Anticipated Impact Report for
Vehicle-Mounted Automated License Plate Recognition (ALPR)
for Parking Management and Enforcement

Michael P. Ford, Ph.D.
Parking and Mobility Division
Department of Transportation
City of Oakland
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1. Information Describing Vehicle-Mounted Automated License Plate Recognition (ALPR) and How It Works

Vehicle-mounted Automated License Plate Recognition (ALPR**)** technology automates the processing of vehicle license plate and compliance information. Specifically, ALPR:

- uses specially-designed cameras mounted on parking enforcement vehicles to capture digital images from surrounding vehicles as they drive through the streets;
- transforms the images into alphanumeric characters with optical character recognition (OCR) software;
- stores the images, plate information, and related metadata in a restricted-access database;
- compares the transformed license plate characters to databases of license plates of interest to operators;
- archives photo evidence and metadata in support of citations issued ("hits") according to evidence retention standards consistent with City and State law; and
- archives anonymous information about parking usages (e.g., number of vehicles present on a given street at a given time and date) to support parking management decision-making ("reads").

[To do: add example images captured by ALPR, both parked and driving, as well as images of the user interface]

2. Proposed Purpose

City of Oakland Department of Transportation (DOT) proposes to use ALPR for parking management and enforcement purposes. Parking management includes occupancy and vehicle turnover information, and parking enforcement includes identification of possible violations and evidence in support of citations issued. ALPR would be integrated with a comprehensive Parking Citation solution that includes backend server processes, intersystem communication and various user interfaces ranging from authorized staff to public self-serve applications (e.g., a browser-based citation review and payment application that allows parkers to review photo evidence that may or may not have been gathered by the ALPR system).

Specific DOT uses of ALPR technology would include:

- "Virtual chalk," automating the time-stamping of vehicles in time-limited parking spaces and areas;
- "Digital permits," including annual, weekly, and other limited-duration permits in parking privilege permit areas, e.g., Residential Permit Parking (RPP) areas; City-owned or enforced parking facilities;
- Parking payment verification, including "pay-by-phone" and "pay-by-plate," on-street and off-street;
- "Hotlist" identification, including scofflaw and stolen vehicles;[1]
- Parking demand management, including parking occupancy and turn-over counts and analysis; and
- Supporting "smart parking" applications with occupancy information, including mobile apps providing parking availability and wayfinding information.

When ALPR systems are deployed for these purposes, they would be mounted on City-owned Parking Enforcement vehicles operated by Parking Control Technicians trained in proper ALPR operation. Currently, DOT is proposing to operate five ALPR systems with additional vehicles equipped in the future.

3. Locations Where ALPR May Be Deployed

ALPR equipped Parking Enforcement vehicles will be deployed throughout the City, while focusing on commercial districts and neighborhoods with Resident Permit Parking (RPP) areas.

4. Potential Impact on Civil Liberties & Privacy

DOT recognizes that all people have an inalienable right to privacy and are committed to protecting and safeguarding this right, and that ALPR could raise concerns regarding real and/or perceived threats to civil liberties and privacy.

In 2013, Edward Snowden and other data experts introduced to the public the concept of "meta data", individual data points such as phone number called, and time of day. Using a simple homemade app that captured only these data points (and never the content of the phone calls), Stanford lawyer and computer scientist Jonathan Mayer could accurately identify 80% of the volunteers in his study, using only open source databases such as Yelp, Facebook, and Google. Among the many individuals he identified, he successfully identified a woman that had an abortion, another woman that had cancer, and a man collecting guns and growing marijuana in his home. Today, data scientists can accurately identify over 95% of individuals based solely on 4 geospatial (time, location) data points. Human are creatures of habit, typically driving the same way to work, our house of worship, and our neighborhood grocery store. Current attempts to "de-identify" or anonymize data are insufficient, due to modern day computing power and the sheer collection of data points available from public and private sources.

[1] Vehicles with five or more outstanding citations at least 30 days old.

ALPR collects information from license plates of vehicles parked in public places and DOT is not proposing to track movement of individuals. However, DOT understands that the public may be concerned that the collection and analysis of this information over time could potentially be used to generate a detailed profile of an individual's movement or abused for other inappropriate purposes.

Specifically, the Department recognizes following actual or potential public concerns:

- **Identity capture.** The public may be concerned that ALPR will capture personally identifiable information (PII) without notice or consent. Although ALPR does not independently generate information that identifies vehicle occupants, license plate information can be used to determine the registered owner. In addition, vehicle occupants or immediate surroundings (including addresses) may be pictured. As a result, it is possible that individuals with access to this data could do additional research to identify the individual.
- **Misidentification.** The public may be concerned that, if ALPR data is widely accessible and inaccurate, individuals may be misidentified as the person driving a vehicle that is violation parking rules or is a scofflaw or stolen vehicle. This could lead to improper government actions against such individuals.
- **Activity monitoring.** The public may be concerned that ALPR data will enable individuals' behaviors to be revealed to and/or monitored by DOT or other government agencies, their partners or affiliates, companies interested in targeted marketing, and/or the public. Such concerns may include basic information about when individuals are in certain locations, as well as concerns about what government or individuals may infer from this data (i.e. marital fidelity, religious observance, or political activity). Although ALPR data is gathered from public places, this could conflict with an individual's expectation of locational privacy.

