Cyclomedia Statement of Work (SOW)

San Bernardino County, California

Statement of Work Prepared by:
Connor Burns, Sales Manager-West

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

1. Project Description

On this 25th day of October 2023, Cyclomedia Technology, Inc. is pleased to provide San Bernardino County, California (the Client) with a statement of work for (1) Road Surface Analysis (ASTM) Pilot, (2) new capture of imagery and LiDAR, and (3) Asset Feature Extraction and Condition. Proposed products and services include new Data Capture of 360° GeoCyclorama™ street level imagery and integrated LiDAR, and derivate Data Analytics products based on services and terms described in County **Contract No. 20-870** between San Bernardino County and Cyclomedia Technology, Inc., executed on August 25, 2020.

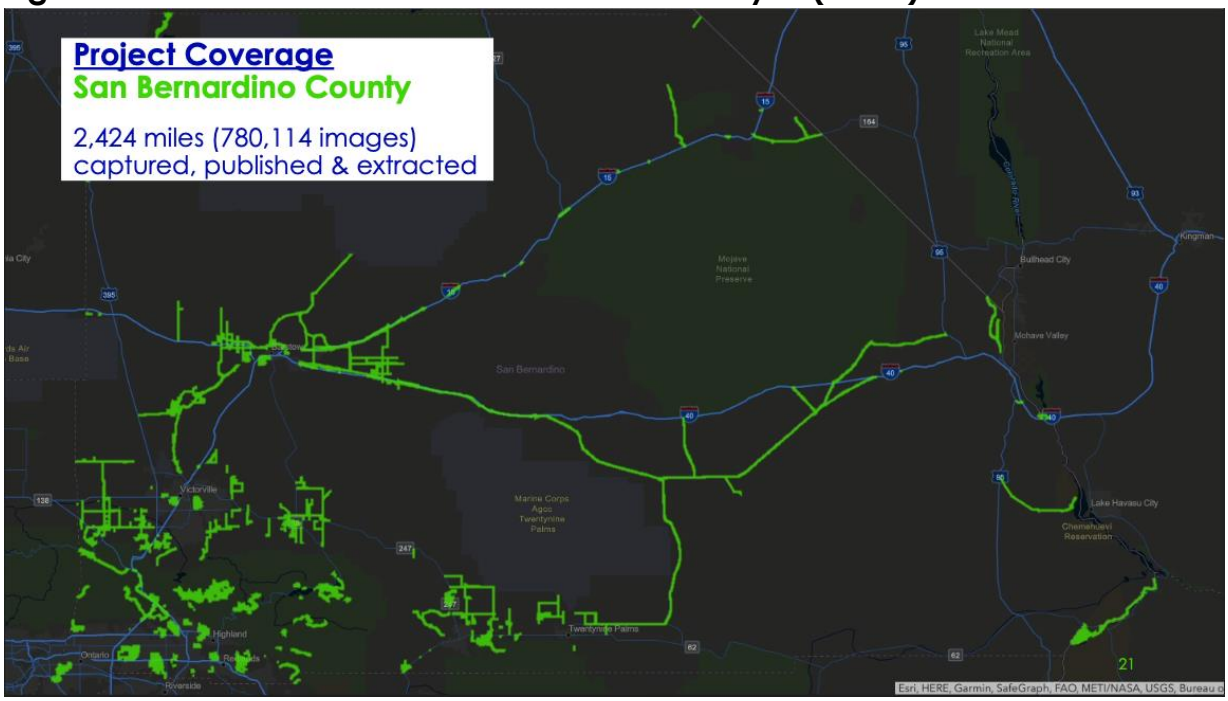
2. Deliverables/Professional Services #1 – Road Surface Analysis (ASTM) Pilot

- Road Surface Analysis (ASTM) for approx. 150 miles of data on county-maintained roads. Analysis is to be conducted on existing imagery and LiDAR from FY20/21 capture. Please see Schedule A – Datasets to be Delivered, and Cyclomedia Product Specification Road Surface Analysis ASTM (2023.2) for full product description, specifications, and delivery details.

