



CONTRACT NO. ML 18131

PURCHASE OF ZERO EMISSION MOTORCYCLES

LOS ANGELES POLICE DEPARTMENT

April 23, 2020

Prepared for the Mobile Source Air Pollution Review Committee (MSRC) under the AB 2766 Discretionary Fund Work Program.

I. Acknowledgments

The Los Angeles Police Department (LAPD) thanks the Mobile Source Air Pollution Review Committee (MSRC) for providing funding for the purchase of three Zero emission electric motorcycles.

Thanks also goes to the Mayor's Office for making participation in the project possible, and providing guidance and support.

The Council of the City of Los Angeles approved and accepted funding on April 25, 2018, and Mayor Eric Garcetti concurred with the Council's approval on May 2, 2018.

Motor Transport Division (MTD) participated in the selection of the Zero emission electric motorcycles and has worked closely with Department entities to assess their use.

This report was submitted in fulfillment of Contract No. ML 18131, entitled "Purchase of Zero Emission Motorcycles", by the LAPD, MTD under the sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed prior to December 2, 2019, since the motorcycles were delivered on July 11, 2018.

II. Disclaimer

The statement and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Reduction Review Committee (MSRC) or the South Coast Air Quality Management District (South Coast AQMD). The mention of commercial products, their sources or their uses in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products.

III. Summary and Conclusion

A. Scope, Purpose and Background of Project

The City of Los Angeles Police Department (LAPD) proposed a pilot project to test the effectiveness of Zero emission motorcycles in off-road patrol and enforcement. The purpose of the project was to determine where law enforcement agencies could effectively utilize electric motorcycles.

Funding from the Mobile Source Air Pollution Reduction Review Committee (MSRC) allowed the LAPD to purchase three Zero emission motorcycles. These Zero motorcycles were provided to the Valley Traffic Division, Off Road Unit (ORU) to test a variety of terrains, particularly off-road trails, parks, fire roads and private streets not easily accessible by patrol vehicles. The motorcycles were tested in each of these environments to determine if the ORU's operational needs would be met. The testing categories included performance, safety, comfort and reliability.

Using Zero emission motorcycles has proven to be effective in off-road patrol around parks, hiking trails, equestrian habitats, and driving surfaces that are not conventionally paved and are often created naturally like sand, gravel, water, mud or snow. Because electric motorcycles do not emit sound, they are an ideal choice in these habitats where noise and caustic emissions are not desirable.

B. Emission Benefits

Emission savings equate to 784 pounds of CO₂ per Zero motorcycle annually. Every gallon of gasoline burned creates about 19 pounds of CO₂. The average motorcycle takes 6 gallons of fuel, creating 114 pounds of CO₂. A Department fuel-powered motorcycle averages 16,000 miles a year, creating roughly 304,000 pounds of CO₂. However, the Zero cannot be utilized in the same way as gas-powered motorcycle engaged in traditional patrol functions. The Zero is more likely to be utilized for special enforcement operations. Therefore, it will not be utilized nearly as much as a gas-powered motorcycle.

C. Work Performed

The MMX motorcycle was evaluated under various off-road conditions normally encountered during ORU daily operations. Enforcement operations took place on off road trails, parks, fire roads and other locations where the terrain is not easily accessible by traditional patrol vehicles. The motorcycle evaluation was intended to determine the performance, safety, comfort, driving range, noise, cost effectiveness of maintenance and repairs. The test was conducted at Hansen Dam and Griffith Park.

- **Acceleration on dirt:**

The test was designed to measure motorcycle performance and control in terms of acceleration in elapsed time from 0-60 mph while on a dirt surface. Evaluation criteria included acceleration, stability, loss of rear wheel traction, and loss of control if the front wheel lifted.

- **Braking on dirt:**

The test was designed to measure the braking response and efficiency of the motorcycle in the dirt. The exercise took place on a semi-soft dirt surface, with light debris, and small rocks and gravel. The hard brake evaluation was conducted by first accelerating the motorcycle to 40 miles per hour (mph), then decelerating to a complete stop.

- **Maneuverability on dirt:**

Three basic off-road maneuvers were used to determine how well the MMX handled on a variety of surfaces.

1. **Hill climbs** – The MMX was driven on hills with various elevations, and different degree of turns and angles, with rough and uneven surfaces, containing small rocks and other obstacles to determine how well it climbed without losing power or control.

2. **Traversing Obstacles** – The MMX was driven over a variety of obstacles, including rocks, trees, branches and uneven surfaces encountered on mountainous terrains to determine how well it negotiated various surfaces.
3. **Traversing through sand, soft dirt and water** – The MMX was driven through sand, soft dirt and numerous creeks containing water reaching over the foot pegs to determine how it handled and whether or not it would stall.

PERFORMANCE RESULTS

Acceleration on dirt:

Acceleration on dirt is 0 - 60 mph, 7.9 seconds (sport mode).

Braking on dirt:

Braking on dirt is 78 feet or less at 40 mph.

Range:

The range is 50-60 miles while in off road use, depending on the steepness of the terrain.

Hill climbs:

Climbing hills, the motorcycle had sufficient power but tended to roll back when stopped abruptly since there is no transmission to hold its position. Since the motion is different from a gas-powered motorcycle, the rider has to adjust to how it feels.

