is the bold idea that excites us and we believe it can only be achieved from the implementation of the shorter-term goals and objectives outlined above.

11. Plan for Partnering with the Private Sector or public agencies

As mentioned in section 1, regional partners (City of Atlanta, GDOT, Cobb County DOT, Gwinnett County DOT, MARTA, Metro Atlanta Chamber of Commerce, and ARC) met with members of the Autonomous Vehicle Alliance (AVA) on April 11th 2017. The alliance was represented by executive member of Cox Automotive, Ford, and General Motors. The rich discussion in the meeting included the subject of building trust between private and public sector, having a champion in the Atlanta region to convene the local agencies as pilot projects take off, and the need to share data and knowledge across jurisdictions in real-time.

Prior to this meeting the ARC completed the Regional Transportation Policy Document (RTTPD). The RTTPD tracked emerging transportation technologies and documented the findings to help the region develop policies by timeline and policy area¹³. One major finding in the document highlighted that data sources will soon change and with it the way we analyze and share new data sets will change as well. Data from connected and autonomous vehicles hold to potential to provide rich insights to local governments but it will be a challenge to analyze and store what is needed from vehicles producing petabytes of data daily. The findings also highlighted how much we need to learn from one another throughout the region to best prepare to welcome and make best use of emerging technologies. Thoughtful policies and uniform data standards will go a long way in helping shape the tomorrow our Regional residents, business, and visitors deserve.

Since the completion of the RTTPD, ARC has further engaged with transportation technology software/hardware companies and OEMS to better understand what opportunities lie ahead. Conversations with organizations like Panasonic's Smart Mobility Division, Blyncsys, Miovision, Metrotech, GridSmart, MAVEN, Cruise, GM, Ford, Cox Automotive, Nokia, Continental, UPS, Porsche, Uber, Lyft, LocalMotors, EasyMile, and so on, we're learning that there is great opportunity for mutually beneficial partnerships.

In the scope of this ATCMTD grant, we will continue these conversations and translate the ideas from them into partnership and action. Many of these companies and others we've not yet engaged with have software platforms from which we can leverage existing its. Other companies have hardware which can be used to fill gaps in information we can retain from our current infrastructure. And many companies have the connected and autonomous vehicles with whom we can test bi-directional V2X communications. Each of the companies we've engaged with to date are excited to support the efforts outlined in this grant proposal and understand some of the concerns we hold such as cost, privacy, security, value, and ease of iteration.

It is worth noting that the City of Atlanta consortium is not comprehensive of all the governments and agencies we aspire to work with over the lifetime of this grant.

¹³ <http://atlantaregionsplan.com/wp-content/uploads/2017/03/ARC-Transportation-Technology-Policy-Documents-2017.pdf>

In 2017, we plan to continue conversations with interested private and public organizations. ARC will release an RFP on behalf of the consortium to select a company to develop the data platform. The work of the developing, testing, and deploying the data platform is projected to begin in Q3 of 2018. By Q4 of 2019, we plan to have assessed the system sufficiently enough to determine if it is the right platform to scale up throughout the region.

During the two years of testing ARC, on behalf of the consortium, will also grow communications with local agencies in the region who are not currently part of the consortium to notify them of the efforts underway and to invite them to join the consortium. One agency we will prioritize engagement with is MARTA to better grow mobility options in the region.

Lastly, to bring industry and local governments closer together to exchange thoughts on how to best build the future, ARC plans on hosting the ConnectATL summit in Q4 of 2017 and 2018. The 2018 ConnectATL summit will provide a good avenue for the consortium to share findings from the ATCMTD grant work with the rest of the region, state, and industry leaders.

12. *Plan to Leverage and Optimize Existing Local and Regional Investments*

The essence of this proposal is to leverage pre-existing deployment of ITS/ATMS infrastructure throughout the region. As stated in the introduction, GDOT, Cobb County, and Gwinnett County have the most extensive and sophisticated ITS/ATMS infrastructure networks in the Region. Much of the City of Atlanta's ITS/ATMS infrastructure was implemented and maintained by GDOT (state routes only). By developing a data exchange platform that would be driven by the existing infrastructure, their performance effectiveness would be optimized because the digital data would be published to mobile applications, web applications, and connected cars. Thus, enabling public sector stakeholders, business, and commuters to make smarter decisions, based on real-time, actionable information.

