



# **EXPLO National Manual for Projects Management**

## **Volume 6, chapter 7**

### **Civil (Site Works and Roads) Design Aids**



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## Civil (Site Works and Roads) Design Aids

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## Civil (Site Works and Roads) Design Aids

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## Civil (Site Works and Roads) Design Aids

### 1.0 PURPOSE

The purpose of this section is to provide the Entity-A/E the templates, checklists, design guidelines, etc. (collectively called Design Aids) to comprehensively define the Civil design of a Project and ensure that the design is complete, uses appropriate templates and has undergone the necessary checks to achieve the quality design which can be used to purchase fit for purpose material/ equipment and safely install all facilities under Entity's project.

Refer to Volume 6, Chapter 7, General Design Guidelines (Document No EPM-KE0-GL-000016) for the definition of terms used and the instructions on the use of every element of Design Aids. This also covers non-discipline specific Design Aid such as Calculation Templates, Calculation check list, Design software list, etc. which apply to all engineering disciplines including Civil. Users are urged to carefully read the instructions provided in the aforesaid document to fully understand the purpose and use of all documents listed in this section.

The Entity-A/E shall review the documents listed in Volume 6, Chapter 7, Section 1 - General Design & Section 2 – Civil Design, and determine the templates, check lists, etc. applicable to their project. The list of applicable templates/ checklists/ etc. may vary from project to project depending upon the Design Scope of Work of every Project.

### 2.0 REFERENCE

1. EPM-KE0-GL-000016 - General Design Guideline
2. EPM-KEC-GL-000001 - Civil Design Guideline
3. EPM-KEC-GL-000005 - Surveying Guideline
4. EPM-KEC-PR-000001 - Exterior Signage Criteria - Procedure

### 3.0 CIVIL DESIGN AIDS

The Civil Design Aids developed for use on Entity's projects are listed below, each issued as a standalone document.

#### 3.1 Civil Design Guideline

Refer to Volume 6, Chapter 7, General Design Guidelines (Document No EPM-KE0-GL-000016) for the purpose and the instructions on the use of discipline Design Guidelines issued for use in the design of Entity's Projects.

Civil Design Guideline and Surveying Guideline references are listed below:

SN	Title	Document No.
1	Civil Design Guideline	EPM- KEC-GL-000001
2	Surveying Guideline	EPM- KEC-GL-000005

#### 3.2 Civil Design Deliverables

Refer to Volume 6, Chapter 7, General Design Guidelines (Document No EPM-KEM-GL-000001) for the purpose and the instructions on the use of List of Design Deliverables issued for use in the design of Entity's projects.

##### List of Civil Design Deliverables

SN	Title	Document No.
1	List of Civil Design Deliverables	EPM- KEC-RG-000001



## Civil (Site Works and Roads) Design Aids

### 3.3 Design Check Lists

Refer to Volume 6, Chapter 7, General Design Guidelines (Document No EPM-KE0-GL-000016) for the purpose and the instructions on the use of Checklists issued for the use in the design of Entity's projects.

Table below lists Civil Checklists issued for use on Entity's Projects

#### List of Civil Checklists

SN	Check List for	Document No
1	Grading Layout Drawings	EPM-KEC-TP-000001
2	Road Layout and Profile Drawings	EPM-KEC-TP-000002
3	Grading Cross-Section at Interval Drawings	EPM-KEC-TP-000003
4	Setting-out Drawings	EPM-KEC-TP-000004
5	Road Cross-Section at Interval Drawings	EPM-KEC-TP-000005
6	Road Signage and Marking Drawings	EPM-KEC-TP-000006

### 3.4 Templates

Refer to Volume6, Chapter 7, General Design Guidelines (Document No EPM-KE0-GL-000016) for the purpose and the instructions on the use of Templates issued for the use in the design of Entity's projects.

Table below lists Civil templates issued for use on Entity's Projects

#### List of Civil Templates

SN	Template for	Document No.
1	Survey Requirement	EPM-KEC-TP-000012
2	Road Pavement Design Criteria	EPM-KEC-TP-000013
3	Earthwork and Grading Design Criteria	EPM-KEC-TP-000017
4	Traffic & Transportation Design Criteria	EPM-KEC-TP-000019
5	Street & Roadways Design Criteria	EPM-KEC-TP-000021

### 3.5 Typical Construction Detail Drawings (TCDDs)

Refer to Volume 6, Chapter 7, General Design Guidelines (Document No EPM-KE0-GL-000016) for the purpose of issue of Typical Construction Detail Drawings (TCDD) in the design of Entity's projects

Table below lists examples of Civil TCDD's issued as sample for use by Entity.

