BRITISH COLUMBIA
The Best Place on Earth

Ministry of Transportation and Infrastructure

CONSTRUCTION AND REHABILITATION COST GUIDE

November 2013

CONSTRUCTION AND REHABILITATION COST GUIDE INDEX

INTRODUCTION

This booklet provides the reader with a construction cost guideline for new construction and rehabilitation work based only on recent historic costs. The user of this booklet must realize that the comparative costs for the construction work is determined by many components related to design, planning, project management, engineering, property acquisition, construction, environment, corporate services, materials, location, trends and construction methods which can all vary widely throughout the Province. Unless otherwise stated, this booklet excludes property acquisition, planning and evaluation, surveys, supervision, traffic management, utilities, defaults. Where possible, we have provided for the reader a range of cost values from the lowest tender, or from the construction value, for various types of construction and rehabilitation work.

This booklet edition is the first edition to approach *"actual" total calculated projects costs* through the project multiple stages listed as planning, project management, engineering, and construction, others as applicable. All previous editions approached the project's cost estimate only based on the Contractor lowest bid alone with other estimated contingences or estimated miscellaneous cost. The team tried their best to approach different Ministry departments and Ministry financial systems to reach the total calculated cost. Having said that there is still a chance that some associated costs were not able to reach and this might increase final cost. This should not be of a substantial risk. The team still trust that this edition is by far the closest to the actual project cost compared to any other edition issued in the previous years. With more effort and knowledge transfer in the future, the accuracy will be much improved.

CONCRETE BARRIER COSTS

Costs are shown in 2013 $'s

Concrete Roadside Barrier (CRB - 690mm)
average cost to supply and install $185/m
Shoulder preparation (supply material, haul and place)
average cost ..... $145/$m^2$
Concrete Median Barrier (CMB - 810mm)
average cost to supply and install $340/m
Concrete Transition Barrier (CTB - 690mm to 460mm)
average cost to supply and install $270/m
Concrete Drainage Barrier (CDB – 690mm)
average supply and install $400/m
Concrete Bull Nose (CBN – 460mm)
average cost to supply and install $150/m
Bridge Parapet Transition (BPT – 810mm)
average cost to supply and install $380/m

BRIDGE STRUCTURE COATING

Costs are shown in 2013 $'s

Major structures Recoating - Lions Gate (2004 - 2006)

cost ..... $24.2 million ($300/m^2)

Truss coating - Ingram Bridge (2005)

cost .....$582,000 ($400/m^2)

BRIDGE DECK RESURFACING COSTS

Deck Resurfacing-high performance concrete overlay

Region 1 ……$600-$1,000/m^2
Silica fume modified high performance concrete

Region 2 ..... $700 - $1,000/m2
Silica fume modified high performance concrete
Region 3 ..... $600 – $1,100/$m^2$
Hot applied rubberized asphalt membrane… $600/$m^2$
Costs can vary due to the following:

- Size of structure
- Grouping of structures
- Percentage of partial and full depth deck repairs
- Complexity of traffic management
- Remoteness of bridge site

Note: Associated Ministry Estimates are included

STRUCTURE CONSTRUCTION COSTS

(Based on bridge deck surface area)

Costs are shown in 2013 $'s

Low level River Crossings and Road Overpass Crossings:

Regions 1, 2 ..... $2,200 - $4,200/$m^2$

Region 3 ..... $2,100 - $3,400/$m^2$

High level River Crossings:

Regions 1, 2 ..... $2,700 - $4,300/$m^2$

Region 3 ..... $3,800 - $6,000/$m^2$

Low Volume Road

Creek Crossings ..... $2,200 - $3,200/$m^2$

Note: On replacement bridge projects, the above costs are based on structure cost and include mobilization, traffic management & quality management where applicable. Demolition of existing bridge is not included.

Different bridges across the regions were analyzed in the recent years and the bridges components unit rates were compiled together with the associated traffic and quality management costs, together with other bridge items.

