

B510-4 - REMOVAL - DELINEATORS, TRAFFIC BARRIERS AND
ENERGY ATTENUATOR WORK - OPSS 510

510-4.1 GENERAL

This section is for delineator, traffic barrier and energy attenuator removal tender items. The work covered by these tender items includes the removal and disposal, or removal and salvage of materials.

510-4.2 REFERENCES

CDED B510-0 - Removal

510-4.3 TENDER ITEMS

Removal of Delineator Posts
Removal of Cable Guide Rail
Removal of Steel Beam Guide Rail
Removal of Steel Box Beam Barrier
Removal of Anchor Blocks
Removal of Concrete Barrier
Removal of Energy Attenuators
Removal of Ramp Closure Gates

510-4.4 SPECIFICATIONS

Details of removing delineator, traffic barrier and energy attenuator are contained in OPSS 510.

510-4.5 SPECIAL PROVISIONS

The designer should refer to Chapter "E" of this manual to review the special provisions applicable to these tender items.

Include the appropriate special provisions as required.

510-4.5.1 Non-Standard Special Provisions (NSSPs)

Some removal operations may have their own specific requirements, in which case a non-standard special provision may be required to include such information as, limits of removal, removal restrictions, salvage/stockpiling, or other pertinent information.

510-4.6 STANDARD DRAWINGS

Applicable standard drawings are in the OPSD 100 series.

510-4.7 DESIGN

Removals required are dependent upon the specific project requirements as described in CDED B510-0.2 References.

510-4.7.1 Salvage

Barrier rails, channels and guide rail cable in re-usable condition should be considered for salvage.

Salvaging of anchor blocks is to be considered based on the need for reuse on a specific contract. Only precast anchor blocks should be considered for salvage.

Salvaging of energy attenuators in full or in part will depend on the type of system installed and the condition of the individual units. Since these systems are costly, any reusable components should be considered. Concrete pads and back walls associated with the attenuators and end treatments are not salvageable. Modules should be inspected for ultra-violet sunlight deterioration prior to considering salvage.

Precast concrete barrier shall only be salvaged when they have connection systems currently approved for use.

Salvaged materials may be:

- a) Re-used on the same contract
- b) Stockpiled at a location designated by the Ministry

510-4.7.2 Removal

a) Removal of Delineator Posts

The work under this item includes the removal of either delineator or guide posts. These posts can be wood, metal or flexible.

b) Removal of Cable Guide Rail

The work under this item includes the removal of systems regardless of the number of cables exclusive of anchor blocks.

c) Removal of Steel Beam Guide Rail

The work under this item includes systems with single or double rails with and without channel.

d) Removal of Steel Box Beam Barrier

The work under this item includes steel box beam median barriers and steel box beam guide rail systems, exclusive of anchor blocks.

e) Removal of Anchor Blocks

The work under this item includes the removal of concrete anchor blocks associated with cable guide rail and steel box beam barrier systems when they require removal or relocation.

f) Removal of Concrete Barrier

The work under this item includes permanent concrete barrier which can consist of cast in place or precast barrier and the associated concrete pad as specified. This item also includes removal of temporary concrete barrier left in place from a previous contract which is not suitable for reuse.

This item also includes removal of any concrete backfill between back to back barrier at bridge piers as well as barrier transitions. Removal of asphalt surfacing over granular fill, between back to back barriers will be included under its respective item.

If the precast concrete barrier meets the connection requirements for reuse on future projects, then a non-standard tender item for, "Removal and Salvage of Temporary Concrete Barrier", should be requested.

g) Removal of Energy Attenuators

Energy attenuators for removal may include the following:

Crash Cushions:

- Inertial Barrier Modules

- GREAT System
- Connecticut Impact Attenuation System (CIAS)
- Hi-dro System
- Trend End Treatment
- REACT 350
- Quadguard System
- Quadguard Wide System
- Quadguard Extra Wide System
- TAU-II System
- TAU-II Wide System
- TAU-II Extra Wide System
- Smart System
- QuadTrend System
- Box Beam Bursting Energy Absorbing Terminal System (BB-BEAT)

Steel Beam Guide Rail End Terminals:

- Crash-Cushion Attenuating Terminal (CAT-350) System
- Extruder Terminal System
- Sequential Kinking Terminal System
- X-Lite Tangent Terminal System
- Eccentric Loader

The work under this item includes the removal of the complete systems including all hardware, concrete pads, backwalls as well as anchoring devices, and associated anchoring devices.

h) Removal of Ramp Closure Gates

The work under this item includes concrete footings, gates, signs and all associated hardware.

510-4.8 COMPUTATION

Removal of Delineator Posts
Removal of Cable Guide Rail
Removal of Steel Beam Guide Rail
Removal of Steel Box Beam Barrier
Removal of Anchor Blocks
Removal of Concrete Barrier
Removal of Energy Attenuators
Removal of Ramp Closure Gates

These are Plan Quantity Payment (PQP) items.

510-4.8.1 Sources of Information

The main sources of information for these items are Field Note Books, B-Plans, ETR Books, and Contour plans.