SN	Sample Installation Standard Details	Discipline	Drawing No.
1	Typical Cross-Section - Residential Road	Civil	EPM-KEC-05-000001
2	Typical Barrier Types	Civil	EPM-KEC-05-000002
3	Curb and Gutter Detail	Civil	EPM-KEC-05-000003
4	Pre-cast Unit Paving Blocks	Civil	EPM-KEC-05-000004
5	Sewer Line Pipeline Section	Civil	EPM-KEC-05-000005

### 3.6 Procedure

Civil procedure of Exterior Signage Criteria (Document No. EPM-KEC-PR-000001) issued for use on Entity's Projects. The purpose of this procedure is to establish the criteria and define the signage category applicable to infrastructure projects.



### 4.0 ATTACHMENTS

1. EPM-KEC-TP-000001 - Checklist - Grading Layout Drawings
2. EPM-KEC-TP-000002 - Checklist - Road Layout & Profile Drawings
3. EPM-KEC-TP-000003 - Checklist - Grading Cross-Section at Interval Drawings
4. EPM-KEC-TP-000004 - Checklist - Setting-out Layout Drawings
5. EPM-KEC-TP-000005 - Checklist - Road Cross-Section at Interval Drawings
6. EPM-KEC-TP-000006 - Checklist - Road Signage & Marking Drawings
7. EPM-KEC-TP-000012 - Survey Requirement Template
8. EPM-KEC-TP-000013 - Road Pavement Design Criteria Template
9. EPM-KEC-TP-000017 - Earthwork and Grading Design Criteria Template
10. EPM-KEC-TP-000019 - Traffic & Transportation Design Criteria Template
11. EPM-KEC-TP-000021 - Streets & Roadways Design Criteria Template
12. EPM-KEC-RG-000002 - List of Civil Deliverables
13. EPM-KEC-05-000001 - Typical Cross-Section-Residential Road
14. EPM-KEC-05-000002 - Typical Barrier Types
15. EPM-KEC-05-000003 - Curb and Gutter Detail
16. EPM-KEC-05-000004 - Pre-cast Unit Paving Blocks
17. EPM-KEC-05-000005 - Sewer Line Pipeline Section



## Civil (Site Works and Roads) Design Aids

### Attachment 1 - EPM-KEC-TP-000001 - Checklist - Grading Layout Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
1	Does this <u>drawing</u> show physical features such as boundary walls, fences, drainage/hydrological features, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Does this drawing show gridlines of coordinates. If a coordinate system is used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Does this drawing show legends for all the entities given on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Does this <u>drawing</u> show North Arrow that also includes Makkah direction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Does this <u>drawing</u> show key map of project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Does this <u>drawing</u> show sheet key?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Does this <u>drawing</u> show references of all typical applicable drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Does this <u>drawing</u> show reference to specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Does this drawing specify units of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does this drawing specify coordinate or baseline reference system and vertical datum?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Does this drawing show match line and drawing reference of other drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Does this <u>drawing</u> show major and minor grading contours?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Does this <u>drawing</u> show major and minor contours of existing surface?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this drawing show stations at intervals that match with the cross-sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Does this <u>drawing</u> show the coordinates of other survey data of grading area limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Does this <u>drawing</u> show grading levels at appropriate distances?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Does this drawing show the flow arrows that show direction of slope of grading?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Does this <u>drawing</u> show the Daylight slope of grading?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Does this drawing clearly show the grading cut and fill?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Are specified cut and fill slopes used for grading of site and road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Is the minimum vertical clearance and slope between Finished Floor Level and Finished Pavement Level appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Is the grading developed to minimize impact to natural drainage pattern?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Are stabilization measures shown on graded slopes that are subject to erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Are heights of cut and fill within the specified limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Are minimum transverse and minimum longitudinal gradients of graded surfaces in accordance with standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Are maximum transverse and maximum longitudinal gradients of graded surfaces in accordance with standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Are the limits of grading clearly marked on this drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No.	Checker's Comments	Resolution					
Originator's Name / Signature and Date:		Checker's Name / Signature and Date:					





