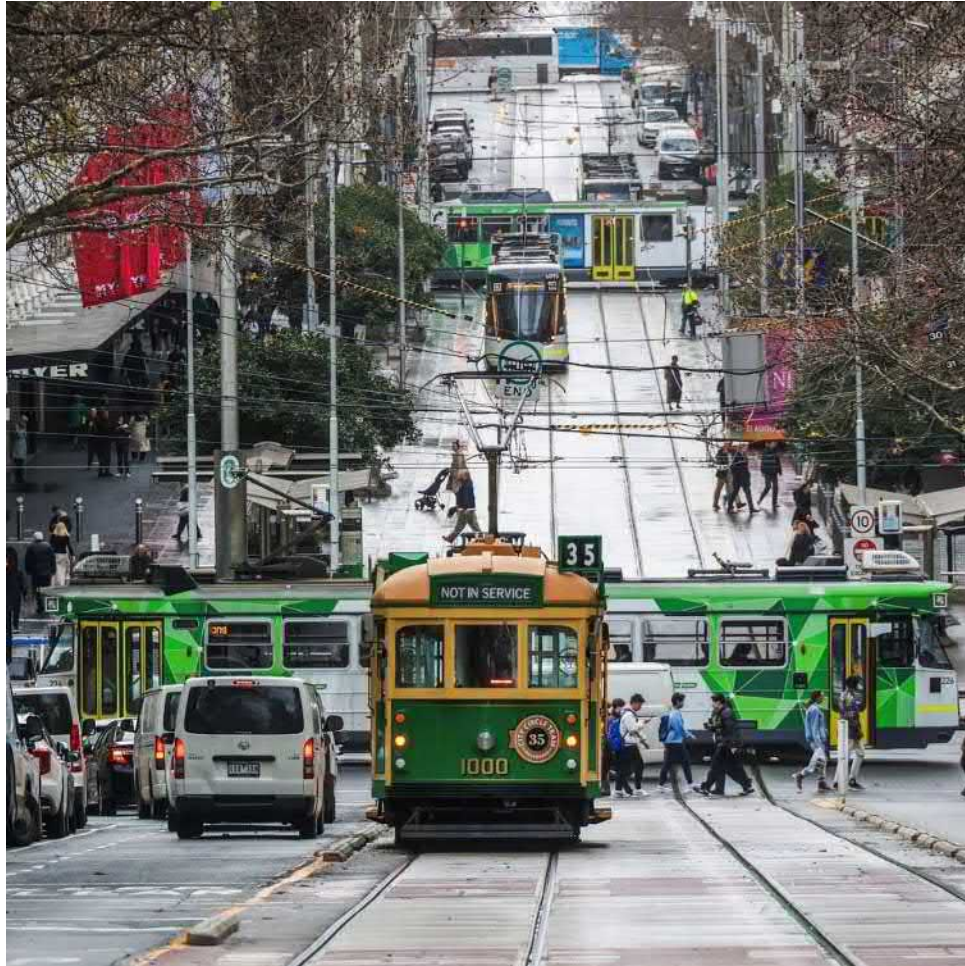




CAPABILITY STATEMENT LIGHT RAIL CONSULTANTS



About Light Rail Consultants

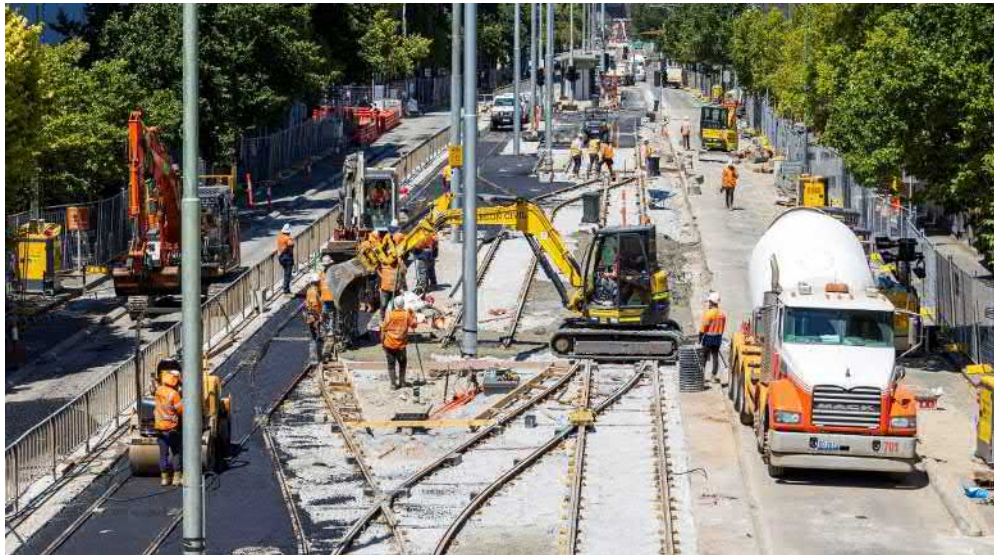
Australia's leading rail industry consultants