510-4.8.2 Method of Calculationa) Removal of Delineator Posts

The unit of measurement for the removal of delineator posts is each.

b) Removal of Cable Guide Rail

Cable guide rail removal is measured horizontally in metres along the centreline of the feature from centre to centre of end anchor blocks with no additional measurement made for overlapping lengths at intermediate anchor blocks.

c) Removal of Steel Beam Guide Rail

The unit of measurement for the removal of steel beam guide rail, temporary transition rails not associated with temporary CATS, transition rails between permanent CATS and concrete barriers, and temporary transitions to existing rigid structures, is by the metre, measured horizontally along the centreline of the feature from end to end of terminal tips.

d) Removal of Steel Box Beam Barrier

The unit of measurement for the removal of steel box beam barrier and rail connections to temporary concrete barrier, is measured horizontally in metres along the centreline of the feature from centre to centre of end anchor blocks with no additional measurement made for overlapping lengths at intermediate anchor blocks.

e) Removal of Anchor Blocks

The unit of measurement for the removal of anchor blocks is each.

f) Removal of Concrete Barrier

The unit of measurement for removal of concrete barrier is by the metre, measured horizontally along the centreline of the barrier from end to end of the installation and/or end treatments. No deductions shall be made for lengths occupied by lighting pole footings and overhead sign structure footings. The

removal of two back to back type B or E1 barriers will be treated as a single installation for measurement purposes, and are only measured once.

g) Removal of Energy Attenuators

The unit of measurement for the removal of energy attenuators is each.

510-4.9 DOCUMENTATION

510-4.9.1 Contract Drawings

Refer to 510-0.9 for general documentation information. Information specific to each tender item is as follows:

a) Removal of Energy Attenuators

The following must also be shown for bidder information in tabular form on the plans:

- The number of Fitch or Energite modules to be removed at each location.
- The number of bays at each GREAT location to be removed.
- The number of steel cylinders including reinforced concrete backwall, with/without reinforced concrete pad, at each CIAS location to be removed.
- The number of bays including reinforced concrete pad and backwall at each Hi-Dro system location to be removed, etc.
- Removal of concrete pad and anchor block in conjunction with Trend End Treatments.

510-4.9.2 Quantity Sheets (Q-sheets)

Refer to 510-0.9 for general documentation information. Information specific to each tender item is as follows:

a) Removal of Delineator Posts

The removal of delineator posts are documented by indicating the station to station limits with the designation right or left of the roadway centreline.

The type of posts (i.e., wood, steel, or flexible) is specified, with the quantity of each type documented in separate columns. The individual column entries are totalled into the tender total and are transferred to Form of Tender.

b) Removal of Cable Guide Rail

Individual removal lengths are documented by station to station limits with the designation right or left of the roadway centreline.

Separate columns are to be used to identify and document the length of 1, 3, and 6 cable systems to be removed.

The individual column entries are totalled into the tender total which is transferred to the Form of Tender.

c) Removal of Steel Beam Guide Raild) Removal of Steel Box Beam Barrier

The individual removal lengths are documented by station to station limits with the designation right or left of the roadway centreline.

The number of rails (single rail, double rail) and the presence of a channel (with channel, without channel) is specified. Each variation is shown in separate columns. Steel box beam guide rails and steel box beam median barriers are documented in the same column.

Steel beam guide rail and box beam guide rail sections used as temporary transition rails joining concrete barrier to temporary concrete barrier (TCB), steel beam guide rail to TCB, box beam guide rail to TCB, and temporary transitions connecting TCB to bridge barrier wall shall be documented in a separate column.

The individual column entries are totalled and combined into the tender total and transferred to the Form of Tender.

e) Removal of Anchor Blocks

The removal of anchor blocks is documented by indicating the station location with the designation right and left of the roadway centreline. The individual column entries are totalled into the tender total which is transferred to the Form of Tender.

f) Removal of Concrete Barrier

The individual removal lengths are documented by station to station limits with the designation right or left of the roadway centreline.

The type of concrete barrier to be removed is identified by item variation. Example types include:

- Cast In-Place
- Precast
- Back to Back
- Back to Back, Granular Filled
- Back to Back, Concrete Filled
- Transition

Quantities of each type are detailed in separate columns.

The individual column entries are totalled into the tender total, which is transferred to the Form of Tender.

g) Removal of Energy Attenuators

The removal of energy attenuators are documented by indicating the station to station limits with the designation right or left of the roadway centreline. Each type of attenuator system is identified in separate columns on the Quantity Sheet.

The number of each complete type of energy attenuator system to be removed is documented at each location on the Quantity sheet.

The salvage of energy attenuators is documented in the same columns. An asterisk is shown against the attenuators to be salvaged with a note "*" To be Salvaged" on the Quantity sheet.

The individual column entries are totalled and combined into the tender total, which is transferred to the Form of Tender.

h) Removal of Ramp Closure Gates

The removal of ramp closure gates is documented by station limits with the designation right or left of the roadway centreline.

The individual column entries are totalled and combined into the tender total, which is transferred to the Form of Tender.

510-4.9.3 Non-standard Special Provisions

A NSSP is required to specify salvage requirements or to have work completed other than described in the specification.

Precast concrete barrier and ramp closure gates are specified to be salvaged. If the materials are not to be salvaged, a non-standard special provision is required to override the specification requirement.

The re-use of salvaged material and/or the delivery location is specified by non-standard special provision.

510-4.9.4 Documentation Accuracy

Stations and individual quantity entries are shown to the nearest whole number metres.