2.1. Area of Interest

- The image below, Figure 1, is a representation of the Client's desired Area of Interest for Road Surface Analysis (ASTM). This view shows data (imagery & LiDAR) captured from FY20/21 efforts; the proposed scope would include 150 miles of analysis from select areas below.

Figure 1. – Area of Interest for Road Surface Analysis (ASTM) Pilot



For purposes of clarification and context, the green area highlights the Area of Interest for Road Surface Analysis ASTM.

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

2.2. Fee Schedule

Proposed pricing is based on the following assumptions:

- Road Surface Analysis is estimated at 150 miles of available imagery and LiDAR data – a minimum of 150 miles is required for project execution.
- The Area of Interest is based on centerlines and road files provided and approved by the Client.
- Project delivery is subject to the original contract and Cyclomedia License agreement terms and conditions – **Contract No. C2018-070** – dated August 25, 2020.

Product	Description	Quantity	Price per Mile	Total Cost
Road Surface Analysis (ASTM)	Road Surface Analysis will be conducted for 150 total miles of data and will include the datasets listed in Schedule A "Datasets to be Delivered" below.	150 miles	$185/mile	$27,750
			Total	**$27,750**

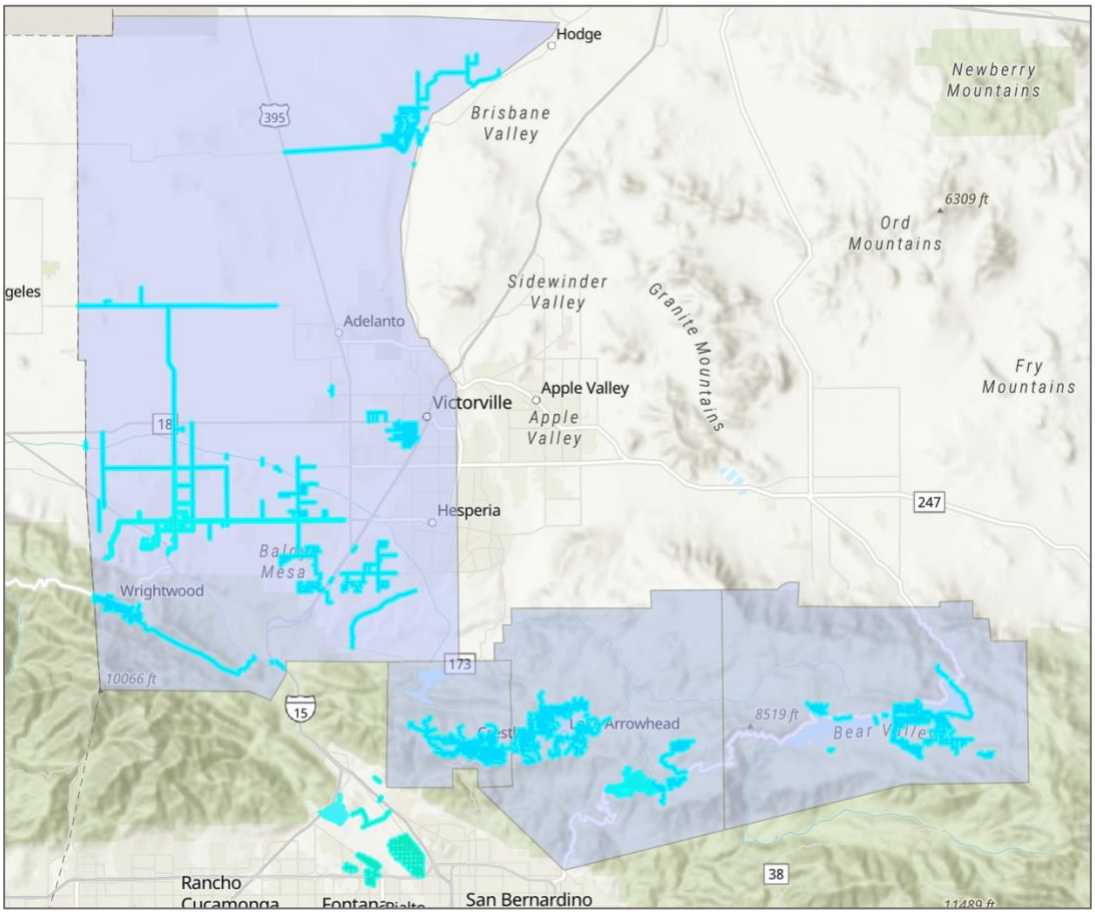
3. Deliverables/Professional Services #2 – New Capture of Imagery & LiDAR

