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TECHNICAL BULLETIN

TECHNICAL SERVICES BRANCH

DECEMBER, 2010

BRANCH OVERVIEW

ORGANIZATION

The organization chart on the reverse side provides an overview of the Branch structure.

The accompanying pages in this bulletin provide more detailed descriptions of the expertise of each group within the Branch, and list the section head and primary contact person.

Services are provided by the following:

- **Building Engineering Section**
- Facility Evaluation Section •
- Facility Planning and Architecture Section •
- Interior Design Section •
- Site Services Section

CONTACT

The overall Branch contact is: Tom O'Neill, P. Eng. **Executive Director** Telephone: (780) 422-7447 E-mail: tom.o'neill@gov.ab.ca

3rd Floor Infrastructure Building 6950 - 113 Street Edmonton, AB T6H 5V7 Fax: (780) 422-7479

ISSUE No. 4 R

MANDATE

Provide a wide range of professional and technical support and expertise for the technical standards, planning, design, construction, renovation, commissioning, post-occupancy review, operation and maintenance of Government owned and funded facilities, as well as partnering with research institutions and industry to develop and introduce new technology.

SERVICES

Using its own resources or through the management of private consultant services, the Branch is a central resource to the Department, providing professional and technical expertise in a variety of building related disciplines. It is also responsible for establishing, coordinating and maintaining standards for the design and technical performance of buildings and the workplace.

Advisory services and guidance are provided to:

- Capital Projects including:
 - Health Facilities •
 - Learning Facilities and Alternative • Procurement
 - Project Delivery •
 - **Project Services** •
- Properties including:
 - Property Management
 - Property Development •
 - **Realty Services** •
- Other Departments, Boards and Agencies

Generally, services include standards setting, design advice, inspections, investigations, facility condition analysis, trouble-shooting, research, design reviews, specification reviews and general consultation on technical aspects of facility design, construction and maintenance.

A more detailed description is provided in the Section overviews that follow.

The most effective use and maximum value is obtained by introducing the specialist resources at the conceptual stages of a project and retaining the involvement until project completion.

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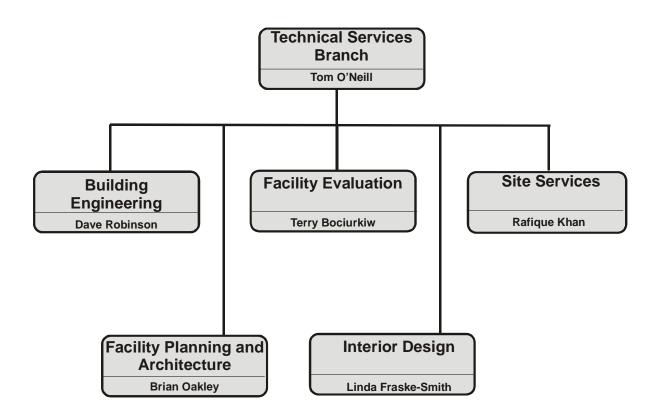
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ORGANIZATION CHART



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BUILDING ENGINEERING SECTION

MANDATE

The Building Engineering Section is composed of five Units and provides specialist expertise in the fields of Acoustics, Energy Management, Electrical and Mechanical.

ACOUSTICS UNIT provides specialist acoustic expertise in support of the acquisition, design, construction, commissioning, operation, maintenance and evaluation of government facilities.

ELECTRICAL ENGINEERING UNIT provides specialist expertise in the electrical engineering discipline related to building systems. Sets electrical technical standards and conducts electrical investigations and design reviews.

ENERGY MANAGEMENT UNIT provides services to facility managers with energy audits, energy monitoring, energy projects and support with utility companies

MECHANICAL ENGINEERING UNIT provides specialist expertise in the mechanical engineering and controls disciplines systems related to buildings. Sets mechanical technical standards and conducts mechanical investigations and design reviews.

STRUCTURAL ENGINEERING UNIT provides structural engineering expertise. Sets structural technical standards and conducts structural investigations and design reviews.

