

## **SPECIFICATION SECTION 04120 – IMPROVEMENT AND RELOCATION OF EXISTING IRRIGATION CHANNELS**

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## **SPECIFICATION SECTION 04120 – IMPROVEMENT AND RELOCATION OF EXISTING IRRIGATION CHANNELS**

### **1. DESCRIPTION**

#### **1.1 General**

This Specification Section prescribes the requirements and procedures for Improvement and Relocation of Existing Irrigation Channels in accordance with Drawings and/or as required by the Engineer.

#### **1.2 Channel Relocation**

Channels shall be constructed in accordance with the Drawings for the improvement and/or relocation of Existing Irrigation Channels affected by the Works.

Such work shall include excavation of channels to the depths and shapes required, including the placing and shaping of excavated materials along the sides as shown on the Drawings.

The work for channel improvement and/or relocation shall include; the removal of existing dikes, connection with the existing channels, filling and flattening of closed channel sections and any other incidental work to complete the Works.

### **2. MATERIAL REQUIREMENTS**

#### **2.1 Materials**

- (a) The materials for improvement and/or relocation of Existing Irrigation Channels and/or structures, shall conform with the material requirements specified in respective Specification Sections for the Existing Irrigation Channels and/or structures to be improved. In the event that the Existing Irrigation Channels and/or structures are of the types that are not covered by this Specification Section the material requirements shall be as stated in the Standards for the materials in ASTM or AASHTO, or as determined by the Engineer.

#### **2.2 Submittals**

##### **2.2.1 Shop and Working Drawings**

- (a) The plans for improvement and/or relocation of the channels shown in the Drawings are approximate and the Contractor shall furnish shop and/or

working drawings, based on the actual situation on Site, containing the construction details for improvement and/or relocation of the Existing Irrigation Channels and/or related structures as indicated on the Drawings and/or as directed by the Engineer.

- (b) The shop and/or working drawings shall be submitted to the Engineer, within the period established in the Specification for submittals of the Contractor, for approval prior to the start of the Works.

#### 2.2.2 Work Scheduling

- (a) A detailed work schedule for each irrigation channel and/or related structures shall be submitted by the Contractor indicating all the construction methods and procedures, including all the necessary measures to control the water and not affect the operation of the existing irrigation and/or waterway systems.
- (b) The Contractor shall not begin the improvement and/or relocation of the irrigation channels and/or the related structures without the Engineer's approval on the schedules and construction methods proposed by the Contractor.
- (c) The Contractor shall schedule all of the required construction works to ensure the improvement and/or relocation of the irrigation channels and/or the related structures can move smoothly. The following shall be considered in the schedule:
  - (i) Temporary Works shall be in place and operating before beginning embankment Works or as directed by the Engineer.
  - (ii) The Contractor shall first shape the Irrigation Channel works to the approved cross sections.
  - (iii) The last activity in the schedule shall comprise the final shaping as well as any repairs or damages that may have occurred during construction after completing all other immediately adjacent or interfacing Works.

### 3. CONSTRUCTION REQUIREMENTS

#### 3.1 Preservation of Existing Waterways

- (a) Existing waterways (which include irrigation channels, drainages, streams and rivers) shall not be disturbed without the permission of the Local

People's Committee and/or Irrigation Company and/or other Companies that are is responsible for their operation and maintenance.

- (b) For waterway realignments, whether temporary or permanent, the Contractor shall maintain the existing channel invert levels as much as possible. Realigned waterways shall be located so that their expected flows will not cause detrimental scour or erosion of the Works or nearby properties.
- (c) The Contractor shall be responsible for maintaining the design flows and water levels in all temporarily relocated waterways (which include irrigation channels, drainages, streams and rivers) as far as possible up to the issue of the Taking-Over Certificate. The Contractor shall also be responsible for any additional pumping or other related works for maintaining these irrigation and other facilities.
- (d) Where embankment stabilisation or other Permanent Works of the Contract will unavoidably block or partially block any existing waterways these waterways shall be relocated to ensure that unrestricted flows can pass the works at all usual supply and drainage rates and will not affect the existing flood control levels.
- (e) If the Contractor cannot avoid excavating or dredging in any existing waterways for proper execution of the Works he shall backfill all such excavations to the original ground elevations and shapes with materials approved by the Engineer after completing construction.
- (f) The Contractor shall remove materials deposited within the waterway area resulting from foundation excavation, constructing cofferdams or other related works following construction.
- (g) Finished grades on realigned (or relocated) irrigation channel inverts shall not vary by more than the dimensional tolerances provided in subsection 3.5 of this Specification Section. The finish shall be sufficiently smooth and uniform to ensure the free flow of water without ponding during periods of low flow.
- (h) The alignment and the shape of cross sections for the realigned (or relocated) Irrigation Channels shall not vary from those specified in the Drawings by more than the dimensional tolerances provided in subsection 3.5 of this Specification Section.