- 360° GeoCyclorama™ imagery with integrated LiDAR for up to 725 capture miles (estimated) of public right-of-way.
- Cloud-based Storage and Access for the duration of the license term (1-yr).
- Unlimited logins for County staff to access imagery using Street Smart™ web applications for the duration of the license term. Staff with Esri licenses can also leverage Cyclomedia imagery using plug-ins for ArcGIS Desktop, ArcGIS Pro, and Web AppBuilder.
- Privacy Filter included – The blurring of faces and vehicles' license plates.
- Elevation Visualization Tool – Generated from the LiDAR point cloud, this tool allows users to rapidly visualize change in elevations and make measurements (e.g., water issues, slopes, crowns, pot-holes, etc.).
- Street Smart™ Plug-In and API Support for duration of the license term.
- See Figure 2 for proposed Area of Interest for new Data Capture.

3.1. Area of Interest

- Throughout the capture, Cyclomedia will provide the Client with routine status reports that include a summary of the overall miles driven, areas collected, and the percentage of images published to the cloud for access. The image below, Figure 2, represents the Client's desired Area of Interest.

Figure 2. Area of Interest – Mountain Region Roads (Paved)
NOTE: includes Prior Pilot Area and Rosena Ranch



The above figures highlight the Areas of Interest provided to Cyclomedia during scoping discussions with the County of San Bernardino, CA and is subject to change depending on Client's needs.

3.2. Fee Schedule

Proposed pricing is based on the following assumptions:

- Data Capture is estimated to be up to 725 capture miles of public and accessible roadways – a minimum of 300 miles is required for project deployment.
- The Area of Interest is based on centerlines and road files provided and approved by the Client.
- Mileage estimates include calculations for roads requiring 2-way passes and buffers for budgetary purposes.
- Any mileage delivered over the contracted amount will be invoiced at a rate of $150 per mile.
- Should the County choose not to re-drive for new Data Capture, there is a $10 per mile annual hosting (renewal) fee for access to imagery upon expiration of the license term (1-yr).

- Delivery of the imagery and LiDAR, Street Smart product, and APIs is subject to the original contract and Cyclomedia License agreement terms and conditions – **Contract No. C2018-070** – dated August 25, 2020.

Product	Description	Quantity	Price per Mile	Total Cost
Area of Interest 1 GeoCycloramas™ Imagery w/ integrated LiDAR (includes Prior Pilot Area and Rosena Ranch)	360° GeoCycloramas™ will be captured for approximately 725 total miles which will include LiDAR capture and processing, based on County shapefiles.	725 capture miles	$150/mile	$108,750
Area of Interest 1 Elevation Visualization Tool	Elevation Visualization Tool generated from the LiDAR point cloud, allows users to rapidly visualize change in elevations and make measurements within the solution (e.g., water issues, slopes, crowns, pot-holes, etc.).	725 capture miles	$5 / mile annually	$3,625
Annual Tech Support Fee (Street Smart API & Plug Ins)	Ongoing annual tech support fee for Street Smart™ API and integrations for ESRI™ products.	1 year	$2,500 / year	$2,500
			Total	**$114,875**

4. Deliverables/Professional Services #3 – Asset Feature Extraction/Condition

- Asset (Inventory) Feature Extraction and Condition for several Areas of Interest defined in Figures 3 and 4 below. Proposed analysis to be conducted on existing (FY20/21 capture) and newly captured imagery and LiDAR consistent with the scoping details provided in the following Figures and Schedules. Analysis on newly captured imagery is contingent upon the scope of work for Section 3, Deliverables/Professional Services #2 – New Capture of Imagery & LiDAR. Additional scoping to confirm road files and Areas of Interest may be required prior to executing a final quote. Please see Schedules B, C, D and E – Datasets to be Delivered for further feature extraction details.