CONTACT

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BUILDING ENGINEERING SECTION (CONTINUED)

ACOUSTICS UNIT

EXPERTISE

- Speech privacy for open-plan and enclosed offices
- Sound transmission of walls, floors, ceilings
- Sound isolating enclosures for audiometric rooms, sound studios and mechanical equipment
- Acoustic properties of materials, such as ceilings, spray-ons and wall panels
- Acoustic design of interior spaces including classrooms, interview rooms, gymnasiums, courtrooms, auditoria, pools, cafeterias, and nursing stations
- Classroom Acoustics
- Occupational Health and Safety noise assessment
- Fire alarm audibility assessment
- Mechanical noise analysis and control
- Impact sound isolation
- Vibration severity of mechanical equipment
- Floor vibration for sensitive equipment
- Community noise evaluation
- Outdoor noise barriers
- Sound masking
- Sound reinforcement or recording systems
- Assistive listening systems
- Speech intelligibility evaluations

SERVICES

- Investigate acoustic, vibration or sound control problems and provide recommendations for appropriate action and estimate of cost
- Develop and maintain departmental design standards and guidelines for Capital Projects and Health Care facilities
- Provide technical content to Alberta Infrastructure Master Specification
- Provide design assistance to consultants for new construction and renovations
- Review projects throughout their development to confirm that design guidelines, requirements and standards have been considered
- Retain and monitor specialist consultants for the purpose of resolving acoustic problems
- Evaluate and test new products
- Conduct site inspections, testing and verification
- Provide commissioning advice or assistance

CONTACT

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BUILDING ENGINEERING SECTION (CONTINUED)

ENERGY MANAGEMENT UNIT

EXPERTISE

- Monitoring of energy use
- Utility rate structures
- Energy planning and conservation
- Energy related building systems (mechanical, electrical, building envelope)
- Energy systems design, construction, operation and maintenance
- Energy codes
- Utility industry and systems

SERVICES

- Energy audits
- Energy technologies and practices
- Performance standards
- Energy related operation and maintenance
- Energy efficiency projects
- Energy accounting
- Utility contracts
- Forecasting energy costs

CONTACT

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BUILDING ENGINEERING SECTION (CONTINUED)

ELECTRICAL ENGINEERING UNIT

MANDATE

Provides specialist expertise in the Electrical Engineering discipline to all areas of the Department in support of the acquisition, design, construction, commissioning, operation and maintenance of facilities throughout the Province

EXPERTISE

- Service and distribution system and equipment, low voltage (to 750v) and high voltage (to 25kv)
- Emergency and standby power generation systems
- Motor controls and control equipment, including line and reduced voltage starters, variable frequency drives, control panels and PLC controls
- Computer power supplies, including filtering, surge suppression and UPS systems
- Electric lighting systems, including lamps, ballasts and luminaires
- Fire alarm systems, both hard wired and multiplex
- Nurse call and Medic Alert systems
- Alarm systems including perimeter intrusion and internal security
- Video and television systems, including closed circuit, security and master antenna/cable systems
- Electrical communications systems, including public address and intercom
- Computer and integrated voice/data wiring systems
- Code requirements for electrical systems

SERVICES

- General technical advice
- Design advice and document review
- Trouble shooting and problem solving
- Maintenance advice and standard maintenance contracts
- Electrical product testing and advice
- Site inspection, testing and verification
- Design standards and guidelines
- Alberta Infrastructure Master Specification technical content
- System master planning, evaluation and maintenance planning
- Engineering studies, calculations and reports
- Short circuit and fault duty analysis.
- Overcurrent protection co-ordination.
- Utility rate and power consumption analysis
- Load profile, control, demand and power factor analysis.
- Power quality monitoring and analysis.
- Lighting system measurements and evaluations.
- Fire alarm system evaluations, audits and verifications.
- Door control and intercom system analysis.

CONTACTS

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BUILDING ENGINEERING SECTION (CONTINUED)

MECHANICAL ENGINEERING UNIT

MANDATE

Provide mechanical engineering expertise to all areas of the Department in support of the acquisition, design, construction, commissioning, operation and maintenance of Government owned and funded facilities.