## Civil (Site Works and Roads) Design Aids

### Attachment 2 - EPM-KEC-TP-000002 - Checklist - Road Layout & Profile Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
01	Does this <u>drawing</u> use the current building Architectural background?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02	Does this <u>drawing</u> show other physical features such as boundary wall, fence, drainage and hydrologic features, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03	Does this drawing show gridlines of <u>coordinates</u> . If a coordinate system is used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04	Does this drawing show legends for all the entities shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05	Does this <u>drawing</u> show North Arrow that also includes Makkah direction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06	Does this <u>drawing</u> show the key map of project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
07	Does this <u>drawing</u> show sheet key?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
08	Does this <u>drawing</u> showing reference to all typical applicable drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
09	Does this <u>drawing</u> mention reference specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does drawing specify units of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Does drawing specify coordinate or baseline reference system and vertical datum?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Does drawing show match line of <u>others</u> drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Is drawing based on latest road model?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this <u>drawing</u> show the centerline/baseline of road with station?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Are road curb types clearly shown and their limits defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Is pedestrian ramp (if any) for road crossing shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Does this drawing show a horizontal alignment which complies with the minimum radius corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Does this drawing show a horizontal alignment which complies with the minimum sight distances corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Does this <u>drawing</u> show a horizontal alignment which complies with minimum curve length?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Does this <u>drawing</u> show a horizontal alignment which complies with minimum and maximum tangent lengths?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Does this <u>drawing</u> show a horizontal alignment with correct spiral length if any?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Does this <u>drawing</u> show the correct super elevation values?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Does this <u>drawing</u> show the correct number of lanes and lane width?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Does this drawing show the correct taper and lane drop lengths if any?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Does this <u>drawing</u> show the correct deceleration and acceleration lengths if any?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Does this drawing show the correct lane widening if any?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Does this drawing show a vertical alignment (profile) which complies with the minimum and maximum grade corresponding to the classification of the road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	Does this drawing show a vertical alignment (profile) which complies with the minimum K value corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	Does this drawing show a vertical alignment (profile) which complies with the minimum sight distances corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	Does this <u>drawing</u> show a vertical alignment (profile) which complies with the minimum vertical curve length?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	Does the profile on this drawing show existing ground levels, advanced grading (if any) and road design levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Civil (Site Works and Roads) Design Aids

### Attachment 3- EPM-KEC-TP-000003 - Checklist - Grading Cross-Section at Interval Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
01	Does this <u>drawing</u> use latest model and information of existing ground and grading?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02	Does this drawing show legends for all the entities given on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03	Does this <u>drawing</u> show references to all applicable typical drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04	Does this <u>drawing</u> show reference to specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05	Does this drawing specify unit of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06	Does this <u>drawing</u> show horizontal and vertical scale of cross-section?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
07	Is appropriate vertical exaggeration used in this drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
08	Is horizontal and vertical scale of cross-section appropriate and as per standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
09	Does this drawing specify correct vertical datum reference?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does this <u>drawing</u> show match line of other drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Does this <u>drawing</u> show station of the cross-section/sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Does the station of the cross-section/sections in this drawing match with grading layout drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Does this <u>drawing</u> show level information of existing ground, top soil removal, and grading?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this <u>drawing</u> show offset values of existing ground, top soil removal, and grading?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Is level information in data band correct with respect to station?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Are specified cut and fill slopes used for grading of site and road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Are the grading elevations coordinated with building pad elevations and other nearby facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Is minimum vertical clearance and slope between Finished Floor Level and Finished Pavement Level appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Is grading developed based on natural drainage pattern of area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Are graded slopes, swales and ditches that are subject to erosion stabilized?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Are heights of cut and fill within the specified limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Are minimum transverse and minimum longitudinal gradients of graded surfaces in accordance with standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Are maximum transverse and maximum longitudinal gradients of graded surfaces in accordance with standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No.	Checker's Comments	Resolution					
Originator's Name / Signature and Date:		Checker's Name / Signature and Date:					