LRC was established in 2008 to capitalise on specialised expertise in the design of Overhead Line Equipment (OLE) and in Track for both railway and tramway projects. The mission of LRC is to be the leader in the market that we serve, to the benefit of our clients and their customers, the local transport authorities and the community who rely on their services.

LRC's objective is to consistently meet client demands and expectations for world class solutions, with high quality designs delivered at competitive rates and to schedule.

Our strategy, through recruitment and training is to provide professionals with proven experience in overhead wiring, track and civil design.

Our value to clients is based on our specialist knowledge in overhead wiring systems and rail designs, and our ability to channel this knowledge into comprehensive tailored solutions for the client's specific requirements.



Core Services



Track Design



Overhead Wiring Design



Energy modelling



Construction Services



Tramway signalling



OUR MAIN SERVICES INCLUDE:



Track and Civil

We undertake engineering designs for new installations and for upgrading operating facilities.

- System and concept design
- Horizontal and vertical design alignments
- Advanced 3D modelling
- Rail fabrication details
- Swept path analysis
- Railway pedestrian crossing
- Track drainage
- Structural design of bridge crossing, tram stops, depots and yards
- Interlocking solutions and platform design



Overhead Wiring

We provide a comprehensive engineering design service, comprising all elements of overhead wiring systems. By making use of the latest design techniques, we deliver modern and innovative designs that are lighter and reduce visual impact.

- System design consulting
- 600V to 1500V AC/DC expertise
- Catenary design
- Power feeder and connection details
- Interlocking solutions and platform design
- Pole, mast and wall bracket design
- Overhead suspension and fitting solutions



LRC provides quality, and on-time delivery services.

OUR MAIN SERVICES INCLUDE:



Ancillary services

We offer specialised engineering services, providing breadth of support to important aspects of project development and execution.

- Infrastructural & interface management
- Structural design
- Traffic Design
- Traffic engineering
- Development of standards, TMP and maintenance procedures



Energy Simulation

We provide engineering services to cover every aspect of energy network design, ensuring optimal performance and safety for transit systems. We provide clear information on energy efficiency for each simulated scenario.

- Energy Modelling
- Energy Simulations



Construction services

We provide skilled individuals for engineering and project support, supervision and management, so we can ensure outcome complies with the standards.

- Design of steel poles
- Consultation on purchasing Overhead Line Equipment
- Installation supervision
- Project management and technical support



Tramway Signalling

We offer specialised engineering services, providing breadth of support to important aspects of project development and execution.

- Signalling for autopoints.

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Project Experience

Swanston Street (Melbourne Uni Terminus)

COMPLETION February 2024
CLIENT Yarra Trams
LOCATION Swanston Street, Melbourne

Track Renewal and Re-Alignment:

- Replacement of track from 15m north of OHP155u (south of Grattan Street) to 5m west of OHP140d (Elgin Street).
- Realignment of track to accommodate increased shunt lengths at the terminus.
- Drafting automatic point circuits and conduits for specialized track signalling.
- Design enhancements include fencing realignment, tactile installation, platform resurfacing, and clearance markings.

Overhead System:

- Modifications to trolley wire terminations and new center pole placements to align with updated shunt positions.
- Retention of overhead wiring for the curve into Elgin Street due to like-for-like track replacement.



Tram Terminus Facilities:

- Upgrade of tram stop facilities, including the addition of an externally accessible toilet cubicle.
- Water and sewer connection designs for new and existing amenities.

Accessibility and Lighting:

- Accessibility audits to ensure compliance with DDA standards for platforms, ramps, and adjacent pathways.
- Lighting design assessment and upgrades for enhanced passenger safety and visibility.