Structure Examples

Hwy 52N 26 KM South of Junction W/Hwy97 (Brassey Creek)

Award Date: August, 2012

Completion Date: June, 2013

Northern Region

Design build contracts for the design and construction of a new bridge at Brassey Creek on Highway 52 including approx. 500 metres of road and approaches and the upgrading of the alignment to 90 km/hr from the existing 80/km hr and the design and construction of a multi-plate arch on piled foundations over Buffalo Creek on 206 Road and the reconstruction of the rural gravel road approaches.

project management	$93,500
engineering	$123,400
construction	$4,539,800
environment	$25,400

Total calculated costs $4,782,100

Pacific Marine Circle Route – Upper Harris Bridge Replacement Structure No. 3187:

Award Date: April, 2012

Completion Date: September, 2012

South Coast Region

The bridge replacement includes mobilization, traffic management including detour and temporary bridge, demolition, and removal of existing bridge, foundations excavation and bridge end fill placement, excavation for and placement of geo textile and rip rap, supply and installation of pre-stressed single cell box stringers and concrete roadside barriers, construction of cast-in-place concrete for parapets, abutments, wing walls, and approach slabs, construction of roadway approach including asphalt pavement, environmental and quality management.

Costs are shown in 2013 $'s

project management	$31,300
engineering	$214,000
construction	$1,982,700
Miscellaneous associated costs	$10,000

Total calculated costs $2,238,000

Highway No. 1 Donald Bridges and Approaches

Award Date: January, 2011

Completion Date: December, 2012

Southern Interior Region

The project includes the construction of four lanes, 302 meter long structure with steel girder superstructure over the Columbia river, four lane 128 meter structure, with steel girder superstructure over the Canadian Pacific Railway mainline, upgrade and realign Highway 1 to two lanes in each direction, with median and shoulders, right turn only intersections. Protected left intersection, paving, aggregate production, and traffic and quality management.

Costs are shown in 2013 $'s

planning	$82,900
project management	$781,600
engineering	$7,691,600
property acquisition	$411,600
construction	$48,321,500
environment	$346,400
*associated costs	$2,164,900
Total calculated costs	$59,800,500

*(Maintenance, Stakeholder, Corporate service, Administration)

Swan Lake Bridge No. 7140 Replacement

Award Date: August, 2010
Completion Date: December, 2010

Northern Region

The project includes replacing the existing 29.5m timber bridge and replaces with a 30m 3 span bridge consisting of timber superstructure and a steel and timber sub-structure. Includes a bicycle rail and approach tie-ins to the new bridge (30m x 8.5m) 255m^2

Costs are shown in 2013 $'s

grade construction	$3,700
bridge construction	$1,372,000
*associated costs	$401,000

Total calculated costs $1,776,700

*(Mobilization, Traffic management, Site modification)

INTERCHANGES

Costs are shown in 2013 $'s

Rural Interchange

A diamond, multi-plate underpass, minimum design standards

Cost range ..... $4,400,000 - $8,800,000

Urban Interchange

A diamond, partial cloverleaf, trumpet, or directional interchange, concrete structures, high pipe underpass.

Cost range ..... $22,750,000 - $36,500,000

McTavish Interchange

Award Date: April, 2010

Completion Date (main contract): June, 2011

South Coast Region

Located on Highway 17 at McTavish Road, North Saanich

Work consisted of:
Layout of work, quality management, erosion control, traffic management, retaining wall construction, modification and installation of new and existing storm sewers and water main, type D excavation, supply and install signs, new sidewalk, curb and gutter, fence construction, supply and install of concrete barrier, construction of piling, reinforced concrete foundations, abutments, columns, superstructure and decks for roadway and pedestrian structures

Costs are shown in 2013 $'s

planning	$214,100
project management	$488,800
engineering	$3,319,200
construction	$19,763,879
associated and miscellaneous	$248,100

Total calculated costs $24,034,079

Hwy 91A Queensborough Interchange North end of the Queensborough Bridge - Marine Way Flyover – Lower Mainland

Award Date: April, 2007

Completion Date: October, 2008

Work consisted of:

Single steel span pedestrian bridge. Six span pile foundation concrete viaduct. Concrete bridge demolition, grading, drainage, paving, electrical, traffic signals, signs, landscaping pavement markings.