## Civil (Site Works and Roads) Design Aids

### Attachment 4 - EPM-KEC-TP-000004 - Checklist - Setting-out Layout Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
1	Does this <u>drawing</u> use the latest building architectural background?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Does this drawing show a legend for all the entities shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Does this <u>drawing</u> show North Arrow that also includes Makkah direction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Does this <u>drawing</u> show a key map of project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Does this <u>drawing</u> show sheet key?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Does this <u>drawing</u> show reference to all typical applicable drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Does this <u>drawing</u> show reference to specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Does drawing specify unit of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Does drawing specify coordinate or baseline reference system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does this drawing show continuation drawing reference of other drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Is drawing based on latest road model?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Does this <u>drawing</u> show the centerline/reference line of road with station?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Does this <u>drawing</u> show the correct horizontal geometry of road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this <u>drawing</u> show clearly the alignment's tangent, curve and spiral?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Does this <u>drawing</u> show coordinates of all required points on alignment's tangents, curve and spiral?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Does this <u>drawing</u> show horizontal curve data such as degree of curvature, radius, length and etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Does this <u>drawing</u> show the transition curve data such as spiral length, A value and etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Does this drawing show the tangent length and bearing angle?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Does this drawing show the horizontal alignment which complies with the minimum radius corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Does this drawing show the horizontal alignment which complies with the minimum sight distances corresponding to the design speed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Does this <u>drawing</u> show the horizontal alignment which complies with minimum curve length?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Does this <u>drawing</u> show the horizontal alignment which complies with minimum and maximum tangent lengths?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Does this <u>drawing</u> show the horizontal alignment with correct spiral length if any?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No.	Checker's Comments	Resolution					
Originator's Name / Signature and Date:		Checker's Name / Signature and Date:					



## Civil (Site Works and Roads) Design Aids

### Attachment 5 - EPM-KEC-TP-000005 - Checklist - Road Cross-Section at Interval Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
01	Does this drawing use latest road, existing ground, and finished grading information?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02	Does this drawing show legends for all the entities given on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03	Does this <u>drawing</u> show references to all applicable typical drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04	Does this <u>drawing</u> show reference to specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05	Does this drawing specify unit of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06	Does this <u>drawing</u> show horizontal and vertical scale of cross-section?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
07	Is horizontal and vertical scale of cross-section appropriate and as per standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
08	Does this drawing specify correct height datum reference?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
09	Does this <u>drawing</u> show match line of other drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does this <u>drawing</u> show station of the cross-section/sections and roadway segment to which each applies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	In this drawing, do the stations of the cross-section/sections match with layout drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Do the cross-sections match with the typical section of that particular road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Does this <u>drawing</u> show details of the road i.e. sidewalk, road curb, sub-grade, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this <u>drawing</u> show center line of road?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Does this <u>drawing</u> show direction and percentage of cross-slope of road cross-section?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Does this <u>drawing</u> show correct super elevation values, where applicable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Does this <u>drawing</u> show level information for finished grade, subgrade, advanced grading and existing ground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Does this <u>drawing</u> show offset values of finished grade, subgrade, advanced grading and existing ground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Is level information in data band correct with respect to the corresponding station?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Does this <u>drawing</u> show the correct number of lanes and lane width?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Does this <u>drawing</u> show the correct curb type and location on cross-sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Does this <u>drawing</u> show the correct barrier type and location on cross-sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Does this <u>drawing</u> show the correct guard rail type and location on cross-sections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Does this <u>drawing</u> show the correct fill slope?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Does this <u>drawing</u> show the correct cut slope?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Does this <u>drawing</u> show the correct aggregate base and pavement type for the road, including thicknesses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No.	Checker's Comments	Resolution					
Originator's Name / Signature and Date:		Checker's Name / Signature and Date:					