5. Mitigations

In recognition of these general and more specific concerns, DOT has taken the following steps to mitigate any perceived potential risk inherent in collecting this data, including but not limited to:

- DOT will tailor access and retention policies to the two categories of information collected:
    - 1) **Reads,** which are images of license plates on vehicles that are not violating parking requirements and are not stolen or scofflaw vehicles; and
    - 2) **Hits,** which are images of license plates on vehicles that are violating parking requirements or are stolen or scofflaw vehicles.
- DOT will use ALPR to support compliance with parking regulations and parking management initiatives, and will not share ALPR data with the Police Department, DMV, Law Enforcement Agencies, other cities jurisdictions, except when such data is used as evidence in support of parking violations ("hits");

- DOT will use ALPR technology according to the proposed ALPR for Parking Management and Enforcement Use Policy as well as all applicable laws, policies and administrative instructions;
- DOT has no plans or intentions of using or deploying the ALPR technology in a manner that is discriminatory, viewpoint-based, or biased via algorithm;
- DOT will conduct annual audits of ALPR data to ensure a reasonable standard of data accuracy and to verify that system operators and administrators are following use policies;
- DOT will keep the public informed about planned and actual ALPR usage, as well as changes that would significantly affect privacy, civil rights, or civil liberties.

To specifically mitigate the potential or feared impacts enumerated in Section 4 of this Anticipated Impact Report, DOT or vendors acting on its behalf will also take the following actions:

- **Identity capture and/or activity monitoring.**
    - ALPRs will not collect any additional information compared to information that is or could be captured manually by DOT Parking Control Technicians;
    - DOT will aim ALPR cameras downward towards the street, to the extent possible, to avoid capturing the faces of vehicle occupants or identifiable details or immediate surroundings;
    - Where PII, such as faces and house numbers, is captured in still images that are retained by DOT or those acting on its behalf, that data will be obfuscated or cropped through technical means such that it is no longer identifiable or reasonably re-identifiable. PII collected by ALPRs that cannot be technically obfuscated will be used solely for the purpose(s) specified in the City's citation notice.
- **Misidentification.**
    - DOT will restrict ALPR data access to registered users, who will be properly trained and will access the ALPR database through a password-protected system;
    - DOT will conduct annual audits of ALPR data to ensure a reasonable standard of data accuracy and to verify that operators and administrators are following use policies;
    - DOT will offer a mechanism for individuals who believe that their vehicle has been mistakenly identified to contest the information.
- **Activity monitoring.**
    - DOT will not retain ALPR data beyond specified time periods.
    - DOT will only use trained and registered uses-users to access ALPR data.
    - ALPR use will be limited to parking management and enforcement purposes.
    - Still images and metadata may potentially be shared with the following:
        - the public, to enable online search and payment of parking citations-by citation number, not by license number when applicable;

        - third-parties involved in City parking management and enforcement, including Conduent (parking citation issuance and processing solution), Paylock (ALPR scofflaw boot solution), Parkmobile (meter pay-by-phone), IPS (single-head and multi-space smart meters), and Scheidt & Bachmann (off-street parking and access control system); and
        - Outside of these planned distributions, DOT will take steps to ensure that systems and data will not be disseminated outside of DOT unless dissemination is required by law, or fulfills an authorized purpose and complies with the DOT's ALPR use policy.
    - Per DOT's ALPR Use Policy, DOT will make an Annual Surveillance Report describing how the technology was used.

6. Data Types and Sources

ALPR technologies are designed to capture still images of vehicles and vehicle details including:

- License plate information, including state and number;
- Wheel positions; and
- Vehicle make, model, color, and type.[2]

ALPR technologies are also designed to capture metadata related to the images mentioned above, including:

- Time and date of image capture;
- GPS coordinates; and
- Camera identification such as officer and vehicle/unit number.

Optical character recognition (OCR) technology converts images of license plates into readable formats that allow various applications including information matching, lookup, aggregating and storage.

7. Data Security

The City relies on third-party vendors for its parking management systems. Conduent has supplied the City's parking citation issuing and processing solution for the past five years and was recently awarded a new five-year contract. In response to security requirements in the City's competitive request for quotations, Conduent made the following declaration:

"Conduent takes the security of our systems and customer data very seriously. We go to great lengths to make sure that all the proper security measures from an application, operating system, hardware, and network perspective are in place and updated regularly. Starting with our network architecture, Conduent uses a series of industry-standard firewalls and intrusion detection systems to ensure that no unauthorized access to our systems is obtained. Our team

[2] Such as sedan, SUV, hatchback, pickup, minivan, van, or box truck.

of security experts is constantly monitoring for any new security alerts and patches that need to be applied to our infrastructure (e.g., OS, hardware, and network). We also perform regular internal security audits to make sure that all system security measures are kept up to date and no new vulnerabilities exist. From an application perspective, access to our systems requires a valid user ID and password that is set to expire at regular intervals. Each user is given access to specific functions based on job role and each user's access and activity is logged for auditing purposes."