Traffic and Civil Works:

- Remodeling of traffic signal plans for Swanston Street/Faraday Street and Elgin Street intersections.
- Drainage connection renewal to council pits, ensuring long-term infrastructure resilience.

Swanston/Victoria/Elizabeth Track Renewal

COMPLETION October 2025
CLIENT Yarra Trams
LOCATION Swanston Street, Melbourne

Track Renewal and Modifications:

- Removal of existing track in the Swanston Street side road and renewal of track from OHP175 to OHP179 on Swanston Street.
- Triple track installation along Swanston Street between OHP176 and OHP178, and introduction of a Gauntlet Switch at OHP179.
- New 5m manual switch at OHP176 to connect to Victoria Street.
- New curve track at the Swanston-Victoria Street intersection and a reverse curve from OHP11 to OHP12 on Victoria Street.
- Shifting tracks 1.2 meters northward in Victoria Street, removal and relocation of crossovers along Victoria Street.
- Renewal of tracks from OHP48 to OHP58 Elizabeth Street, including a new H crossing at the Elizabeth-Victoria Street intersection.



Overhead Wiring:

- Overhead wiring design for new curves and crossovers at the Swanston-Victoria Street intersection and Elizabeth-Victoria Street intersection.
- Removal of overhead network for the sideways road tracks in Swanston Street.

Feeder System:

- Undergrounding of new feeder conduits and pits to accommodate the new track alignments.
- Creation of sectionalizing diagrams and drafting of isometric drawings as per Yarra Trams' specifications.

Traffic Signal Plan (TSP):

- Remodeling of TSPs at Victoria-Bouverie-Therry Street and for the new H crossing at Elizabeth Street and Victoria Street intersection.

Underground Services:

- Complete BYDA assessment and mapping of existing services.
- Coordination with stakeholders to ensure smooth integration with existing underground infrastructure.

Melville Road Track Renewal and Overhead Upgrade

COMPLETION November 2023
CLIENT Yarra Trams
LOCATION Melville Road, Brunswick West

Track Renewal:

- Renewal of curve track (OHP118–OHP125), reverse track (OHP130–OHP137), and straight track (OHP125–OHP190), while retaining the existing alignment.
- Removal of the existing crossover at Dawson Street near Daly Street.
- Relocation of the crossover at Melville Road (post-Moreland intersection) to enhance operational efficiency.
- Renewal of drainage connections to council pits as required.

Overhead Wiring:

- Upgrades to existing wiring systems for enhanced durability and alignment with new track configurations.
- Design and installation of overhead wiring for the relocated crossover at Melville Road.



Feeder System:

- Undergrounding of aerial feeder cables to future-proof the network.
- Development of sectionalizing diagrams and isometric drawings as per Yarra Trams' directives.

Traffic Signal Plan (TSP):

- Updating TSPs for the removal of the Dawson Street crossover and the installation of the new crossover at Melville Road.

Utility Services:

- Comprehensive BYDA assessment and mapping of underground services for design accuracy and construction planning.

Federation Square/Flinders Street Tram Stop Upgrade

COMPLETION March 2022

CLIENT Yarra Trams

LOCATION Federation Square and Flinders Street Tram Stop

Platform Upgrade and Extension:

- Increase the height of both platforms (inbound and outbound) to 290mm to meet DDA compliance standards.
- Widen the southbound platform and access ramp for enhanced passenger loading capacity.
- Modify platform layout to future-proof for a mid-platform pedestrian crossing and integrate improved shelter positioning.

Bridge Structural Assessment:

- Assess the structural capacity of the bridge to support additional platform loadings, including shelters and new equipment.
- Design solutions for shelter foundations and implement drainage enhancements at the northern end of the platform.



Road Safety and Traffic Signal Plan:

- Develop and remodel traffic signal plans at Flinders/Swanston and Swanston near the Yarra River.
- Conduct a Road Safety Audit compliant with Austroads guidelines, incorporating smarter Lite LED safety tactiles.

Accessibility (DDA Audit):

- Ensure compliance with DSAPT, DDA, and Australian Standards through design reviews and post-construction audits.

Feature Survey:

- Complete detailed surveys for the area around and underneath the Swanston Street Bridge, including 3D point cloud modeling.

Additional Services:

- Waterproofing upgrades.
- Relocation of signal pedestals and optimization of existing power supply for electrical systems.
- Lighting Lux Level calculations and CCTV layout enhancements.