On the private sector side, the opportunity to leverage existing technological investments is just as strong, if not stronger. For instance, all the OEMs (Porsche, GM, Ford, etc.), e-commerce and advanced logistics/goods distribution (UPS, FedEx, Kroger, Amazon, etc.), cloud computing providers (Microsoft, Google, and AWS), ride hailing/mobility on demand

services (Uber and Lyft), the telecommunication providers (Verizon Telematics & AT&T), social media providers (WAZE), mobile device and software providers (Apple “CarPlay” and “Android Auto”) are all recent private sector investments that will have an overwhelming impact on the design and operability of a data exchange platform. Because several of these companies have their headquarters or principal place of business located in the metro Atlanta area, being able to find the right approach for leveraging private investment is a very positive notion.¹⁴ The Metro Atlanta Chamber of Commerce has also invested a great deal in building relationships with private sector stakeholders, centered around Smart Cities and IoT, through its IoT/Mobility Executive Committee and Leadership Council.

13. Schedule

The overall timeline completing the intended scope of work is two (2) years from the date that the funding is authorized. Many of the major tasks will be accomplished concurrently. ARC anticipates that all the ITS/ATMS related implementation will take 18 – 24 months, depending on NEPA documentation and review, permitting, and equipment vendor responsiveness. ARC anticipates that the data exchange platform development will take the full two years.

14. Support or Leveraging of DOT ITS Program or Innovative Technology Initiatives

The work proposed in this application seeks to support efforts of interest to several ITS Programs including:

- Accelerating Deployment across city and county jurisdictions,
- Automation of data analysis and deployment of necessary services on our roadways,
- Testing communication to and from Connected Vehicles in real-time,
- Strategically preparing for Emerging Capabilities of future transportation technologies,
- Leveraging the value of Enterprise Data at the local level and in the private sector,
- And Interoperability of the devices currently and to be deployed in the Atlanta region.

¹⁴ According to spartareport.com article, there are 16 Fortune 500 companies that reside in Atlanta, as of 2014, most of which will benefit from a standardized data exchange platform (Home Depot, UPS, Coca-Cola, Delta Air Lines, Aflac, NCR, Genuine Parts, Newell Rubbermaid, PulteGroup, etc.).

Staffing Description

1. Description of Organization of Staffing

[Redacted]

2. Primary Point of Contact and Contact Info

The primary point of contact for the grant is:

Leslie S. Caceda
Transportation Technology
Mobility Services Division
Atlanta Regional Commission
470.378.1574
229 Peachtree Street N.E, Suite 100
Atlanta, Georgia 30303