Traversing Obstacles:

The motorcycle was heavier than a gas-powered off-road motorcycle, but the weight was evenly distributed, with most of the weight coming from the batteries in the center of the motorcycle. The front portion of the motorcycle (forks), were found to be on the shorter side and as a result required the rider to adjust traversing tight locations and obstacles encountered in the field.

Traversing through sand, soft dirt and water:

The motorcycle performed fairly well on sandy surfaces, loose dirt and uneven terrain. No issues were encountered while traversing water obstacles (streams) with any of the electrical components.

ADDITIONAL FACTORS

Comfort:

Officers who participated in testing the Zero motorcycle thought it was comfortable. The bike was evenly balanced and the riding geometry was very similar to that of a gas-powered motorcycle.

Noise Emission:

The MMX does not emit sound, making it ideal for enforcement activities around equestrian habitats, which are very common in most of the City's large parks. In addition, hikers and outdoor enthusiasts will not be disturbed by any noise emitted from the MMX. The lack of noise also makes the MMX ideal to carry out covert enforcement activities.

The MMX is also an ideal choice for deployment at in-door and out-door special events frequented by large crowds where caustic emissions may be a hazard.

Maintenance Cost:

The MMX has lower maintenance costs compared to similar sized gas-powered motorcycles, making its use cost-effective for some enforcement activities. Annual cost of maintenance and repair of the Zero motorcycle is approximately \$1,461 (\$570 for parts and \$890 for labor). The maintenance requirements are similar to other off-road motorcycles. However, the cost to maintain similar gas-powered motorcycle is \$3,493; whereas, the cost to maintain the MMX was \$1,461, or approximately 50% less than that of a gas-powered motorcycle.

Purchase Cost:

The Zero MMX motorcycles cost \$12,862 each; whereas, the cost of similarly equipped gas-powered motorcycles is \$8,033.

Future Recommendations:

Future recommendations include the limited introduction of the Zero motorcycles into the fleet for a few reasons. They include battery range and cost of purchase. Aggressive tactical riding is 45 to 155 minutes

The Zero motorcycles have a limited driving range, making them less ideal for conventional patrol duties. On a single charge, the range is 60 to 70 miles. Recon riding is 65 to 175 minutes and aggressive tactical riding is 45 to 155 minutes. Batteries on the Zero motorcycles need to be charged for two hours; whereas, fuel can be obtained for gas-powered motorcycles in a matter of minutes. Therefore, an obvious drawback is that the Zero motorcycles are not operational as quickly as gas-powered motorcycles.

The cost analysis to purchase Zero motorcycles must take into account tangible and intangible factors. Intangible factors include noise, caustic emissions, carbon footprint, and other environmental factors as well as cost to purchase and the cost to maintain and repair. Tangible factors include the cost of purchase, the cost to maintain and repair, the cost to charge versus the cost to fuel and other operational costs.

The Zero has obvious environmental advantages. Noise emanating from the Zero is considerably less than a gas-powered motorcycle, making its use in parks, off-road trails, and indoor events ideal.

[newsroom \(/newsroom\)](#) / [2020 archives \(/2020_archives\)](#) / [january 2020 \(/january_2020\)](#)

News Release

Wednesday, January 15, 2020



All Electric Motorcycles NR20014ti

LAPD Races To The Future With Zero All Electric Motorcycles

Los Angeles: Through a Clean Transportation Funding grant from the Mobile Source Air Pollution Reduction Review Committee (MSRC), the LAPD races to the future and supports the City's Sustainability Plan with the purchase of three Zero all electric off-road motorcycles. The evolution of zero emissions policing has begun, ushering amazing progress through the embrace of new technologies, and the LAPD is once again leading the way with a zero emissions ride.

The three Zero off road motorcycles are part of a pilot project to test the effectiveness of zero emissions motorcycles in off-road patrol around parks, hiking trails, equestrian habitats, and driving surfaces that are not conventionally paved and are often created naturally like sand, gravel, water, mud or snow, and to also provide patrol at special events. Because electric motorcycles do not emit sound, they are an ideal choice in these habitats where noise and caustic emissions are not desirable.

Zero motorcycles started the electric motorcycle revolution in 2006. Headquartered and crafted in California, they were the right choice for a law enforcement agency that prides itself in serving and collaborating with the community and has been leading the way since its inception.

Since 1990, the MSRC has invested more than 400 million in hundreds of clean transportation initiatives that reduce air pollution from motor vehicles throughout the South Coast Region. When the opportunity arose, the LAPD sought MSRC assistance to launch its Zero All Electric Off-Road Motorcycles Pilot Program. Knowing that the MSRC played a key role in helping deliver thousands of clean vehicles to the streets of communities throughout the region, the partnership was a natural one destined to ensure success while helping to conserve the limited financial resources of the LAPD.



Follow @LAPDHQ (<http://twitter.com/LAPDHQ>)



LAPD on Facebook (<http://www.facebook.com/thelapd?sk=info>)



Follow @lapolicefdtn (<http://twitter.com/lapolicefdtn>)



([/iwatchla](#))

NEWS ARCHIVES

[\(/january_2020/content_basic_view/24366\)](#)

2020	
http://www.lapdonline.org/2020_archives	