Maribyrnong Road Track Renewal and Overhead Upgrade

COMPLETION September 2024
CLIENT Yarra Trams
LOCATION Union Road to Clyde Street, Maribyrnong Road

Track Renewal:

- Straight track renewal from OHP111 (Union Road) to OHP155 (Clyde Road), including the Raleigh Road Bridge (OHP147–OHP153).
- Relocation of the existing crossover at Maribyrnong Road (CH830–CH870) per Yarra Trams-approved design.
- Drainage upgrades and renewal of bonding infrastructure to enhance operational reliability.

Overhead Wiring:

- Replacement of rigid fittings with elastic fittings for improved durability and reduced maintenance.
- Design of overhead wiring for the relocated crossover, including adjustments for three spans on either side.



Feeder Design:

- Retention of existing feeder conduits and pits with additional designs for future undergrounding per sectionalizing diagrams.

Traffic Assessment:

- Partnered with TraffixGroup to assess traffic flow and safety at key intersections, including Maribyrnong Road/Epsom Road/Scotia Street.

Utility Services:

- Conducted "Before You Dig Australia" (BYDA) assessments and identified underground services for construction planning.

Bridge/Expansion Joints

- LRC scope was extended to include the new track structure over the existing Maribyrnong Bridge including all expansion joints.



St Kilda Road Track Renewal and Overhead Upgrade

COMPLETION August 2024

CLIENT Yarra Trams

LOCATION St Kilda Road (OHP1–OHP154) & Carlisle Street Intersection

Track Renewal:

- Replacement of straight and curve track between OHP1–OHP154 and at the Carlisle Street/St Kilda Road intersection (OHP33–OHP36 to OHP189).
- Relocating Stop 31 to the nature strip between OHP145–OHP151.
- Widening and elongating Stops 34 and 35 for both inbound and outbound directions.
- Straightening track between OHP147 and OHP151.
- Optimization of drainage at Stops 30, 34, and 35, substituting U-drains with PVC drainpipes behind the platforms.
- Implementation of 57kg/m grooved rail using Type 2 and Type 3 track structures.
- Design of Auto Points track circuits using Elektroline systems.



Overhead Wiring:

- Upgrades to accommodate new track alignments, including the Carlisle Street intersection and OHP2–OHP145 along St Kilda Road.
- Weight tension system design from OHP153–OHP187.
- Feasibility study and report on weight tensioning systems from OHP2–OHP145.
- Elastic design for the Carlisle Street/St Kilda Road intersection.

Feeder System:

- Undergrounding feeder conduits within the project scope.
- Creation of sectionalizing diagrams and isometric drawings as per Yarra Trams' specifications.

Utility Services:

- BYDA assessment and mapping of existing underground services to guide design and construction.