4.1. Area of Interest

- The images below, Figures 3 and 4, represent the Client's desired Areas of Interest for Asset (Inventory) Feature Extraction and Condition. Figure 4 shows Data Capture (imagery & LiDAR) from '20-21 efforts, reflecting the AOI for the re-extraction of newly defined traffic assets and attributes (Schedule B). Figure 5 shows centerlines from County road files selected for paved roads in Rosena Ranch, for which new imagery and LiDAR capture and a full asset inventory extraction (Schedules C and D) are proposed.

Figure 3. Area of Interest 1 – '20-21 County-wide Data Capture

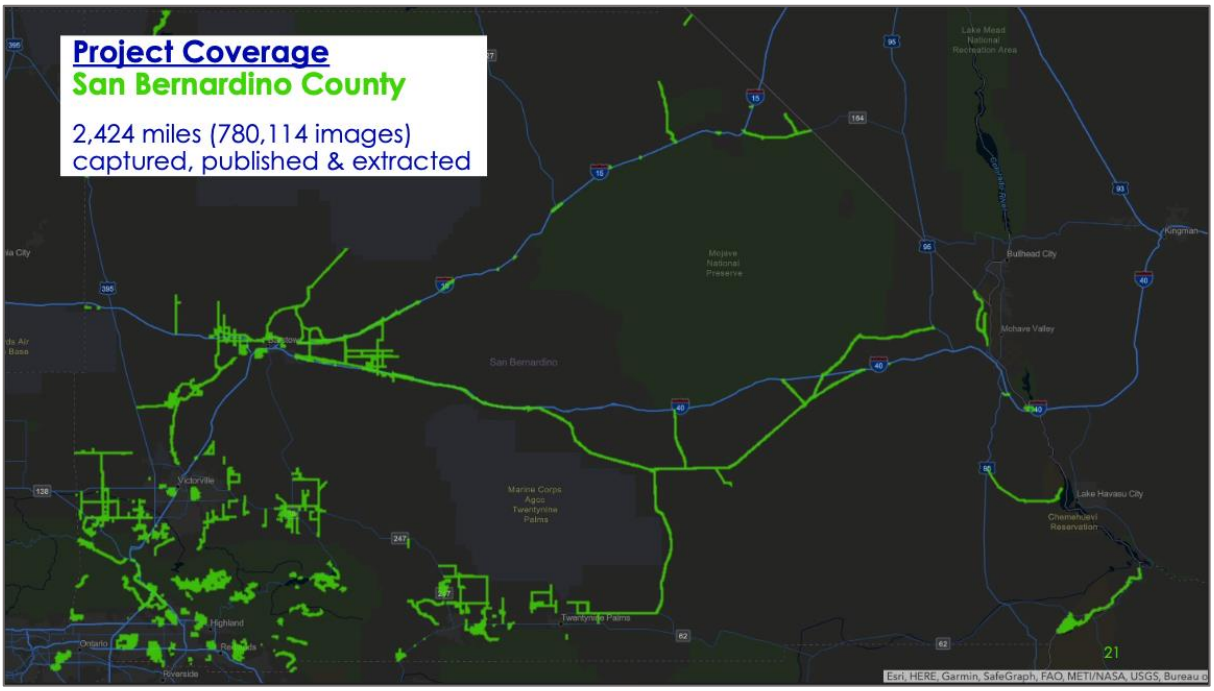
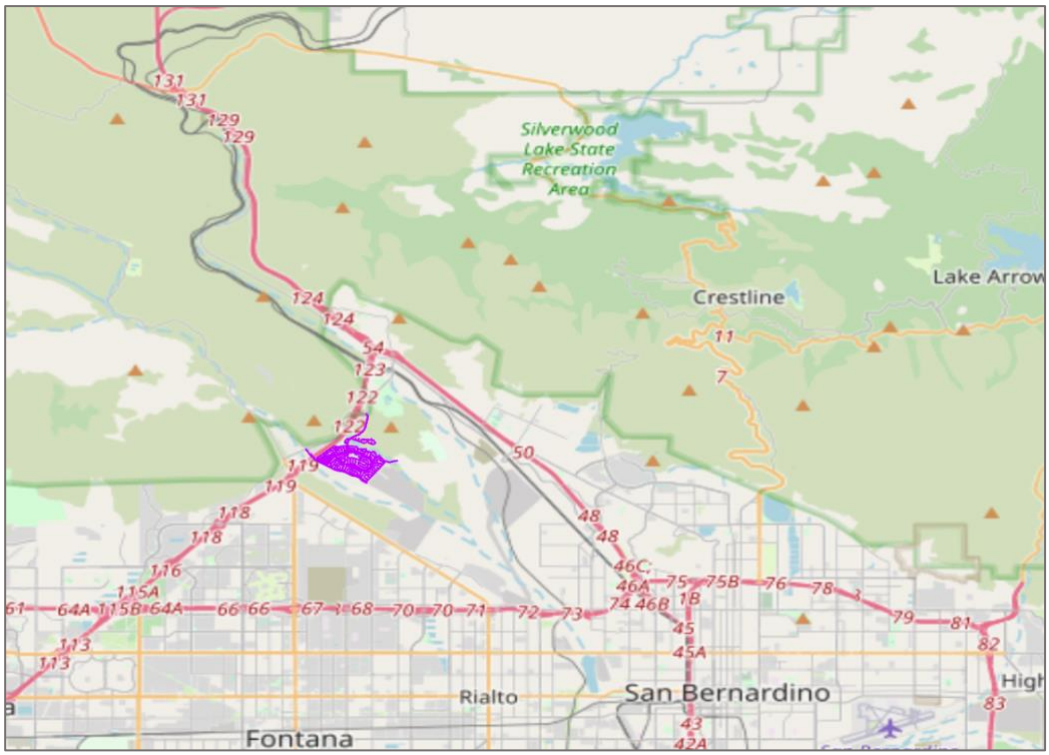