## Civil (Site Works and Roads) Design Aids

### Attachment 6 - EPM-KEC-TP-000006 - Checklist - Road Signage & Marking Drawings

PROJECT NAME:		DRAWING NO.			REV.		
No.	QUESTIONS	ORIGINATOR			CHECKER		
		N/A	YES	NO	N/A	YES	NO
1	Does this <u>drawing</u> use latest building architectural background?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Does this <u>drawing</u> show other physical features such as boundary walls, fences, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Does this drawing show gridlines of <u>coordinates</u> . If a coordinate system is used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Does this drawing show legends for all entities given on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Does this <u>drawing</u> show North Arrow that also includes Makkah direction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Does this <u>drawing</u> show key map of project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Does this <u>drawing</u> show sheet key?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Does this <u>drawing</u> show references to all typical applicable drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Does this <u>drawing</u> list reference specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Does this drawing specify unit of dimensions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Does this drawing specify coordinate reference system or baseline reference system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Does this <u>drawing</u> show match line of other drawings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Is this drawing based on latest road model?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Does this <u>drawing</u> show centerline/reference line of road with station?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Are all applicable regulatory movement control signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Are all applicable regulatory mandatory movement signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Are all applicable regulatory movement prohibition signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Are all applicable regulatory parking control signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Are all applicable regulatory freeway control signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Do all regulatory sign placements consider minimum clear visibility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	Are all applicable advanced warning signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	Are all applicable hazard marker signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Are all applicable diagrammatic signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Do all warning sign placements consider minimum clear visibility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Are all applicable route marker signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Are all applicable trailblazing signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	Are all applicable at-grade junction guide signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	Are all applicable grade separated junction guide signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	Are all applicable general information signs shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	Is color coding of all signage identified on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	Are guide signs provided as per recommended reading time/distance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	Are all applicable temporary signs (if any) shown on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	Are station and offset of all road markings provided on drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34	Are lane marking, centerline <u>marking</u> and edge line marking provided as per local standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	Are stop line, pedestrian crossing marking and give way line provided as per local standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36	Is correct type of arrow marking provided as per local standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Attachment 7 - EPM-KEC-TP-000012 - Survey Requirement Template



Survey Requirement Template

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SAMPLE



## Civil (Site Works and Roads) Design Aids

### Attachment 8 - EPM-KEC-TP-000013 - Road Pavement Design Criteria Template



#### Road Pavement Design Criteria Template


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## Civil (Site Works and Roads) Design Aids

### Attachment 9 – EPM-KEC-TP-000017 - Earthwork and Grading Design Criteria Template

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1.3 Definitions	5
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.ERROR! BOOKMARK NOT DEFINED.	
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## Civil (Site Works and Roads) Design Aids

### Attachment 10 - EPM-KEC-TP-000019 - Traffic & Transportation Design Criteria Template



#### Traffic and Transportation Design Criteria Template


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1.3 Definitions	5
1.4 Abbreviations	5
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## Civil (Site Works and Roads) Design Aids

### Attachment 11 - EPM-KEC-TP-000021 - Streets & Roadways Design Criteria Template

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## Civil (Site Works and Roads) Design Aids