South Coast Region

Conventional contracting methods unless otherwise noted.

Costs are shown in 2013 $'s

contract cost	$21,250,000
contingencies	$1,209,000
engineering	$2,411,400
ministry materials	$60,500
miscellaneous	$516,600
utility relocation	$165,000

Total calculated costs $25,612,500

Squamish Nation Pedestrian Overpass

Award Date December 2011

Completion Date: May 2012

South Coast Region

Work consisted of:

Construct a pedestrian overpass and approach ramp over Highway 99 and the CN Rail right-of-way, connecting Squamish First Nation land on either side. The project includes the construction of mechanically-stabilized earth (MSE) walls. Approx area: 211m^2

Costs are shown in 2013 $'s

project management	$241,800
engineering	$777,900
construction	$2,068,600
other associated and miscellaneous	$103,400

Total calculated costs $3,191,700

CURB AND GUTTER CONSTRUCTION COSTS

Costs are shown in 2013 $'s

2-Lane Highway..... ....$112/m

..*(Includes remove/dispose asphalt pavement)* ……$248/m

4-Lane Highway..... .....$112/m

Slip form only. When Curb and Gutter work includes different aspects such as landscaping, utility work or electrical work the cost per metre will vary depending on the additional work

SIDEWALK COSTS

1.5m wide concrete sidewalk ..... $67 m^2

1.8m wide concrete sidewalk ....$77 m^2

Sidewalk costs do not include such things as: remove and dispose of existing sidewalks, new driveway letdowns, and other work such as landscaping, utility work, will vary the cost per sq. metre depending on these additional works.

FENCING COSTS

Costs are shown in 2013 $'s

Standard Wire Fence

Average cost for fencing

Type A, B, or C range fence, wire fabric or barbed wire, mixed wood and steel posts

Type A, B wire fabric.....$26-$40/m

Type C barbed wire..... $15-$21/m

Type D chain link..... .....$98-$129/m

Wildlife Exclusion Fencing

2.4 m high heavy gauge Paige wire, mixed wood and steel posts.

Flat to rolling terrain with no rock outcroppings

cost ..... $38-$48/m

Rocky conditions where drilling and metal posts are required

cost ..... $83-$93/m

Note: Fencing costs shown are per side of highway. Contractor supplied material and labour costs included.

Bridge Sidewalk Fencing

Costs are shown in 2013 $'s

	Qty	Avg Price	Award Price
*2 Rail Sidewalk Fence (2008)	36	$253	$173
**3 Rail Sidewalk Fence (Galvanized) (2010)	113	$190	$200
**3 Rail Sidewalk Fence (Black) (2010)	123	$204	$203

*2 Rail Fence: Hwy 1 Stocking Creek 16198-0001(May 2008)

**3 Rail Sidewalk Fence: SS 2009 – Amendment (SS741-07-01) McTavish Interchange 04338-0001 (Apr 2010)

The numbers reflected above are based on different quantities and market conditions for each identified year.