Figure 4. Area of Interest 2 – Rosena Ranch Roads



The above figures highlight the Areas of Interest provided to Cyclomedia during scoping discussions with the County of San Bernardino, CA and is subject to change depending on Client's needs.

4.2. Fee Schedule

Proposed pricing is based on the following assumptions:

- Asset Feature Extraction is estimated at 2,424 miles of existing imagery and LiDAR data, and 25 miles of new imagery and LiDAR data.
- The Areas of Interest are based on centerlines and road files provided and approved by the Client.
- The rate ($492 per mile) proposed for the full asset inventory in newly captured areas (Figure 5) requires a $120,000 minimum of total feature extraction work.
- Project delivery is subject to the original contract and Cyclomedia License agreement terms and conditions – **Contract No. C2018-070** – dated August 25, 2020.

Product	Description	Quantity	Price per Mile	Total Cost
Area of Interest 1 Asset Feature Extraction – Re-extraction of Traffic Assets	Asset Feature Extraction will be conducted on approx. 2,424 miles of existing data and will include the datasets listed in Schedule B "Datasets to be Delivered" below.	2,424 miles	$98/mile	$237,552
Area of Interest 2 Asset Feature Extraction – Full Inventory for Rosena Ranch	Asset Feature Extraction will be conducted on approx. 25 miles of newly capture data and will include the datasets listed in Schedules C and D "Datasets to be Delivered" below.	25 miles	$492/mile	$12,300
			Total	**$249,852**

5. Invoicing

Invoicing Terms	
Imagery Invoicing	30% mobilization fee upon execution
	70% upon delivery (publishing) of imagery
All Other Deliverables	100% upon delivery
Payment Terms	See County Contract No. 20-870

5.1. Invoice Schedule

(1) Road Surface Analysis (ASTM) Pilot

- Road Surface Analysis (ASTM) – 100% ($27,750) upon delivery of the data

(2) New Capture of Imagery & LiDAR

- Data Capture & Licensing – 30% ($32,625) mobilization fee upon execution
- Data Capture & Licensing – 70% ($76,125) upon publishing of the imagery
- Elevation Visualization Tool – 100% ($3,625) upon publishing of the imagery
- Annual Tech Support Fee – 100% ($2,500) upon publishing of the imagery