EXPERTISE

Mechanical systems and equipment in all types of building facilities:

- heating
- cooling
- ventilation
- controls
- plumbing
- fire protection
- specialty

Commissioning of mechanical systems including:

- facility start up
- operation and maintenance manuals
- operator familiarization

Energy management control systems (EMCS):

- hardware
- software
- commissioning

Environmental issues

- refrigerants (CFC's)
- halons
- indoor air quality

Project planning and budget preparation for mechanical work

SERVICES

- Provide mechanical engineering and commissioning advice and guidance.
- Develop and update guidelines, requirements and standards for the design and commissioning of mechanical systems.
- Assist project management with the development of project scope and cost during the initial planning phases.

- Review projects throughout their development period, at intervals consistent with the risk involved, to confirm design guidelines, requirements and standards.
- Update mechanical technical content in the Master Specifications
- Write technical articles to communicate requirements or strategies developed by the Section
- Review and interpret codes applicable to mechanical systems
- Investigate and analyze problems with mechanical systems including recommendations for corrective action and estimate of cost.
- Review maintenance and retrofit projects to determine the feasibility and value added
- Evaluate and report on new mechanical systems and equipment
- Evaluate and report on new control systems
- Establish standards for control systems software
- Provide engineering support to property management in the operation and maintenance of mechanical systems including energy conserving strategies and environmental issues

CONTACTS

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Health Allan Foo, P. Eng. Telephone: (780) 422-7413 E-mail: <u>allan.foo@gov.ab.ca</u>

Controls Roman Unyk, P. Eng. Telephone: (780) 422-7413 E-mail: roman.unyk@gov.ab.ca

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BUILDING ENGINEERING SECTION (CONTINUED)

STRUCTURAL ENGINEERING UNIT

MANDATE

Provide Structural engineering expertise to all areas of the Department in support of the acquisition, design, construction, commissioning, operation and maintenance of Government owned and funded facilities.

STRUCTURAL EXPERTISE

- Foundation systems, slab on grade
- Cast-in-place concrete structure (reinforced and post-tensioned)
- Precast concrete structures (reinforced and prestressed)
- Underground structures (including waterproofing)
- Water reservoirs
- Retaining walls
- Structural steel and custom steel fabrications
- Light gauge steel framing
- Metal decking/cladding
- Masonry
- Timber structures, including glulam
- Structural loads due to use, occupancy, climate, earthquakes, materials storage, etc.
- Parkade restoration and protection
- Corrosion control
- Corrosion of post-tensioning systems
- Concrete durability
- Concrete repair
- Demolition
- Preservation and restoration of structures, including historic structures

STRUCTURAL SERVICES

- Procurement and management of structural and geotechnical consultant services
- Design standards and guidelines
- Alberta Infrastructure Master Specification technical content
- Design review and assistance
- Construction inspection
- Structural investigations
- Evaluation of structural systems
- Monitoring of deteriorating structures
- Loading assessments
- Research
- Feasibility studies
- Resolution of structural construction problems
- Assistance in resolution of construction disputes
- Advice on design and construction of complex structures and of structures subject to unusual loads or conditions
- Advice on the upgrading of structures
- Solutions to underground leakage problems
- Demolition advice
- Preservation, restoration, and renovation advice
- General technical advice

CONTACT

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FACILITY EVALUATION SECTION

The Facility Evaluation Section is composed of three units:

- Facility Evaluation
- Preventive Maintenance
- CAD/ GIS and Records

MANDATE

- Facilitate maintenance planning through the development and operation of the electronic evaluation module of the Building and Land Infrastructure Management System (BLIMS) for owned and supported buildings. BLIMS provides easy access to basic building information, pictures, condition information, functional information, deferred maintenance, and recommendations to remedy deficiencies.
- Manage annual facility evaluation program for owned buildings, schools, post secondary institutions, health facilities and social housing.
- Establish facility evaluation standards and methodology; provide training to consultants and evaluation module users.
- Develop and report on facility condition performance measures.
- Provide information to assist the Department with multi-year maintenance planning, strategic planning, disposition/acquisition planning and capital project planning.