APPENDIX A

RESUMES

ARC Resumes

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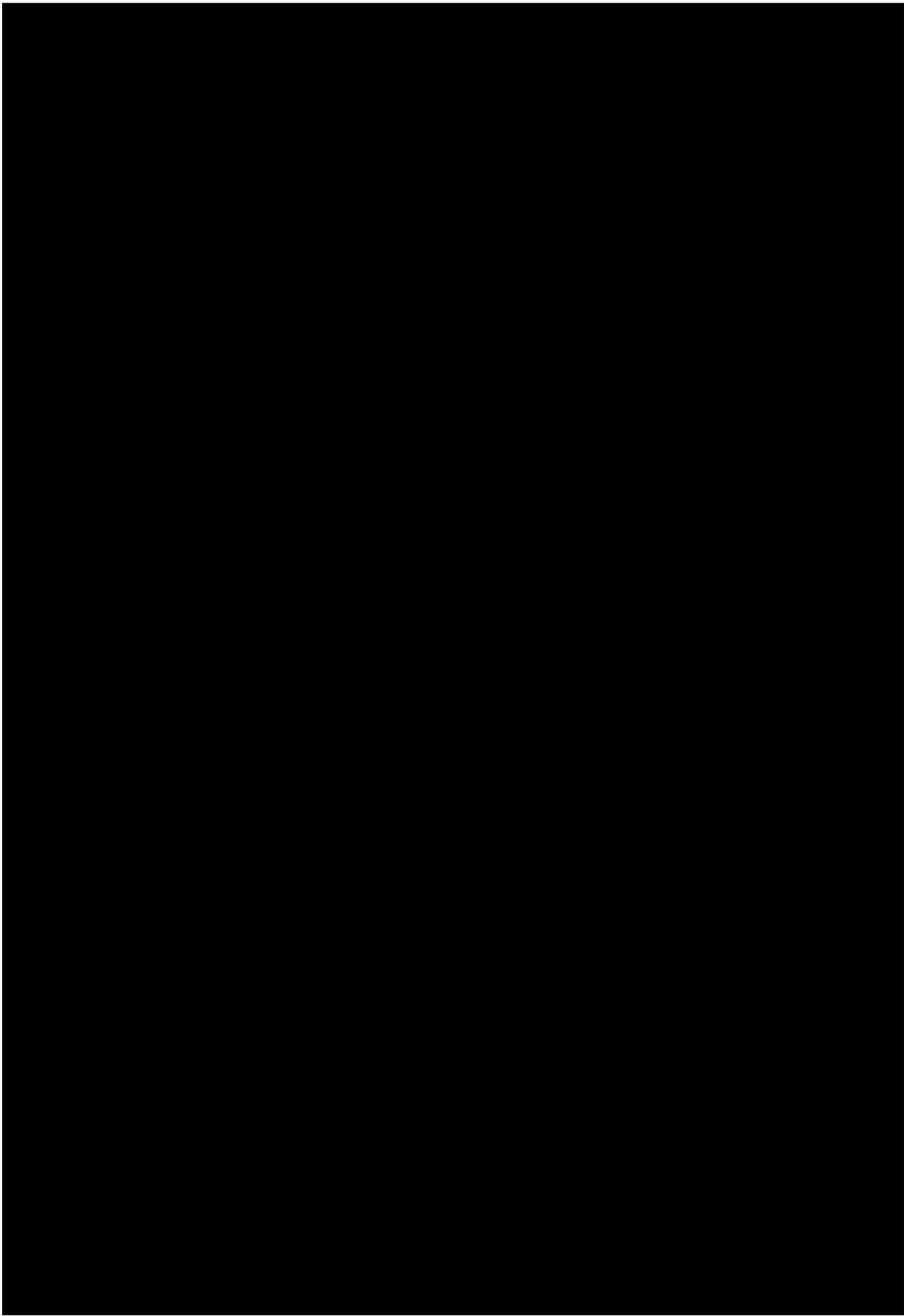