GRADING CONSTRUCTION COSTS

Costs are shown in 2013 $'s

2 - Lane Low Volume Road Construction:

Easy Conditions..... $542,000 - $867,000/km

Moderate Conditions.....$867,000 - $1,032,000/km

Difficult Conditions.....$1,032,000 - $2,166,000/km

Very Difficult Conditions..$2,166,000 - $3,250,000/km

2 - Lane High Volume Road Construction:

Easy Conditions.....$867,000 - $1,516,000/km

Moderate Conditions.....$1,516,000 - $2,703,000/km

Difficult Conditions.....$2,703,000 - $3,250,000/km

Very Difficult Conditions..$3,250,000 - $5,158,000/km

4 - Lane High Volume Road Construction:

Easy Conditions.....$1,547,000 - $2,837,000/km

Moderate Conditions.....$2,837,000 - $3,611,000/km

Difficult Conditions.....$3,611,000 - $5,158,000/km

Very Difficult Conditions..$5,158,000 - $10,832,000/km

Note: The above range of costs for highway construction include construction, engineering, materials supplied by MOT, miscellaneous and utility relocation but does not include engineering design or property acquisition

Grading examples

Trans Canada Highway No. 1 Monte Creek to Pritchard Four Laning - Phase 1, Grading and Paving

Award Date: August 2011

Completed: October 2012

Southern Interior Region

3.16 km (12.64 lane km)

Work consisted of:

The Work includes: roadway and drainage excavation (154,000 m3 Type D; 80,700 m3 Type A), granular materials (51,898 m3), asphalt paving (22, 185 t), drainage works, waterline, signing & precast concrete box and barrier construction.

Costs shown in 2013 $'s

planning	$104,000
project management	$74,200
engineering	$2,725,300
construction	$8,665,300
corporate services	$407,500
property acquisition	$6,284,200
environment	$3,899,200
miscellaneous	$19,800

Total calculated costs	$22,179,500
Cost per lane km	$1,754,700

Highway 97 Plett Road to Stone Creek, Bridge Construction and Four Laning

Award Date: February 2010

Completed: March 2011

Northern Region

8 lane km

Work consisted of:

New bridge and four lane construction on Highway 97 from Plett Road to Stone Creek Bridge. Approximately 2 kilometers of 4-lane highway construction, 2 intersections, bridge and approaches. Utility pole moves, property acquisition, creek channelization and riprap, gravel crushing, waste disposal management.

Costs shown in 2013 $'s

contract cost	$12,802,000
ministry materials	$21,200
miscellaneous	$221,800
utility relocation	$123,400

Total calculated costs	$13,168,400
Cost per lane km	$1,646,100

Highway 99 NB Shoulder Bus Lane – KGB to Hwy 91 MD

Award Date: September 2010

Completed: October 2010

South Coast Region

Work consisted of:

Cold milling and inlaying of deteriorated asphalt pavement, fine grading of newly constructed shoulder bus lane, new asphalt paving and asphalt overlay.

Costs are shown in 2013 $'s

planning and project management	$169,800
engineering	$2,787,600
construction	$16,427,500
other associated and miscellaneous	$414,300

Total calculated costs $19,799,200

Highway No. 22 Minto Road Intersection Improvements

Award Date: September 2012

Completed: October 2012

Southern Interior Region

Work consisted of:

Quality management, traffic management & control, survey layout, install & maintain C-035 & C-035 EOP's, aggregate production, asphalt mix design for class 1 (1600) medium mix, clearing & grubbing, cold milling 50mm, removals, supply & install drainage components, grading, asphalt pavement for class 1, 16mm medium mix, construct integral asphalt curb and islands, supply and install new CRB, supply & apply joint sealant, signing, pavement & thermoplastic markings, site cleanup and restoration.

Costs are shown in 2013 $'s

project management	$2,300
engineering	$77,400
construction	$2,006,900
environment	$1500
corporate services	$32,300
administration	$5,000

Total calculated costs $2,125,400

HWY 1 Clanwilliam Overhead No. 0354 Replacement

Award Date: June 2011

Completed: November 2011

Southern Interior region

Work consisted of:

Construction of a new Clanwilliam Overhead No. 0354 over the Canadian Pacific Railway mainline consisting of two parallel two lane, three span structures and including: supply and construction of a mechanically-stabilized earth (MSE) abutment retaining wall, cast in place abutments, steel girders and cast in place deck. Upgrading of Hwy No. 1 to two lanes in each direction with median. Includes clearing and grubbing two new (MSE) retaining walls, type D and type A excavation, grade and embankment construction and paving.

