

4 *Climate Science Used Today*

Appendix 1 provides summaries of the information currently used in infrastructure design and maintenance by different infrastructure sectors. This compilation begins the important task of identifying what information is currently used by state engineers and architects. The next important step will be to complete this list through a systematic survey of state engineers and architects. This could be an initial action taking by the proposed standing Climate-Safe Infrastructure Working Group.

Building Sector - Information Used for Current Planning, Design and Decision-Making

New & Existing Buildings, Parking Lots and Garages	<ul style="list-style-type: none"> • Ventilation requirements • Heating and cooling degree days for planning, including grid planning • Weather files • Hourly climate data • Historic weather data • Temperature: hourly min, max, average • Precipitation: hourly frequency and intensity, and duration • Wind: hourly min, max, average speed, direction, duration and 3 second gust • Air Quality: Ozone, VOC's, Particulate matter • Humidity: hourly min, max, average, dew point, USGS flood maps • ASHRAE Design Day: min/max dry bulb and dew point temperature • Zero Net Energy requirements & calculator
Energy Demand for Space Cooling	<ul style="list-style-type: none"> • Climate projections to estimate Cooling Degree Days
Energy Demand for Space Heating	<ul style="list-style-type: none"> • Climate projections to estimate Heating Degree Days

Transportation Sector - Information Used for Current Planning, Design and Decision-Making

Culvert Design	<ul style="list-style-type: none"> • NOAA Atlas 14 precipitation data (based on historical rainfall data) • Land use (based on stable historical conditions) • Material selection • Return frequency • Design life
Pavement Design	<ul style="list-style-type: none"> • Temperature extremes for material selection and expansion/contraction at bridge joints • Soil conditions for water saturation • Precipitation for design of bridges and culverts • Life-cycle cost • Maintenance operations
Bridge Design	<ul style="list-style-type: none"> • Temperature extremes for material selection and expansion/contraction at bridge joints • Soil conditions for water saturation • Precipitation for design of bridges and culverts • Life-cycle cost • Maintenance operations
Signals and Signage Design	<ul style="list-style-type: none"> • Temperature extremes for material selection • Precipitation for selection of control housing
Caltrans Buildings	<ul style="list-style-type: none"> • Temperature extremes for material selection and insulation • Precipitation for elevations, foundation and soil conditions • Energy usage for lighting and HVAC
Safety Rest Areas	<ul style="list-style-type: none"> • Temperature extremes for material selection and insulation • Precipitation for elevations, foundation and soil conditions • Energy usage for lighting and HVAC • Water table
Landscape Areas	<ul style="list-style-type: none"> • Soil conditions • Native plant species • Temperature • Precipitation • Water table
Roads and Bridges	<p>Historic weather data:</p> <ul style="list-style-type: none"> • Temperature: hourly min, max, average • Precipitation: hourly frequency and intensity, and duration • Wind: hourly min, max, average speed, direction, duration and 3 second gust • Air Quality: Ozone, VOC's, particulate matter • Humidity: hourly min, max, average, dew point

Water Sector - Information Used for Current Planning, Design and Decision-Making

Dams	<ul style="list-style-type: none"> • Landslide hazards • Rainfall and snowpack • Wind speed • Temperature, dewpoints • Historical storm and stream gauge data • Watershed ground cover and predominant soil types present • Digital Elevation Models / Terrain data • Lidar imagery • Stream networks • CEQA compliance • Downstream hazard assessment (population and infrastructure) • Water Rights Permit
Pipelines/Tunnels	<ul style="list-style-type: none"> • Hydrologic evaluations of watersheds • Hydraulic design of drainage facilities • Scour analyses • Head pressures • Groundwater table level • Fault locations and seismicity
Canals	<ul style="list-style-type: none"> • Hydrologic evaluations of watersheds • Flood routing through reservoirs, rivers and bypasses
Levees	<ul style="list-style-type: none"> • Hydrologic Evaluations of watersheds • Hydraulic design of drainage facilities • Flood routing through reservoirs, rivers and bypasses
Pumping/Generating Plants	<ul style="list-style-type: none"> • Occupancy requirements • Foundation suitability • Wind speed • Earthquake hazards • Groundwater table level • O&M requirements • Forebay/Afterbay water surface elevations

Energy Sector Information Used for Current Planning, Design and Decision-Making

Electrical Transmission Lines	<ul style="list-style-type: none"> • Historic maximum temperatures
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