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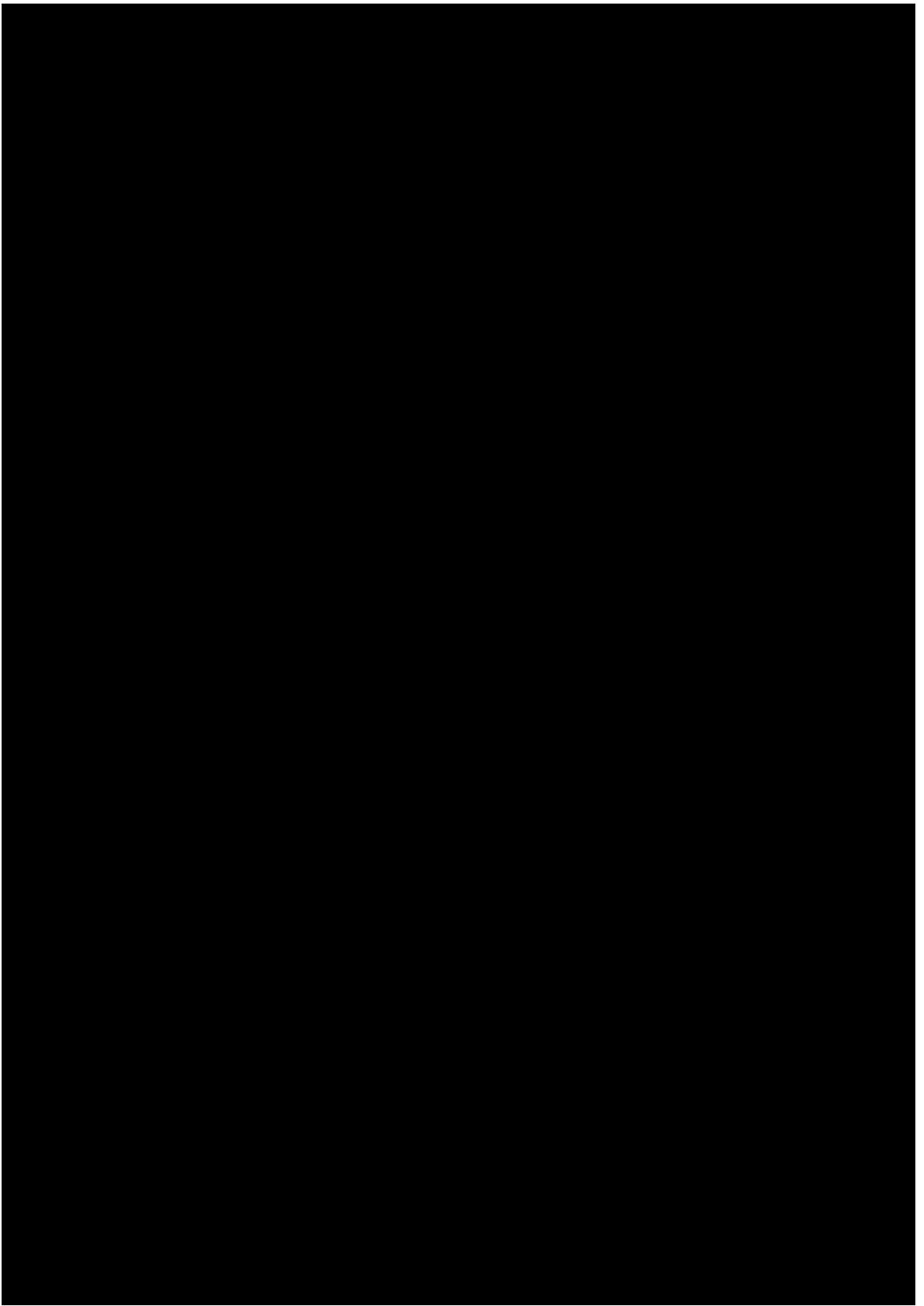
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