(3) Asset Feature Extraction & Condition

- Data Extraction & Attribution – 100% ($249,852) upon delivery of the data (note: asset data may be delivered and billed in phases)

Total Billables: $392,477

6. Contact Information

Firm Name	Cyclomedia Technology, Inc.
Business Address	8215 Greenway Blvd Suite 300 Middleton, WI 53562
Contact	Connor Burns Sales Manager - West T: (714) 906-4402 E: cburns@cyclomedia.com

This statement of work is valid for 90 days.

SCHEDULE A
Datasets to be Delivered
Schema for Road Surface Analysis (ASTM) Pilot

Product Name	Feature	Geom Type	Geom Description	Attributes	Notes
Road Service Analysis – ASTM* (RSA-ASTM)	**Individual Road Defects Asphalt**	Polygon	Polygons	UniqueID	See Product Specification
				DefectType	
				Size	
				Length	
				Severity	
				Pavement	
				Road Name	
				InspectDate	
	Individual Road Defects Concrete	Polygon	Polygons	UniqueID	
				DefectType	
				Size	
				Length	
				Severity	
				Pavement	
				Road Name	
				InspectDate	
	ASTM Scoring Road Segments Asphalt	Polygon	Polygon	SegmentID	
				PCI Score	
				PCI Rating	
				Pavement/%Asphalt	
				Length	
				InspectDate	
	ASTM Scoring Road Segments Concrete	Polygon	Polygon	SegmentID	
				PCI Score	
				PCI Rating	
				Pavement/%Asphalt	
				Length	
				InspectDate	

*See Cyclomedia Product Specification Road Surface Analysis ASTM (2023.2) for full product description, specifications, and delivery details.

SCHEDULE B

Datasets to be Delivered

Traffic Assets Applicable to "Re-Exctraction" Efforts for 2,424 miles of '20-21 Data

#	Feature	Feature Description	Geom Type	Geom Description	Attributes	Pick Lists	Attribute Description
1	**Pavement Striping**	Pavement Striping	Line	Line along center of each stripe of paint, continuous on dashed and solid lines	Color	White, Yellow	
					Pattern	Single, Double, Single Dashed, Double Dashed, Solid-Dashed, Dotted/Lane Drop	
					Reflectors	Yes, No	
					Dash Spacing	17ft, 36ft	
					Condition		
					Detail Number		Determined via post processing by Cyclomedia team.
					Length		Length of geometry segment for feature delivered in feet.
2	**Traffic Sign**	Traffic and pedestrian signage along public roadways	Point	Point in the relative center of the sign	Sign Height		Height of sign rounded to the nearest 6 inches. Ex 36"
					Sign Width		Width of sign rounded to the nearest 6 inches. Ex: 36"
					MUTCD Code		Includes Street Name Signs INCLUDES CA MUTCD codes
					StructureID		Cyclomedia ID of sign structure the sign is attached to.
3	**Sign Support**	Post or pole supporting a sign	Point	Point at the base of the sign support or at the relative center of the supports when a sign has multiple supports	Post Type	Wood, Metal Other	
					Sign Count		Total number of signs attached to sign structure. Ex: 4
4	**Median**	Painted or physical feature intended to separate lanes or directions of travel	Polygon	Generalized median perimeter captured	Type	Raised, Painted, Green, Combination	

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

SCHEDULE C
Datasets to be Delivered
Full Asset Inventory Applicable to Newly Capture Areas
(25 Miles of Rosena Ranch Roads)