Costs are shown in 2013 $'s

planning	$114,600
project management	$413,700
engineering	$3,954,600
construction	$21,962,100
corporate services	$1,096,300
environment	$276,200
other	$168,300
Total calculated costs	$27,985,800

Mile 10 Passing Lane

Award Date: June 2012

Completed: September 2012

Northern Region

Work consisted of: Construction of a 2km northbound passing lane approximately 15 km north of Dawson Creek. The project scope also includes improvements to Farmington intersection.

Costs are shown in 2013 $'s

planning	$31,000
project management	$228,700
engineering	$438,400
construction	$1,670,600
contract administration	$8,600
Total calculated costs	$2,377,300

GROOVED RUMBLE STRIPS

Costs are shown in 2013 $'s

Grooved rumble strips are on the paved shoulder of the road. Generally 8-10 mm deep with a 300 mm radius by 140 mm wide, 300-400 mm apart.

average cost including traffic control:

shoulder..... $595 /lin. km

centre line with median barrier…..... …….$632 /lin. km

double solid centre line..... $667 /lin. km

(lin. km = linear kilometre)

LANDSCAPE ESTABLISHMENT COSTS

Rural Standard

Primarily the grading of existing soils, seeding to rough grass and naturalized/functional plantings; limited use of imported soils, decorative plants and bark mulch; usually no irrigation.

Suburban Standard

A mix of rural and urbanized conditions entailing significant use of imported or amended soils, seeding to mowed grass, upgraded planting and irrigation of shrubs and trees.

Urban Standard Landscaping

A more developed, premium level of landscaping with imported topsoil, significant plantings and bark mulching and/or aesthetic hard surfacing, seeding or sodding to lawn grade grass, and irrigation as required.

To clarify the parameters of the costs noted below:

Costs shown in 2013 $'s

The costs have been based on projects encompassing several hectares, but actual values may be highly variable

Landscape items: include supply and planting costs

unirrigated grass ..... ……..$9.8 - $12/$m^2$

irrigated lawn..... …..$21 - $23/$m^2$

irrigated lawn with boulevard trees $29.4 - $34.6/$m^2$

unirrigated plantations……..$23 - $29.4/$m^2$

irrigated plantations..... …… $41 - $59/$m^2$

decorative stamped concrete/pavers $87 - $98.5/$m^2$

hydroseeding ..... …..$0.77 - $0.88 m^2

Hydroseeding –including base per/ha material application rates of 1,500kg mulch, 40kg tackifier, 75kg standard seed mix, and 300kg standard fertilizer

Note: The above landscape establishment costs, with the exception of general hydroseeding, usually includes a one year maintenance agreement, which is typically a standard requirement for MoT Landscaping Projects.

PAVEMENT REHABILITATION COSTS

Costs are shown in 2013 $'s

Hot Mix Paving overlay 50mm (minimal base repair)			
Overlay Width	Life Expectancy	Cost / lane km	Average
Overlay width 1 Lane only	15+years	$103,700 - $138,750	$120,700

Pavement Rehabilitation (continued)

Mill and Fill (50 mm) (The recycled asphalt pavement is stockpiled locally)			
	Life Expectancy	Cost/ lane km	Average
1 Lane	15+ years	$127,000 - $173,500	$150,000

Costs are shown in 2013 $'s

Hot In Place Recycle with Add Mix and rejuvenating agent (50 mm depth)			
	Life Expectancy	Cost/ lane km	Average
1 lane	9-11 years	$52,000 - 60,000	$56,000

Milling & Placement of Milling on Side roads (50 mm depth)		
	Life Expectancy	Cost/ lane km
1 lane	7-10 years	$64,500