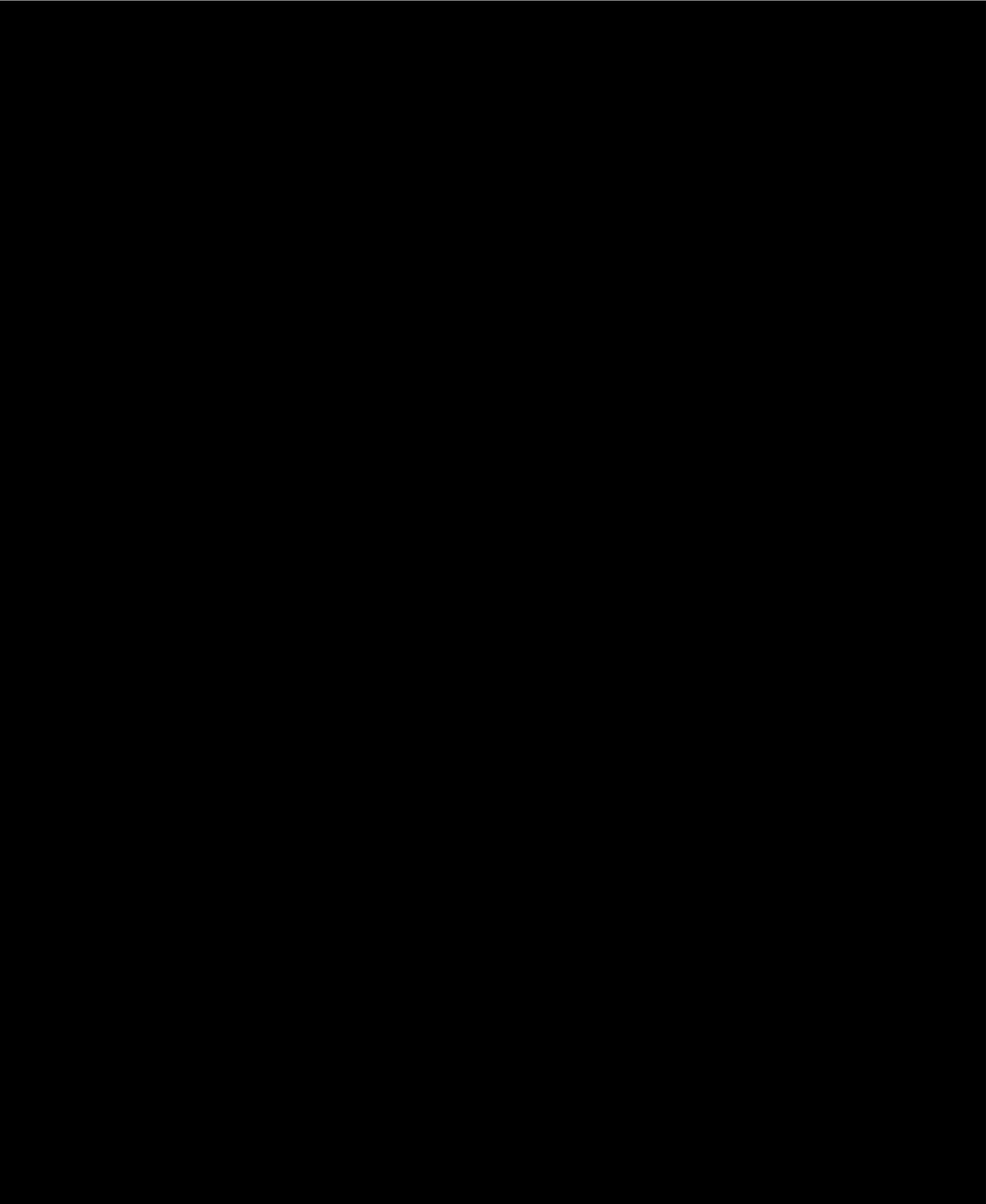
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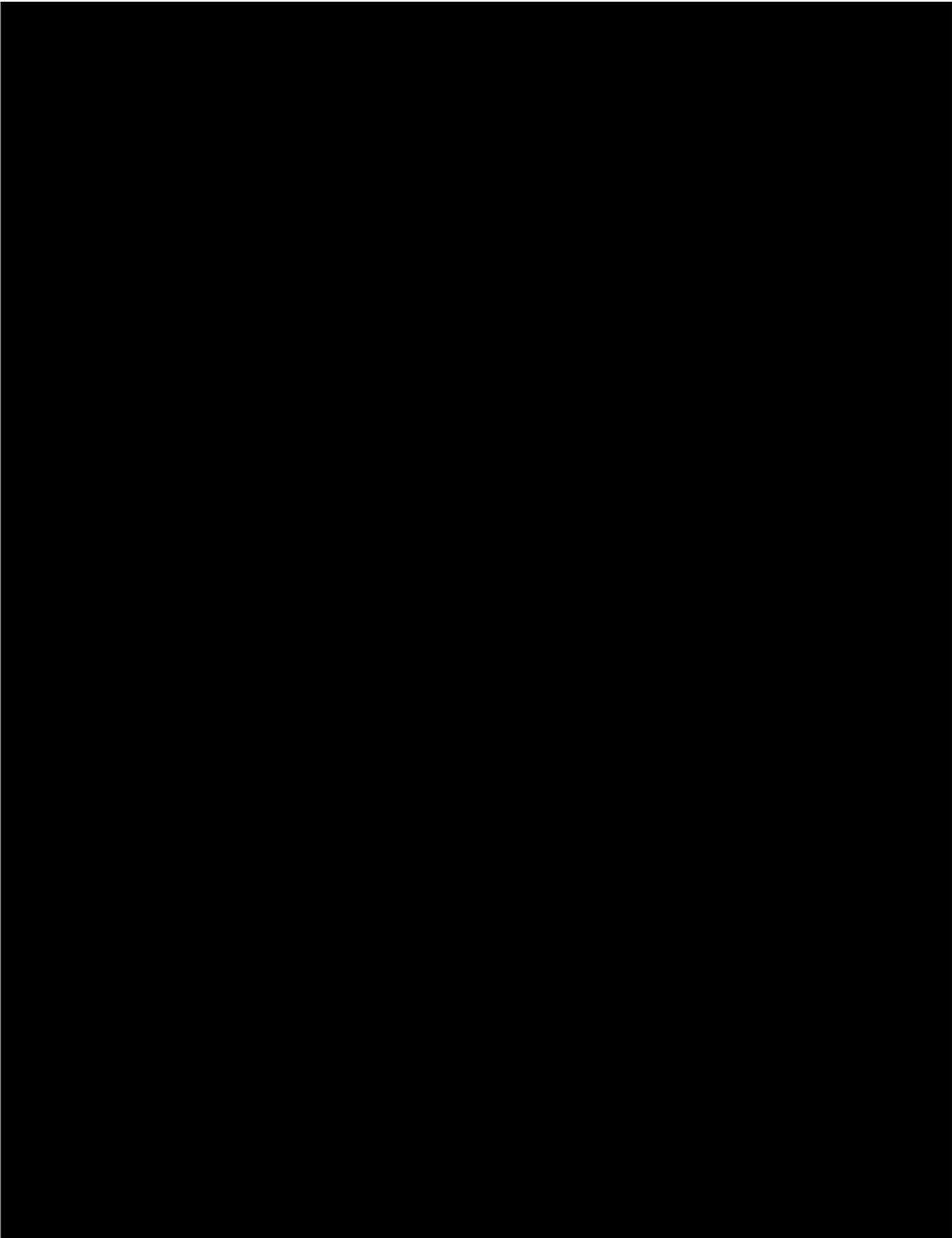
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