#	Feature	Feature Description	Geom Type	Geom Description	Attributes	Pick Lists	Attribute Description
1	**Pavement Striping**	Pavement Striping	Line	Line along center of each stripe of paint, continuous on dashed and solid lines	Color	White, Yellow	
					Pattern	Single, Double, Single Dashed, Double Dashed, Solid-Dashed, Dotted/Lane Drop	
					Reflectors	Yes, No	
					Dash Spacing	17ft, 36ft	
					Condition		
					Detail Number		Determined via post processing by Cyclomedia team.
					Length		Length of geometry segment for feature delivered in feet.
2	**Traffic Sign**	Traffic and pedestrian signage along public roadways	Point	Point in the relative center of the sign	Sign Height		Height of sign rounded to the nearest 6 inches. Ex 36”
					Sign Width		Width of sign rounded to the nearest 6 inches. Ex: 36”
					MUTCD Code		Now Including Street Name Signs INCLUDES CA MUTCD codes
					StructureID		Cyclomedia ID of sign structure the sign is attached to.
3	**Sign Support**	Post or pole supporting a sign	Point	Point at the base of the sign support or at the relative center of the	Post Type	Wood, Metal Other	

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

				supports when a sign has multiple supports	Sign Count		Total number of signs attached to sign structure. Ex: 4
4	**Median**	Painted or physical feature intended to separate lanes or directions of travel	Polygon	Generalized median perimeter captured	Type	Raised, Painted, Green, Combination	
5	**Traffic Beacons**	Lamps used to emphasize pedestrian crossing, school, or other signage	Point	Point at bulb	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
6	**Pavement Markings**	Words or symbols on pavement	Point	Point at the relative center of the word or symbol. Symbols that are multi-part such as crosswalks and yield lines are a single point	Condition	Good, Fair, Poor	Good no visible issues with pavement marking, fair slight fading, poor pavement marking is hardly visible and can only distinguish outline of marking.
					Type	See tab 5_PvMark	See sheet 2 for list of symbol types
7	**Signal Poles**	Base of Traffic light support	Point	Point at base of Traffic light where traffic light is on a pole support at point closest to the roadway	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
8	**Traffic Signals**	Traffic control device with red, yellow, and/or green lamps	Point	Point at topmost lamp if vertical, leftmost lamp if horizontal	Condition	Good, Fair, Poor	Point on each traffic signal head connected to a mast arm
					PoleID		ID of signal pole
9	**Signal Cabinets**	Cabinet used for controlling traffic signals	Point	Point at base of cabinet	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage graffiti or obstructions.
					PoleID		ID of signal pole(s) the cabinet is controlling.
					Type	TS-1, TS-2 Type 1 R77, TS-2 Type 1 P44, Other	Type of cabinet. County to provide list of types (expecting 3-4).

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

10	**Street Lights**	Streetlight lamp	Point	Point at relative center of bulb	Condition	Good, Fair, Poor	Good street light has no visible damage, fair street light has minor damage, Poor bulb is missing from street light or pole is knocked down.
					AssignedTo	-	Blanket field for San Bernardino to update as necessary
					Height		Height of street light measured from bulb to base of pole.
11	**AC Dikes**	Elevated mound (dike) used to separate asphalt and concrete from "green area" or non-drivable surface	Line	Line along mound	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
					Length		Length of AC dike delivered in feet.
					Type	Type 1, Type 2	Type of AC dike - Type 1 (cut), Type 2 (packed)
12	**Curbs**	Line along curb	Line	Line along curb	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
					Gutter	Y/N	Y/N if a gutter is present along the curb and roadbed.
					Length		Length of curb segment delivered in feet.
13	**Guardrails**	Line along guardrail	Line	Line along guardrail	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
					Length		Length of guardrail delivered in feet.
					Post type	wood, metal	Material type of post.
					Guardrail Type	w-beam, thrie-beam, cable rail, box beam, other	Type of guardrail.
14	**Sidewalk**	Sidewalk	Line	Two lines on the outer edges of the sidewalk	Condition	Good, Fair, Poor	Single line up center of sidewalk.
					Length		length of sidewalk segments delivered in feet.