EXPERTISE

- General and specialized facility assessments
- Long and short term maintenance planning
- Building code and standards
- Building repair, maintenance and capital upgrading
- Barrier free access requirements

SERVICES

- On-site reviews with users and property managers.
- Identify and rate energy use, environmental concerns, safety and other items related to performance of facilities.
- Facility evaluations rate condition of critical building components, building systems and whole building.
- Evaluation Module (RECAPP) software training.
- Review compliance with the Alberta Building Code and other standards.
- Assist with coordinating maintenance with ongoing or planned capital development
- Life cycle maintenance planning.

CONTACT

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FACILITY EVALUATION SECTION(CONTINUED)

PREVENTIVE MAINTENANCE UNIT

MANDATE

Provides effective services to facility managers to prepare, implement and monitor preventive maintenance management systems.

EXPERTISE

- Preventive Maintenance Standards
- Preventive Maintenance planning and implementation
- Predictive Maintenance
- Operating and Maintenance Manuals
- Facility Maintenance System (FMS) software.
- Operating codes and standards

SERVICES

- Operation and maintenance manual library.
- Prepare preventive maintenance manuals (52 weeks and basic) that are easy to use and understand.
- Prepare contract documents for tendering preventive maintenance work.
- Training for site personnel on the tasks and procedures to be used in the preventive maintenance program (FMS and manual)
- FMS software training and online support
- Site visits and record reviews (drawings, O&M manuals, technical literature and facility evaluation reports) to assess design intent, operating procedures and control strategies
- On-site review of preventive maintenance practices and records. Reporting with recommendations to optimize operations
- Develop preventive maintenance standards that are consistent with current technology
- Provide benchmark and audit process guidelines for facility managers.

CONTACT

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CAD / GIS AND RECORDS UNIT

MANDATE

Prepare and maintain site plans and site records. Provide CAD standards, computerized drafting services and support of departmental graphics database applications.

EXPERTISE

- Computer assisted drafting and information systems resources
- Geographic Information Systems
- Mapping
- Aerial Photography
- Survey and legal land description
- GPS and integration of GPS with GIS
- Building Information Modeling (BMI) software

SERVICES

- Prepare and maintain site records for Infrastructure owned and administered properties.
- Compile and maintain property ownership and leasing site plans and mapping for the Calgary and Edmonton Transportation and Utility corridors.
- Compile mechanical "as-built" drawings for existing buildings
- Drafting services / GIS
- Fuel Tank Registration
- Tracking of Municipal Agreements, Local Improvements, Joint Venture and other Agreements.
- Interpret or plot legal land descriptions
- Publish GPS point databases of owned and leased lands and buildings and/or publish field collected GPS points and tracks to existing and new maps

CONTACT

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FACILITY PLANNING AND ARCHITECTURE SECTION

MANDATE

The Facility Planning and Architecture Section provides leadership and expertise in promoting advanced architectural planning, design, materials and technologies for the development, maintenance and operation of world-class building facilities.

BUILDING ENVELOPE UNIT conducts investigations and provides specialist expertise to obtain walls, windows, skylights and roofs that function well and are cost effective for the life of the building.

BUILDING ENVIRONMENT UNIT provide specialist expertise in architectural and related subject areas of building materials, indoor air quality, hazardous materials, environmental assessments, occupational health and safety, accessibility, building and fire codes.