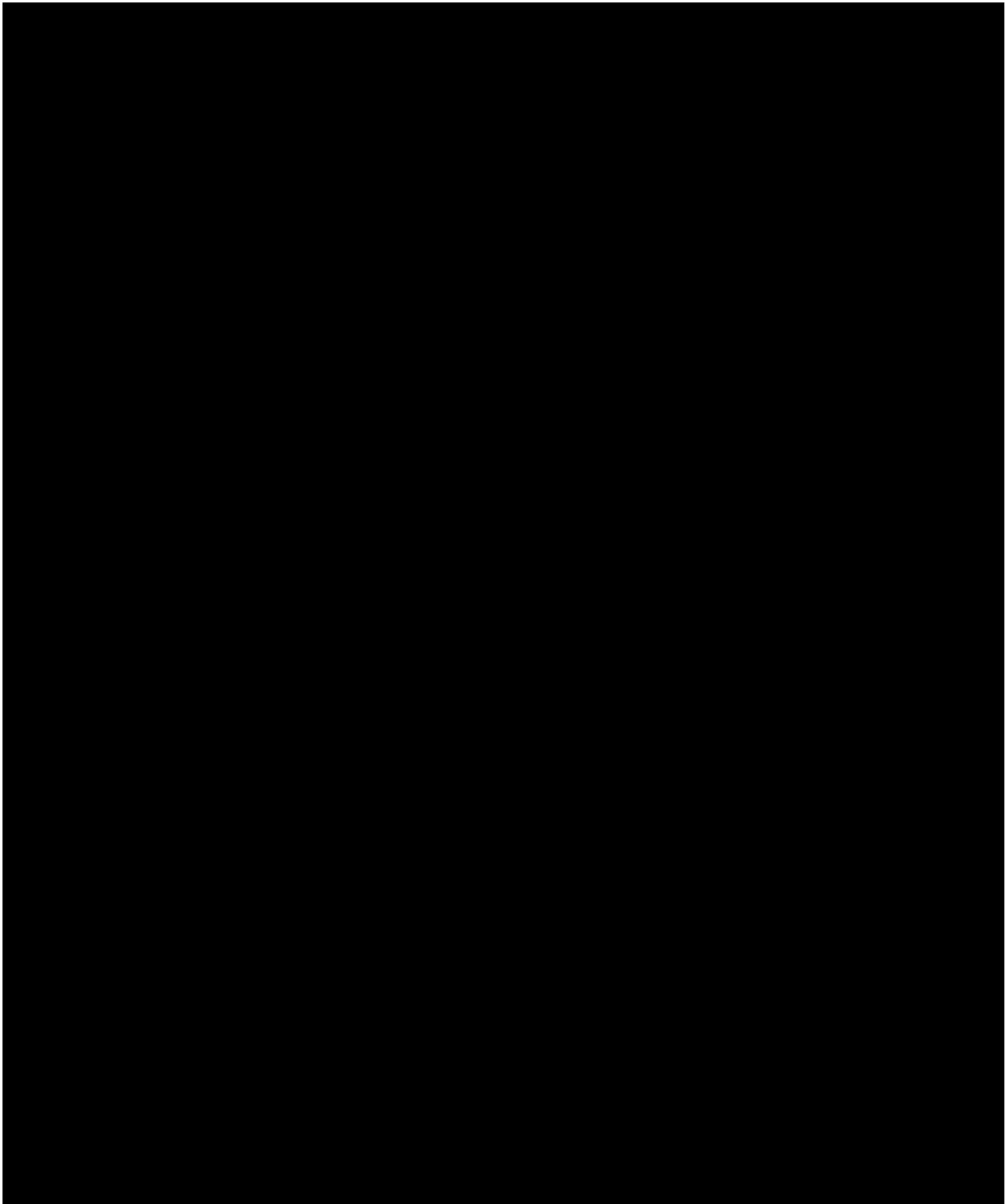
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Grant Application Package