Dublin Rd OHLE Permanent package Level Crossing Removal

COMPLETION August 2022 – December 2023

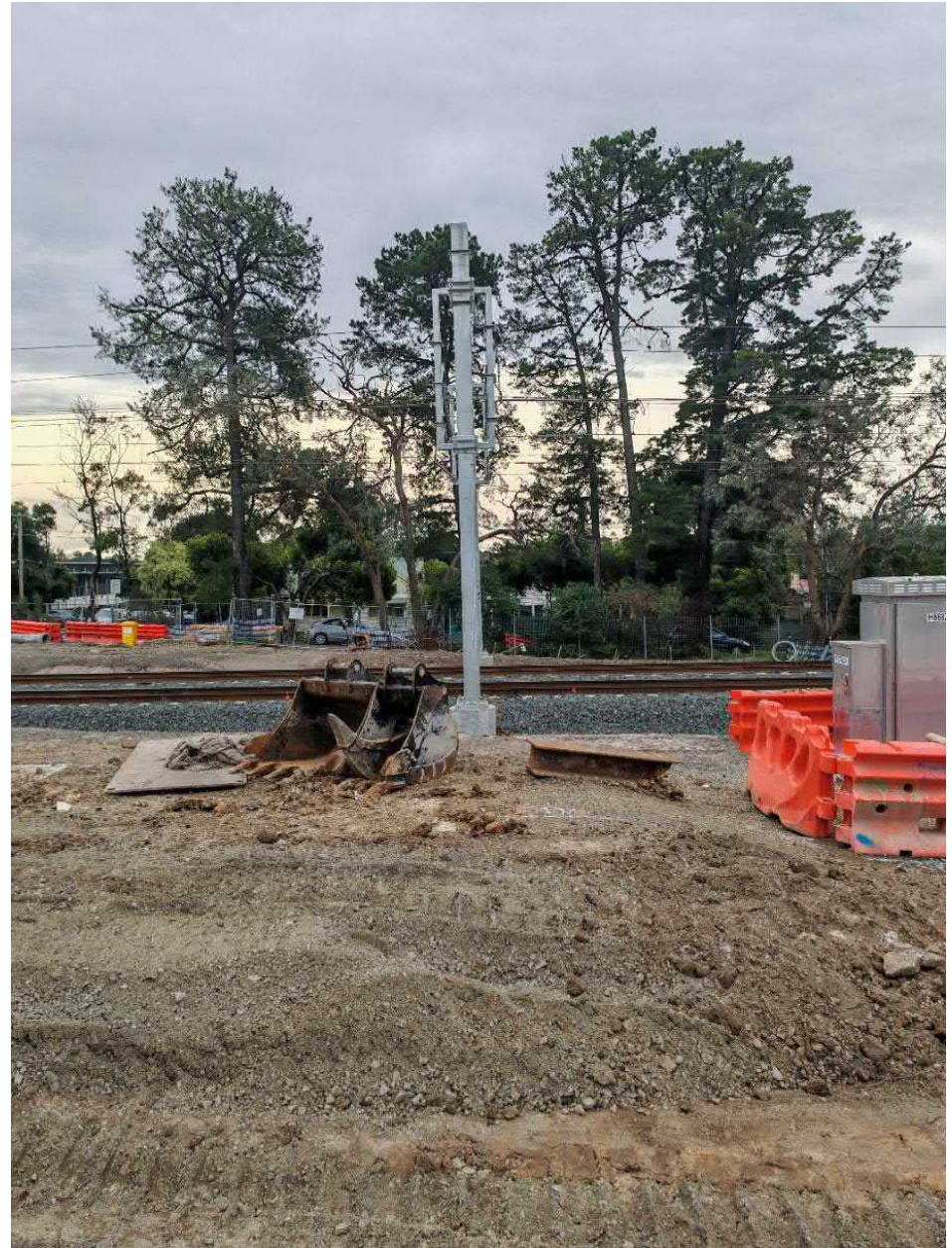
CLIENT Southern East Program Alliance (SEPA), Melbourne (Secondment)

LOCATION Dublin Rd OHLE

Brief: Design of OHW permanent works including design of two jumper airgaps, 1 No. auxiliary feeder wire per track and providing bridge attachments

Key Responsibilities:

- OHLE Package lead – ensuring the project requirements and project budget is met and deliverables submitted within the project program
- Produced design and drafting in accordance with latest MTM standards
- Prepared and applied for standard waiver



Greensborough & Montmorency Track Duplication (OHW Design)

COMPLETION Oct 2020 – December 2021

CLIENT Southern Program Alliance (SPA), Melbourne (Secondment)

LOCATION Greensborough & Montmorency

Brief: Design of OHW permanent works including design of additional auxiliary feeders for track duplication works between Greensborough and Montmorency.

Key Responsibilities:

- OHLE Design lead responsibility for Montmorency track duplication works
- Produced design and drafting in accordance with latest MTM standards
- Obtained approval for two MTM Standard waivers
- Producing design calculation sheets
- Liaising with construction, other design disciplines and MTM, in order to proceed to IFC design