EXPERTISE

- Architectural project objectives and terms of reference to achieve quality design. Participate in consultant selection and interviewing processes. Contribute to project programming , planning and siting through charrette, the design process and milestone submittal reviews
- Detailed knowledge of advanced building design and technology to enable effective achievement of the required functionality, scope and quality in construction, renovation, upgrading, and rehabilitation projects.
- Architectural design and planning of advanced building facilities, including: productivity, daylighting, LEED compliance, integrated design, evidence-based design, advanced materials, healthcare and education facilities, safety and security design for specialized facilities (e.g. correctional centres), life-cycle value in design.
- Professional advocacy to the AAA and RAIC including: recognition programs, awards and publication; representation of accomplishments and research findings.
- Professional Practice Resource for: fair and ethical practice, fees and conditions of engagement and dispute resolution and mediation

SERVICES

- Design standards, guidelines and policies in the Architectural discipline.
- Manages content of standards related to the planning and architectural components of building projects.
- Manages research and promotes advanced design and operational technologies for complex owned and funded facilities, including: courthouses, correctional centres, healthcare facilities, schools, post-secondary institutions, laboratories and research centres.
- Coordinates an integrated approach to innovation and technological advancement in owned and funded building facilities
- Manages budgets for research and pilot projects.
- Manages risks of adopting new technologies through benchmarking, documenting performance and developing related departmental standards.
- Coordinates technical input on Public Private Partnerships (P3) projects and other alternative service delivery models
- Provides code analysis to ensure safe facilities complying with the new objective-based Alberta Building Code being introduced in 2006, including guiding advances in security, fire safety and accessibility of buildings, and analyzing innovative equivalencies for compliance.
- Transfers technology to stakeholders and industry through collaboration, design charettes, value engineering, education and guidance.

CONTACT

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FACILITY PLANNING AND ARCHITECTURE SECTION (CONTINUED)

BUILDING ENVIRONMENT UNIT

EXPERTISE

- Materials, products and systems performance
- Asbestos abatement
- PCB, lead, mercury, radioactive products, chlorofluorocarbons (CFCs) and WHMIS regulated chemicals investigations
- Mould investigations and remediation
- Site remediation
- Indoor air quality
- Barrier-free accessibility
- Building and fire code applications

SERVICES

Hazardous Materials Services

- Provides hazardous materials management services in Government occupied space.
- Conducts procedural workshops for Infrastructure personnel that must come into contact, through their work, with hazardous materials.
- Develop and maintain records of known hazardous materials in Government facilities.
- Maintain good operational communications with PAO, Workplace Health and Safety, (Alberta Human Resources and Employment), Regional Health Authority, Risk Management, Departmental Safety Officers and Municipal equivalencies, to ensure consistency of policy and procedures relative to hazardous materials management.
- Recommend direction of policy for and in relation to hazardous materials.
- Provides technical input to Infrastructure Master Specification.

Building Fabric

- Investigate performance problems of building materials and systems.
- Set standards for expected performance.

Environmental Services

- Respond to Alberta Infrastructure requests for environmental assessments and investigations.
- Assist in managing environmental consultants in conducting environmental assessments.
- Investigate indoor air quality problems.

Code and Regulations Services

- Advice on the interpretation of the Alberta Building and Fire Safety Codes, and Occupational Health and Safety Regulations as they relate to architectural, occupational health and safety, barrier free, and fire safety issues.
- Assist in the preparation of fire safety plans.
- Assist with Building and Fire Code reviews.

CONTACT

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FACILITY PLANNING AND ARCHITECTURE SECTION (CONTINUED)

BUILDING ENVELOPE UNIT

BUILDING ENVELOPE EXPERTISE

The Building Envelope Unit offers:

- Problem investigation and resolution for existing buildings.
- Design and construction guidelines, recommendations and advice for new designs, additions and renovations.
- Material assessments to establish acceptability.
- Utilization of research in practical ways.

BUILDING ENVELOPE SERVICES

Many problems can be avoided through timely involvement of specialist expertise. Involving Building Envelope Unit early in the design process is most effective in preventing concerns.

Envelope assemblies, if defective, allow uncontrolled flow of air, water and heat. Obvious signs of defects are water stains, condensation, frost, efflorescence, material degradation, mold and mildew, occupant discomfort, high energy use and various health and safety concerns. Hidden problems, if left unattended, can lead to more expensive repairs in the future.