Opportunity Title:	Advanced Transportation and Congestion Management Techn
Offering Agency:	DOT Federal Highway Administration
CFDA Number:	20.200
CFDA Description:	Highway Research and Development Program
Opportunity Number:	693JJ317NF0001
Competition ID:	693JJ317NF0001
Opportunity Open Date:	04/12/2017
Opportunity Close Date:	06/12/2017
Agency Contact:	Jeff Martin Agreement Specialist E-mail: jeffrey.d.martin@dot.gov Phone: 202-366-1323

This opportunity is only open to organizations, applicants who are submitting grant applications on behalf of a company, state, local or tribal government, academia, or other type of organization.

Application Filing Name:

Select Forms to Complete

Mandatory

[Application for Federal Assistance \(SF-424\)](#)

[Budget Information for Non-Construction Programs \(SF-424A\)](#)

[Assurances for Non-Construction Programs \(SF-424B\)](#)

Optional

[Key Contacts](#)

Instructions

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This electronic grants application is intended to be used to apply for the specific Federal funding opportunity referenced here.

If the Federal funding opportunity listed is not the opportunity for which you want to apply, close this application package by clicking on the "Cancel" button at the top of this screen. You will then need to locate the correct Federal funding opportunity, download its application and then apply.

Application for Federal Assistance SF-424

* 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	* 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	* If Revision, select appropriate letter(s): <input type="text"/> * Other (Specify): <input type="text"/>
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* 3. Date Received: <input type="text" value="Completed by Grants.gov upon submission."/>	4. Applicant Identifier: <input type="text"/>
--	--

5a. Federal Entity Identifier: <input type="text"/>	5b. Federal Award Identifier: <input type="text"/>
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State Use Only:

6. Date Received by State: <input type="text"/>	7. State Application Identifier: <input type="text"/>
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8. APPLICANT INFORMATION:

* a. Legal Name:

* b. Employer/Taxpayer Identification Number (EIN/TIN): <input type="text" value="58-6002324"/>	* c. Organizational DUNS: <input type="text" value="0758638450000"/>
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d. Address:

* Street1:
Street2:
* City:
County/Parish:
* State:
Province:
* Country:
* Zip / Postal Code:

e. Organizational Unit:

Department Name: <input type="text" value="Center for Livable Communities"/>	Division Name: <input type="text" value="Mobility Services"/>
---	--

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: * First Name:
Middle Name:
* Last Name:
Suffix:

Title:

Organizational Affiliation:

* Telephone Number: Fax Number:

* Email:

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

X: Other (specify)

Type of Applicant 2: Select Applicant Type:

C: City or Township Government

Type of Applicant 3: Select Applicant Type:

* Other (specify):

Metropolitan Planning Org

*** 10. Name of Federal Agency:**

DOT Federal Highway Administration

11. Catalog of Federal Domestic Assistance Number:

20.200

CFDA Title:

Highway Research and Development Program

*** 12. Funding Opportunity Number:**

693JJ317NF0001

* Title:

Advanced Transportation and Congestion Management Technologies Deployment Initiative

13. Competition Identification Number:

693JJ317NF0001

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

Delete Attachment

View Attachment

*** 15. Descriptive Title of Applicant's Project:**

ConnectATL: Leveraging and enhancing transportation technology in the Atlanta Region

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant

* b. Program/Project

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

* a. Start Date:

* b. End Date:

18. Estimated Funding (\$):

* a. Federal	<input type="text" value="4,375,000.00"/>
* b. Applicant	<input type="text" value="0.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="4,375,000.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="8,750,000.00"/>

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

a. This application was made available to the State under the Executive Order 12372 Process for review on

b. Program is subject to E.O. 12372 but has not been selected by the State for review.

c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

Yes No

If "Yes", provide explanation and attach

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name:

Middle Name:

* Last Name:

Suffix:

* Title:

* Telephone Number: Fax Number:

* Email:

* Signature of Authorized Representative:

* Date Signed:

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 01/31/2019

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Connected Vehicle Hardware and Software Deployment in Gwinnett County	20.200	\$ 1,056,000.00	\$ 1,056,000.00	\$	\$	\$ 2,112,000.00
2. Traffic Signal Technology and Intelligent Node - Smart Lights for connected vehicle deployment in the City of Atlanta	20.200	1,224,000.00	1,224,000.00			2,448,000.00
3. Transit signal priority, Transit information, Active Transportation sensors, connected vehicle deployment in Cobb County	20.200	1,920,000.00	1,920,000.00			3,840,000.00
4. Regional data sharing platform to test connect vehicle deployments	20.200	175,000.00	175,000.00			350,000.00
5. Totals		\$ 4,375,000.00	\$ 4,375,000.00	\$	\$	\$ 8,750,000.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	Connected Vehicle Hardware and Software Deployment in Gwinnett County	Traffic Signal Technology and Intelligent Node - Smart Lights for connected vehicle deployment in the City of Atlanta	Transit signal priority, Transit information, Active Transportation sensors, connected vehicle deployment in Cobb County	Regional data sharing platform to test connect vehicle deployments	
a. Personnel	\$ 0.00	\$ 0.00	\$ 0.00	\$ 62,933.00	\$ 62,933.00
b. Fringe Benefits	0.00	0.00	0.00	37,130.00	37,130.00
c. Travel	0.00	0.00	0.00	0.00	
d. Equipment	2,112,000.00	2,448,000.00	3,840,000.00	200,000.00	8,600,000.00
e. Supplies	0.00	0.00	0.00	0.00	
f. Contractual	0.00	0.00	0.00	0.00	
g. Construction	0.00	0.00	0.00	0.00	
h. Other	0.00	0.00	0.00	0.00	
i. Total Direct Charges (sum of 6a-6h)	2,112,000.00	2,448,000.00	3,840,000.00	300,063.00	\$ 8,700,063.00
j. Indirect Charges				49,937.00	\$ 49,937.00
k. TOTALS (sum of 6i and 6j)	\$ 2,112,000.00	\$ 2,448,000.00	\$ 3,840,000.00	\$ 350,000.00	\$ 8,750,000.00
7. Program Income	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	

SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program		(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8.	Connected Vehicle Hardware and Software Deployment in Gwinnett County	\$ 0.00	\$ 0.00	\$ 1,056,000.00	\$ 1,056,000.00
9.	Traffic Signal Technology and Intelligent Node - Smart Lights for connected vehicle deployment in the City of Atlanta	0.00	0.00	1,224,000.00	1,224,000.00
10.	Transit signal priority, Transit information, Active Transportation sensors, connected vehicle deployment in Cobb County	0.00	0.00	1,920,000.00	1,920,000.00
11.	Regional data sharing platform to test connect vehicle deployments	0.00	0.00	175,000.00	175,000.00
12. TOTAL (sum of lines 8-11)		\$	\$	4,375,000.00	\$ 4,375,000.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 4,375,000.00	\$ 1,075,000.00	\$ 1,154,000.00	\$ 1,417,000.00	\$ 729,000.00
14. Non-Federal	\$ 4,375,000.00	1,075,000.00	1,154,000.00	1,417,000.00	729,000.00
15. TOTAL (sum of lines 13 and 14)	\$ 8,750,000.00	\$ 2,150,000.00	\$ 2,308,000.00	\$ 2,834,000.00	\$ 1,458,000.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program		FUTURE FUNDING PERIODS (YEARS)			
		(b)First	(c) Second	(d) Third	(e) Fourth
16.	Connected Vehicle Hardware and Software Deployment in Gwinnett County	\$ 2,112,000.00	\$ 1,500,000.00	\$ 0.00	\$ 0.00
17.	Traffic Signal Technology and Intelligent Node - Smart Lights for connected vehicle deployment in the City of Atlanta	2,448,000.00	1,500,000.00	0.00	0.00
18.	Transit signal priority, Transit information, Active Transportation sensors, connected vehicle deployment in Cobb County	3,840,000.00	1,500,000.00	0.00	0.00
19.	Regional data sharing platform to test connect vehicle deployments	350,000.00	200,000.00	0.00	0.00
20. TOTAL (sum of lines 16 - 19)		\$ 8,750,000.00	\$ 4,700,000.00	\$	\$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges:		22. Indirect Charges:	
23. Remarks:			

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<p>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</p> <p>Completed on submission to Grants.gov</p>	<p>TITLE</p> <p>Executive Director</p>
<p>APPLICANT ORGANIZATION</p> <p>Atlanta Regional Commission</p>	<p>DATE SUBMITTED</p> <p>Completed on submission to Grants.gov</p>