Costs are shown in 2013 $'s

Pavement Rehabilitation (continued)

Surface Treatments			
	Life Expectancy	Cost / One lane km	Average
Single Graded Aggregate Seal	3-7 years	$20,600 - $27,000	$23,700
Graded Aggregate Double Seal	3-7 years	$28,200 - $32,500	$30,300
Microsurfacing	7-11 years	$37,950 - $57,450	$59,300

Note: All the above costs include pavement rehabilitation, project management, Ministry of Transportation site supervision, centre line marking, geotechnical evaluations, construction costs, labor, equipment and materials.

Pavement Rehabilitation examples

Asphalt Pavement SS-502 EPS HWY 3 & 5 Hope Overpass to Nicolum Creek Bridge (38.8 LKMs)

Award Date: April 2012

Completed: July 2012

South Coast Region

Work consisted of:

Cold Milling and inlaying deteriorated sections of pavement, and overlaying with asphalt pavement under SS 502 – EPS

Costs are shown in 2013 $'s

planning	$119,300
project management	$263,200
engineering	$685,400
construction	$3,849,600
other (default)	$14,100
Total calculated costs	$4,931,600
Cost per lane km	$127,103

Hwy 7 Mission Area Resurfacing, Dewdney to Deroche (20.30 Lane Km)

Award Date: July 2012

Completed: October 2012

South Coast Region

Work consisted of:

Increasing the existing pavement condition rating, through addressing the ride comfort and pavement distress by rehabilitating the existing surface thru pavement repairs and a 60mm overlay. Consideration should be given to geometric improvements that can be substantiated, including but not limited to enhancing the paved shoulder width to 1.5m.

Costs are shown in 2013 $'s

planning	$59,400
project management	$151,400
engineering	$353,100
construction	$2,322,200
Total calculated costs	$2,886,100

McBride - Valemount Sealcoating

Award Date: September 2012

Completed: October 2012

Northern Region

Work consisted of:

Sealcoating approx 34 km of candidate side roads in the communities of Dunster and Valemount

Costs are shown in 2013 $'s

project management	$2,400
construction	$1,375,500
associated and miscellaneous	$ 14,500
Total calculated costs	$1,392,400
Cost per km	$41,000

Hot-in-Place Recycling Hwy 5, Valemount to Tete Jaune (39.5 lane km), Avola O/H to Whitewater Bridge (90.0 lane km), (129.5 lane km)

Award Date: March 2012

Completed: September 2012

Northern Region

Work consisted of:

45 km of Hot-in-Place recycling, on Highway 5, between the Avola Overhead and Whitewater River, excluding 6 km Messiter Summit and approximately 18 km of HIPR on Highway 5, between Valemount and Junction of Highway 16 at Tete Jaune. The work to be carried out under the contract generally consists of quality management, survey layout, aggregate production, Hot-in-Place recycled asphalt pavement with admixures, rejuvenating agent, and supply and application of restorative joint seal.

Costs are shown in 2013 $'s

project management	$41,200
construction	$4,735,500
Total calculated costs	$4,776,700

Hot-in-Place Recycling 2011/12, Canyon Drive 520R, (38.0 lane km)

Award Date: August 2011

Completed: October 2011

Northern Region

Work consisted of:

Hot-in-Place Recycle for 19kms (38.0 total lane kms) on Canyon Drive from the Junction Highway 29N in Hudson's Hope to the WAC Bennett Dam.