• Investigate envelope problems and recommend appropriate action Establish design guidelines for envelope assemblies

- Retain and manage specialist consultants to assist in the resolution of envelope problems
- Coordinate in-house roofing expertise
- Provide technical content for Alberta Infrastructure Master Specifications.
- Prepare envelope master details
- Provide design assistance to consultants for new buildings and retrofits. Present alternate solutions and help to determine which is the most appropriate
- Provide construction inspection assistance
- Evaluate the interrelationship of envelope and other building systems so that they work in conjunction with one another
- provide clinics to designers, contractors and operators to ensure technology and theory is understood by these groups
- Maintain centralized source of building envelope information

CONTACT

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INTERIOR DESIGN SECTION

MANDATE

Provide expertise in the Interior Design discipline to all areas of the Department in support of the acquisition, design, construction, operation and maintenance of Government owned and funded facilities throughout the province.

EXPERTISE

Staff has experience and expertise in:

- General Purpose Office Space, Healthcare and Housing Facilities, Schools and special use facilities.
- Interior finish products.
- Interior systems: furniture, walls, millwork, etc.
- Space planning and utilization that enhances the function and quality of interior spaces.
- Barrier-free considerations.
- Ergonomics

SERVICES

- General and specialized technical advice.
- Selection of materials and finishes to appropriately convey the design concept, and to meet functional, maintenance, life-cycle performance, environmental, and safety requirements.
- Develop and maintain departmental design standards, guidelines and policies.
- Provide technical content to the Master Specifications.
- Review projects throughout their development to confirm that design guidelines, requirements and standards have been considered.
- Encourage the principles of environmental sustainability in design.
- Provide space planning feasibility studies.
- Assist with the development of project scope and cost during initial planning phases.
- Investigate and analyze problems and recommend solutions.

- Retain and monitor design consultants
- Provide project management services
- Research and evaluate furnishings and interior finishes.
- Research new and innovative ways of utilizing space.
- Evaluate and test new products
- Maintenance of a reference library of product catalogues, material samples and related technical literature.

CONTACT

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SITE SERVICES

MANDATE

Provide professional and technical support related to municipal engineering, site development, and landscape projects and programs for Government owned and funded facilities.

EXPERTISE

Site Services staff has experience and expertise in the following areas:

- Water distribution systems
- Water wells (development, licensing)
- Water treatment (chlorination, filters)
- Water reservoirs
- Sanitary sewer systems
- Sewage lift stations and lagoons
- Small sewage treatment systems
- Storm sewer systems
- Storm water management
- Tunneling for utility crossings
- Geotechnical
- Environmental Site Assessment (ESA Phase 1)
- Municipal service agreements
- Floodplain Assessments
- Fuel storage and piping systems
- Chain link fencing
- Security fencing and systems for Correctional Centres
- Erosion control
- Roads
- Parking lots
- Concrete (sidewalks, curbs)
- Paving stones
- Pedestrian trails
- Trailers and portable classrooms
- Legal surveys and legal plans
- Landscape Development:
 - Exterior and interior landscaping
 - Site upgrades and restoration
 - Soft and hard landscaping
 - Plant selections
 - Tree and site landscape evaluations
 - Topsoil, sodding and site grading
 - Seed selection and applications
 - Irrigation systems
 - Grounds maintenance
 - Horticulture

SERVICES

- Assist in the selection of new sites by assessing servicing needs and costs and advise on potential flood, environmental, geotechnical and access issues.
- Establish site and landscape design guidelines.
- Update site and landscape Master Specifications.
- Provide advisory services related to new municipal engineering, site development and landscape projects. Prepare scope of work, establish budgets, assist in consultant selection, negotiate consultant agreements, review contract documents, and respond to construction issues.
- Evaluate condition of existing site and landscape infrastructure, recommend solutions and provide cost estimates.
- Provide site and landscape design reviews on building projects.
- Complete tree assessments.
- Assist with landscape grounds maintenance and snow removal contracts.
- Update the "Manual for Maintenance of Grounds".
- Provide advisory services related to moving and providing trailers.
- Manage legal surveys and assist with right-of-ways.
- Review easement documents.
- Review local improvements.
- Prepare property disposition reports.
- Assist in the development of municipal service agreements.

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