Metro Tunnel Project- Sunbury Traction Power Upgrade, Footscray to Tottenham

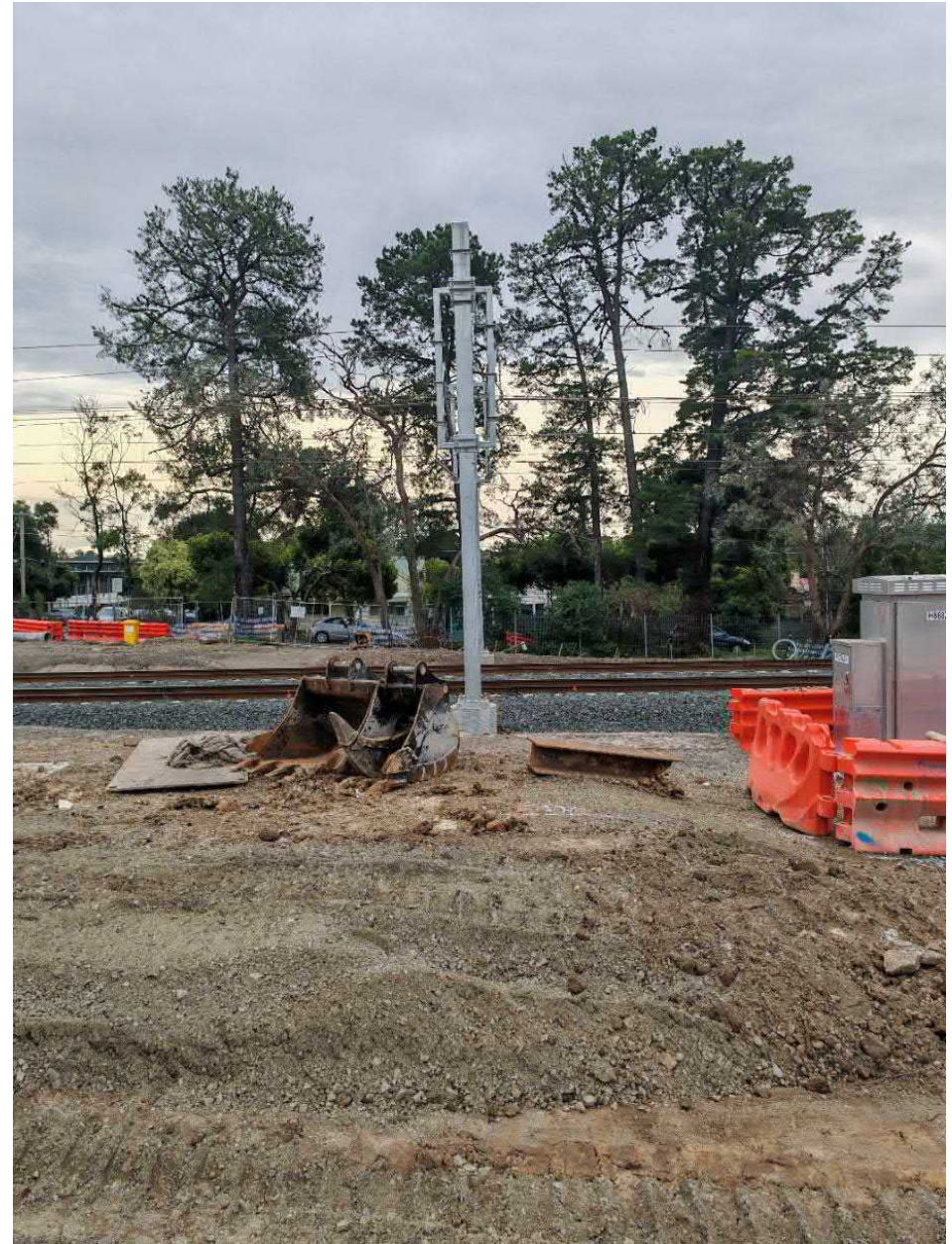
COMPLETION August 2019 – October 2020

CLIENT Rail Infrastructure Alliance (RIA), Melbourne (Secondment)

LOCATION Sunbury

Key Responsibility:

- Undertook design lead role for this package
- Prepared detailed design of 4 No. auxiliary feeders per track and upgrading the existing switches.
- Undertook relevant calculations to develop the design such as; identifying uplifts, wire profile the feeders for different temperatures and check clearances, produce proposed loadings for analysing structures
- Ensured the design is in accordance to project PS&TR
- Produced allocation tables for different type of feeder support arrangements.



IN HOUSE SYSTEMS

LRC-Developed Computer Software Design Tools

LRC has developed design tools based on MS Excel and MS Visual Basic, to reduce computation and checking time.

The design tools produce calculations for overhead line geometry, with result-checking, for wiring tensioning and swing parameters, curve loading and support spacing, stagger and pendulum height, across temperature differentials.

Elements of the LRC Design Tools are shown below.

The Auto-tension Swing program calculates stagger change and wire creepage for given lengths of auto-tensioned overhead wiring on cantilever supports, within a temperature differential.

The Curve Spacing program calculation ensures that trolley wire stagger is within the specified limits throughout the prescribed curve radius, with consideration of mid-span offset, to produce acceptable support span spacing and segment loading.