Costs are shown in 2013 $'s

project management	$154,000
construction	$2,260,200
Total calculated costs	$2,414,200
Cost per Lane km	$63,500

Asphalt Resurfacing Highway 97 Kruger Hill

Award Date: October 2012

Completed: March 2013

Southern Interior Region

Work consisted of:

Hot-in-Place Recycle for 19kms (38.0 total lane kms) on Canyon Drive from the Junction Highway 29N in Hudson's Hope to the WAC Bennett Dam.

project management, administration	$317,310
construction	$2,672,200
Total calculated costs	$2,989,510
Cost per Lane km	$78,700

Asphalt surfacing, Highway 6, Lumby East (19.8 lane km)

Award Date: September 2010

Completed: October 2010

Southern Interior Region

Work consisted of:

The Work to be carried out under the contract generally consists of quality management, traffic management, aggregate production, asphalt mix design, milling and asphalt paving.

costs are shown in 2013 $'s

project management	$11,000
construction	$1,550,300
Total calculated costs	$1,561,300
Cost per lane km	$78,900

RAILWAY CROSSING COSTS

(Two Lane Level crossings are an average of 12m in width)

Costs are shown in 2013 $'s

Level Crossing Surface (Single Track)

- softwood planked ..... $5,500 - $8,000
- paved ..... $8,000 - $10,000
- concrete ..... $12,500 -$16,500
- full depth rubber ..... $13,000 - $20,000

Track Reconstruction for Level Crossings (Not including surface)

- simple reconstruction ..... $10,000 - $13,000
- upgrade rail components ..... $21,000 - $32,000

Underpass Structures (Rail over road, single track)

- 2 Lane Hwy ..... $2,200,000 - $3,000,000
- 4 Lane Hwy ..... $3,000,000 - $4,000,000

Overhead Structures (Road over rail)

- 2 Lane overhead no sidewalk . $3,800 - $5,100/$m^2$

Note: Above structures are based on historical information inflated to 2013 $. Still the complexity of the scope may vary these numbers may result in increase in the cost. The above are with easy conditions

RUNAWAY FACILITIES

Costs are shown in 2013 $'s

Arrestor Bed Type

Coarse gravel arrestor bed; approaching and departing lanes and a service lane..... $485,200 -$810,000

Gravitational Type

Gravitational type runaway facilities consist of a runaway lane terminating in a minimal depth arrestor bed on a steep uphill grade.

When constructed in conjunction with a highway construction project ..... $194,000 – $566,200

NOISE ATTENUATION SYSTEM

Costs are shown in 2013 $'s

Highway 1 McCallum Interchange Noise Barrier – Jackson Street

Award Date: February 2012

Completed: March 2012

Installation of a 270m long and 3m high noise barrier. A pilot project to utilize a wood panel and concrete or steel post noise attenuation system.

contract cost	$366,600
Associated and Miscellaneous cost	$31,000
Total calculated costs	$397,600

RETAINING WALL STRUCTURE COSTS

Costs are shown in 2013 $'s

(Supply and install) Gabion, Lock Block (no Geogrid)
up to 3 courses high (2.25 m to 3 m) ..... $525-750/$m^2$

Lock Block with Geogrid and Geosynthetic
Soil Anchored Retaining Wall $1,000-$1,260/m^2
Binwalls and Greenwalls $1,000-$1,200/m^2
*Mechanically Stabilized Earth Walls $875-$1,260/m^2
(*not economical under 3 m high)

SIGNALIZATION AND LIGHTING COSTS

Costs are shown in 2013 $'s

Electrical Installation Type	Engineering Design Cost	Construction Cost	Annual Power and Maintenance
Urban Traffic Signal	$8,700 - $13,000	$213,300 – $301,100	$3,700 - $3,900
Rural Traffic Signal	$8,700 - $13,000	$188,500 - $251,300	$3,700 - $3,900
Pedestrian Signal	$5,000 -$7,600	$131,530 - $190,000	$2,000
Continuous Lighting *	$3,150 -$4,350	$173,300 - $200,400/km	$4,550 - $6,280/km
Intersection Lighting	$2,500 -$3,800	$14,100 - $27,100 (~$7,000/ lum.)	$265 - $330/lum

Note Continuous lighting costs assumes lighting two lanes with approximately 50m spaced – 250W HPS luminaries