- (i) The Contractor shall notify the Engineer after completing Irrigation Channel excavation. No lining works shall begin until the Engineer approves the formations.

### 3.2 Preservation of Water Control Structures

The Contractor shall not disturb existing water control structures adjacent to the works of this Contract without the approval of the Local Authorities. These structures shall include existing culverts, canal inlets, regulators, gates, pumping stations, etc.. Water regulation structures for irrigation shall not be disturbed without the permission of the Local Authorities that are responsible for their operation and maintenance.

### 3.3 Concrete Lined Irrigation Channels

Relocation of Existing Irrigation Channels, which are concrete lined shall conform with the requirements of this Specification Section and Specification Section 07100 Concrete and Concrete Structures.

Such work shall include; excavation of the channels to the depths and shapes required, the deposition and shaping of excavated materials along the sides, bedding, construction of the new channels and their respective connections with the existing irrigation systems.

### 3.4 Earth Lined Irrigation Channels

Relocation of the existing channels which are earth lined shall conform with the requirements of this Specification Section, Specification Section 03300 Borrow Material and Specification Section 03400 Embankment.

Such work shall include excavation of the channels to the depths and shapes required, the deposition and shaping of excavated materials along the sides, bedding, construction of the new channels and their respective connections with the existing irrigation systems.

### 3.5 Dimensional Tolerances

Items	Tolerances
Finished grades on realigned (or relocated) Irrigation Channel inverts	$\pm 1$ cm from the existing invert levels
Alignment and shape of cross sections for realigned (or relocated)	$\pm 5$ cm (at any points) from those specified in the Drawings

irrigation channels as specified in the Drawings	
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#### **4. MEASUREMENT AND PAYMENT**

##### **4.1 Method of Measurement**

- (a) The length of the irrigation and the related drainage channels to be improved and/or relocated shall be measured (along the centre line) in linear meters of irrigation and/or drainage channels constructed/relocated in accordance with the approved shop drawings.
- (b) The water regulation structures; either newly installed or relocated existing structures shall be measured in sets of completed structures constructed/installed/relocated in accordance with the shop drawings.
- (c) The Improvement and Relocation of Existing Irrigation Channels provisions, material requirements and construction requirements identified in this Specification Section shall be measured for payment in pay items 04120-01, 04120-04, 04120-05-1, 04120-11-1, 04120-11-2, 04120-12, 04120-13, 04120-20 and 04120-21.
- (d) Any Improvement and Relocation of Existing Irrigation Channels Works not specifically identified in this Specification Section but which are necessary for the performance of the Works shall be deemed to be included in pay items 04120-01, 04120-04, 04120-05-1, 04120-11-1, 04120-11-2, 04120-12, 04120-13, 04120-20 and 04120-21.

##### **4.2 Basis of Payment**

- (a) The work under this Specification Section shall be paid for in accordance with the applicable unit prices as indicated in the Bill of Quantities and given below. Payment shall constitute full compensation for performing the requirements of the Contract for the items of work as specified including furnishing all necessary labor, materials, tools, equipment, incidentals and tests.
- (b) The connections and/or transitions (temporary or permanent) with existing waterways, channels and structures shall be deemed to be measured and paid in the unit rates identified in this Specification Section. No separate items will be measured or paid.

- (c) The Contractor shall be responsible for the costs of additional pumping or other related work to maintain irrigation and other facilities necessary to preserve existing waterways.

<b><u>Pay Item</u></b>	<b><u>Description</u></b>	<b><u>Unit</u></b>
<b>04120</b>	<b>Improvement and Relocation of Existing Irrigation Channels</b>	
04120-01	Irrigation Channel Relocation-Type CE1 (Earth: 0.5mx0.5m)	m
04120-04	Irrigation Channel Relocation-Type CE3A (Earth: 1.0mx0.6m)	m
04120-05-1	Irrigation Channel Relocation-Type CE4B (Earth : B=1.5m)	m
04120-11-1	Irrigation Channel Relocation-Type CE7B (Earth : B=2.1m)	m
04120-11-2	Irrigation Channel Relocation-Type CE7C (Earth : B=2.7m)	m
04120-12	Irrigation Channel Relocation, Type CE8 (Earth: 5.0m*1.5m)	m
04120-13	Irrigation Channel Relocation-Type CC1 (Conc.: 0.7mx0.7m)	m
04120-20	Irrigation Channel Relocation-Type CC7 (Conc.: 3.0mx2.0m)	m
04120-21	Irrigation Channel Relocation-Type CR1 (Conc.: 0.5mx0.5m)	m