Staff confirms that these general security measures will extend to its use of Conduent's ALPR solution. DOT commits to developing standard operating procedures that respect and build on these measures and related safeguards.

8. Fiscal Cost

Initial Purchase Cost
DOT secured City Council approval through the Mid-Cycle Budget process to procure ALPR equipment for five (5) parking enforcement vehicles at a one-time cost for equipment and setup of $338,600.

Personnel Costs
Existing DOT staff, including Parking Enforcement supervisors and Parking Control Technicians, will be trained by the City's vendor to use the ALPR system with the aim of incorporating the technology into its routine enforcement activities. Other DOT staff already dedicated to parking management initiatives will use occupancy data from the system in support of demand-responsive parking and other transportation-related initiatives.

Ongoing Costs
The annual, recurring costs of the five vehicle-mounted APLR systems is expected to be $28,800 payable to the vendor.

Potential Sources of Funding
With ALPR-equipped vehicles, increases in Parking Control Technician productivity are conservatively estimated to result in one additional citation per hour. Together, the five ALPR-equipped vehicles are expected to generate an additional $500,000 in citation revenue annually.

Potential Replacement/Insurance Costs
In the event an ALPR equipped vehicle is permanently out of service (i.e. due to a total loss vehicle accident) there will be an expected cost to replace.

9. Third Party Dependence

The City depends on third-party vendors to provide parking management systems including Conduent (parking citation issuance and processing solution), Paylock (ALPR scofflaw boot solution), Parkmobile (meter pay-by-phone), IPS (single-head and multi-space smart meters), and Scheidt & Bachmann (off-street parking and access control system).

The proposed ALPR solution will be sourced and supported by Conduent. In April, 2018 the City contracted with Conduent to supply a Parking Citation Management Solution, Parking Enforcement Equipment and Special Service Project. That solution is intended to integrate "key City of Oakland and third party stakeholder systems to deliver a comprehensive automated parking citation processing, including a public portal for online services, accurate processing of lockbox payments, timely production of all correspondences and collection of unpaid citation and to ensure parking enforcement equipment/handheld devices and automated license plate recognition systems are fully functional and in compliance with all specifications of the City's Request For Qualifications #13375 and Contractor's RFQ Response." The Genetec-ALPR solution is offered as an option in the new contract.

10. Alternatives

The alternatives to using the proposed ALPR solution include:

- Continuing to capture license plate images as part of the citation issuing process with handhelds (this option will remain available under the new Conduent contract whether the APLR option is executed or not);
- Continuing to time-stamp vehicles in time-limited parking spaces and areas by staff typing plate information into handhelds (this option will remain under the new contact);
- Issuing permits for Residential Permit Parking (RPP) areas by using bumper stickers and hanging placards, the procurement, processing, and use of which would be relatively costly and inconvenient and less environmentally friendly;
- Verifying meter payments using "pay-by-phone" and "pay-by-plate," which would require staff to type plate information into their handhelds;
- Limiting "Hotlist" vehicle identification, including scofflaw and stolen vehicles, to those vehicles that are processed manually through handhelds;
- Continuing to conduct parking occupancy and turn-over counts and analysis in support of parking management programs intermittently and less reliably by costly consultants or, when available, student interns;
- "Smart parking" applications, including mobile apps providing parking availability and wayfinding information, will be less reliable and therefore less likely to be adopted.

11. Track Record

The City of Oakland Department of Transportation is a new department, so it does not have a track record to report concerning its use of ALPR. However, since 2009, the Finance Management Bureau has managed and Police Service Technicians (PSTs) in the Oakland Police Department have staffed a Paylock-contracted project using ALPR to enforce scofflaw vehicles.

In addition, several cities in California have been using ALPR for years. For example, the cities of Berkeley and Sacramento have been using ALPR since 2013 and 2003, respectively.[3] Although these cities most often use ALPR for law enforcement purposes, [DOT is not aware of any privacy issues or concerns arising from these programs.]

While this impact analysis and proposed use policy for ALPR have been developed by DOT alone, DOT staff recognizes the need to work across departments to maximize the benefits of ALPR investments to parking and related operations while preserving the civil liberties and privacy of the community. Questions or comments concerning this draft Impact Assessment should be directed to Michael Ford, Manager, Parking and Mobility Division, via email at mford@oaklandca.gov or phone at (510) 238-7670.

[3] See https://www.eff.org/pages/california-automated-license-plate-reader-policies for a list of California cities using ALPR. [FNs for Berkeley and Sacramento agreements]