15	**Pedestrian Ramps (see Schedule C below for attribution)**	Enhanced ramp	Point	Enhanced Ramp	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
					Detectable Warning	Y/N	Y/N if a DWS pad is present on pedestrian ramp.
16	**Intersections**	Location where roadways meet	Point	Location where roadways meet	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
17	**Bridges**	line along centerline of top-most roadway on bridges	Line	Line along centerline of top-most roadway on bridges	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
					Length		Length of bridge line delivered in feet.
18	**Culverts**	Used for drainage	Point	Point at the opening of the culvert	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
19	**Catch Basins**	Drainage for water to pass underground	Point	Drainage for water to pass underground	Condition	Good, Fair, Poor	Good no visible issues, fair minor damage or fading, poor major damage or obstructions.
20	**Bus Stop Signs**	Signage for buses	Point	Signage for buses			
21	**Park and Ride Signs**	Signage for park and ride facilities	Point	Signage for park and ride facilities			

SCHEDULE D
Datasets to be Delivered
Curb Ramp Data Dictionary

Feature	Feature Description	Geom Type	Geom Description	Attributes	Attribute Description
Pedestrian Ramp Enhanced (ADA)	Pedestrian Ramp (Enhanced)	Point	Point placed in the relative center of the ramp with comprehensive measurements.	Curb Ramp Type	General type of ADA ramp Perpendicular Parallel Combination
				Adjacent Sidewalk Width	Measured value.
				Adjacent Sidewalk Cross Slope	Measured value. (Delivered as percent)
				Adjacent Sidewalk Passing Space	Identifies if there is passing space provided at 200 ft intervals if the sidewalk is less than 5 feet wide. Present (1) Not Present (0) Not Applicable (97)
				RampWidth	Measured value.
				Running Slope	Measured value. (Delivered as percent)
				Cross Slope	Measured value. (Delivered as percent)
				Flare Slope A	Measured value. (Delivered as percent)
				Flare Slope B	Measured value. (Delivered as percent)
				Turning Space	Indicates presence of turning space. Present (1)

Address
8215 Greenway Blvd, Suite 300
Middleton, WI 53562

T +1.510.900.5142
E info-us@cyclomedia.com
W cyclomedia.com

	Not Present (0) Not Applicable (97)
Turning Space Width	The measured value. Measurements over 60 inches are reported at 60 inches.
Turning Space Length	The measured value. Measurements over 60 inches are reported at 60 inches.
Turning Space Cross Slope	Measured value. (Delivered as percent)
Detectable Warning Surface Length	Measured value.
Detectable Warning Surface Spans Width of Curb Cut	Identifies if the DWS spans the width of the curb cut Present (1) Not Present (0) Not Applicable (97)
Truncated Dome Spacing	Identifies if the truncated domes of the DWS are consistently spaced based on a visual assessment. Present (1) Not Present (0) Not Applicable (97)
Detectable Warning Surface Within 5' of Curb Line/Grade Break	Identifies if the DWS is within 5 feet of the curb line/grade break Present (1) Not Present (0) Not Applicable (97)
Color Contrast	Identifies if the DWS is visually distinct from the surrounding ramp Present (1) Not Present (0) Not Applicable (97)

				Lip Present	Identifies if there is a visible lip present at the base of the ramp. Present (1) Not Present (0) Not Applicable (97)
				Gutter Flowline Slope	Measured value. (Delivered as percent)
				Gutter Counter Slope	Measured value. (Delivered as percent)
				Pedestrian Signal Height	Identifies, if a pedestrian signal is present, if the height is between 15" and 48" Present (1) Not Present (0) Not Applicable (97)
				Pedestrian Signal Location	Identifies, if a pedestrian signal is present, if it is within 10" of clear space Present (1) Not Present (0) Not Applicable (97)
				Crosswalk Clear Space	Identifies if there is a crosswalk clear space present Present (1) Not Present (0) Not Applicable (97)

SCHEDULE E
Datasets to be Delivered
Standard Feature Metadata

Feature	Standard Metadata	Attributes	Attribute Description
All Features	All features include the following metadata as attributes.	ID	A unique ID created by Cyclomedia.
		Easting	Longitude (x) of coordinates of feature, in decimal degrees
		Northing	Latitude (y) of coordinates of feature, in decimal degrees
		Elevation	Elevation (z) of coordinates of feature, in U.S. feet (GRS80)
		Recorded At	Date of the feature's field collection
		Street Smart URL	StreetSmart link to asset location for visualization.