Curve Radius (m)

23

Outside Stagger (m)

0.23

Inside Stagger (m)

0.15

Curve Spacing (m)

8.4

Compute

Load is high, reduce the spacing to

7.9

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Initial Temp(°C)=

0

Final Temp(°C)=

50

Distance from MPA(m)=

500

Cantilever pivot length(mm)=

3000

Stagger Change(mm)=

30

Change in wire length(mm)=

425

Compute

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Pendulum Suspension Temperature Sag and Offset

The Pendulum Suspension program, shown below, checks the stagger and height of pendulum against the cross-section temperature suspension height and stagger tables.

Initial Wire Temp

22

LRC - Pendulum Suspension

Initial Tension (N)

10000

Initial Temp (°C)

0

Span (m)

30

Stagger (mm)

130

Angle of Disconnection

1.1

Support Type

Single Pendulum (L)

Calculate

Support Attachment from Table (mm)

579

Wire Temp (°C)	5	17	25	33	41	50
Tension (N)	10000	8000	6027	4000	4027	2000
Support Height (mm)	444	419.07	394.73	370.38	346.02	319.91
Length (mm)	32.8	45.8	62	83.5	107	134
Stagger (mm)	130	130	130	130	130	130

Change Stagger

Change Stagger



LRS (LRC Registration System) is an in-house developed, project system that supports office management. Its main purpose is to allow the company to run more smoothly.

LRS helps control project work including documents, schedules, resources, contacts, timesheets, time costs, expenses, invoice billing, contracts, reports and transmittals. The system provides better visibility and control of projects in a real-time, day-to day environment, improving work scheduling, productivity, timesheets and ensuring deadlines are met.



To achieve viable business benefit, LRC always strives to act with integrity to maintain high standards of business ethics and conduct. This principle is applied in our dealings with employees, partners, contractors, clients, suppliers, authorities, governments, competitors, and the community.

Our policies and procedures are consistent with this principle and are part of our framework to guide business operation.

Quality is managed at LRC through constant supervision, assessment and revision of all internal and external project processes and practices.

Quality in all LRC designs ensures reliability, performance, ease of installation and maintenance.



All of our activities are align with :

Quality Management System ISO 9001:2015

Occupational Health and Safety Management System ISO 45001:2018.

Rail Infrastructure Design Software Suite

The proprietary design software suite employed by LRC includes state-of-the-art features, including, amongst others:

- Generates preliminary **2D plans** and realistic for concept analysis and visualisation against prerequisite parameters, alternative layouts and design options
- Accommodates hybrid systems that involves merging of old and new technologies
- Includes a user configurable and updatable suite of integrated design rules and checks, to optimise the design and guide and alert designers when tolerances are reached and exceeded
- Provides full connectivity that allows project engineers to apply their skill and judgement to refine and optimise designs prior to construction, or to capture as-built changes after construction
- Has parametric templates containing variations and dependencies, supports changes in track geometry and spacing, curvature, cant, wire height and stagger, which simplifies and automates the design process, providing consistency, productivity improvements and cost savings
- Can facilitate templates to provide an evolving OLE library for client, project or corporate future use as standards or for rework in other projects
- Produces fully annotated project drawings and deliverables including design check sheets, reports and schedules: asset lists, cost estimates, delivery schedules, construction pick lists and site set out
- Incorporates restricted 'fixed zones' and clearances to avoid obstacles such as over-track distributions, tunnels, crossings, bridges, structures and underground utilities
- Maintains complete information for use, not only with the current project, but for future use in operations, maintenance and rehabilitation works to sustain the network
- Caters for to a range of configurable international standards for global infrastructure projects
- Addresses both horizontal and vertical track geometry, and also station, yard and depot layouts, as well as earthworks and track ballast



Our Client

We work closely with our clients to fully understand the engineering scope, schedule, and budget.

As a result, we provide high quality engineering design solutions, with minimal cost variations and schedule disruptions, traditionally required to cover rework after misunderstood design requirements.

As an integral part of our philosophy, we view stakeholders as co-developers, ensuring that we maintain their design intent and that they stay up to date with design developments.

Our approach to engineering is focused on achieving:

- Quality engineering project deliverables - on time and budget
- Practical designs to meet agreed project objectives.
- Zero rework

Clients benefit from cost saving and practical, workable designs. LRC benefits from building long-term client relationships.



pitt&sherry

AECOM

aurecon



JACOBS



Traffix Group





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