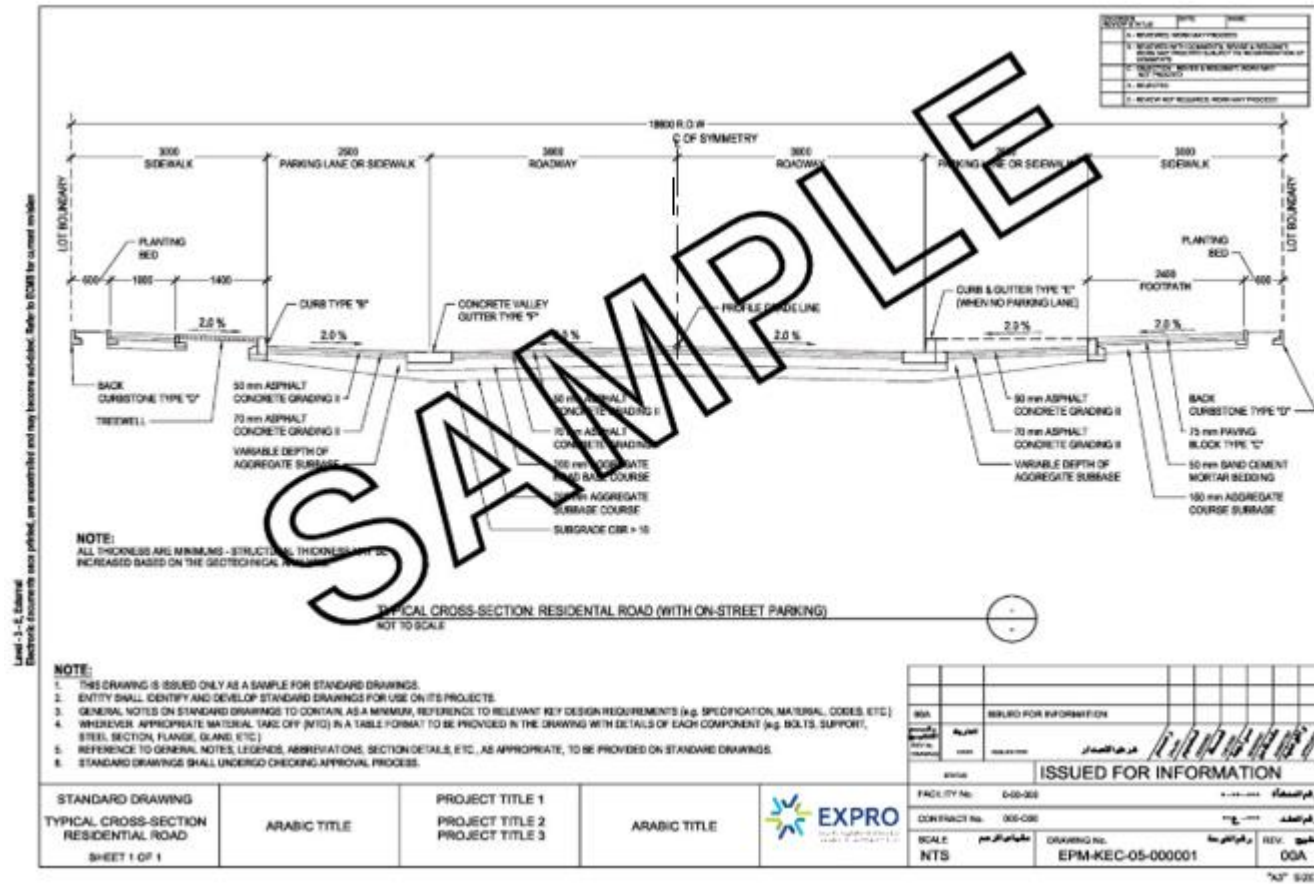
### Attachment 12 – EPM-KEC-RG-000002 – List of Civil Deliverables

SN	Deliverable	Tool	Deliverable Contents	Developed During*	Deliverable/ Data required for				Comments
					Procurement	Construction	Start-Up & Commissioning	Project Controls	
1.0 GENERAL									
1	BIM / 3D Model	<del>AutoCAD / 3ds Max</del> IntroWorks/ Civil3D, <del>NavisWorks</del> Bentley Navigator	The 3D model shall show realistic depictions and contain relevant design data for all physical disciplines in sufficient detail to produce the design deliverables. Model reviews shall be conducted for functional checks and collision checks. The BIM / 3D model shall be setup to support 4D and 5D delivery. Model collaboration methods will be put in place to ensure all stakeholders are referencing the latest BIM / 3D model and collaborating most effectively. Interference checking is performed on all models; interference management processes are used as part of the design and quality control process and prior to extracting IFC deliverables.	B&D		Y		Y	
2	Specifications	<del>eSpec</del> / MS Word	Engineering specifications define the technical and Quality Management System requirements including applicable codes. Refer to EPM-KEC-RG-000002 for the contents of SOW and Specification.	B&D	Y	Y	Y		
3	Bulk Quantity Takeoff / BOQ	MS Excel / MS Access	Provide Bulk Quantity Takeoffs (QTOs) for tracking engineering-released quantities at 30%, 60%, & 90% Milestones to support construction installation including method of measurement and/or standard code or measurement principles.	B&D	Y	Y	Y	Y	
4	Tagged Material Tracking / BOQ	MS Excel / MS Access	Equipment and Specialty Items (EAI): Includes tags, sizes, description, quantity, physical dimensions, weight, capacity, datasheet (fit / function) type information.	D		Y	Y	Y	
5	Permitting submittals	PDF	Include documents and drawings required for applicable construction and environmental permitting activities for the project. Specific documents vary by scope and permit type as well as responsible discipline.	B&D	Y	Y			
6	Interface Management Plan	MS Office	Establish the Interface Management Plan per discipline to ensure all stakeholders receive the information they require in a timely manner.	B&D	Y	Y			
7	Standard Details and Notes	2D	Select details needed and show them on a set of standard project drawings. These details include those items that do not need to be uniquely designed for a specific set of loads or job conditions. They include but are not limited to: -Survey monuments -Supporting road details (guardrails, curbs, etc.) -Chain link fence detail	B&D	Y	Y			



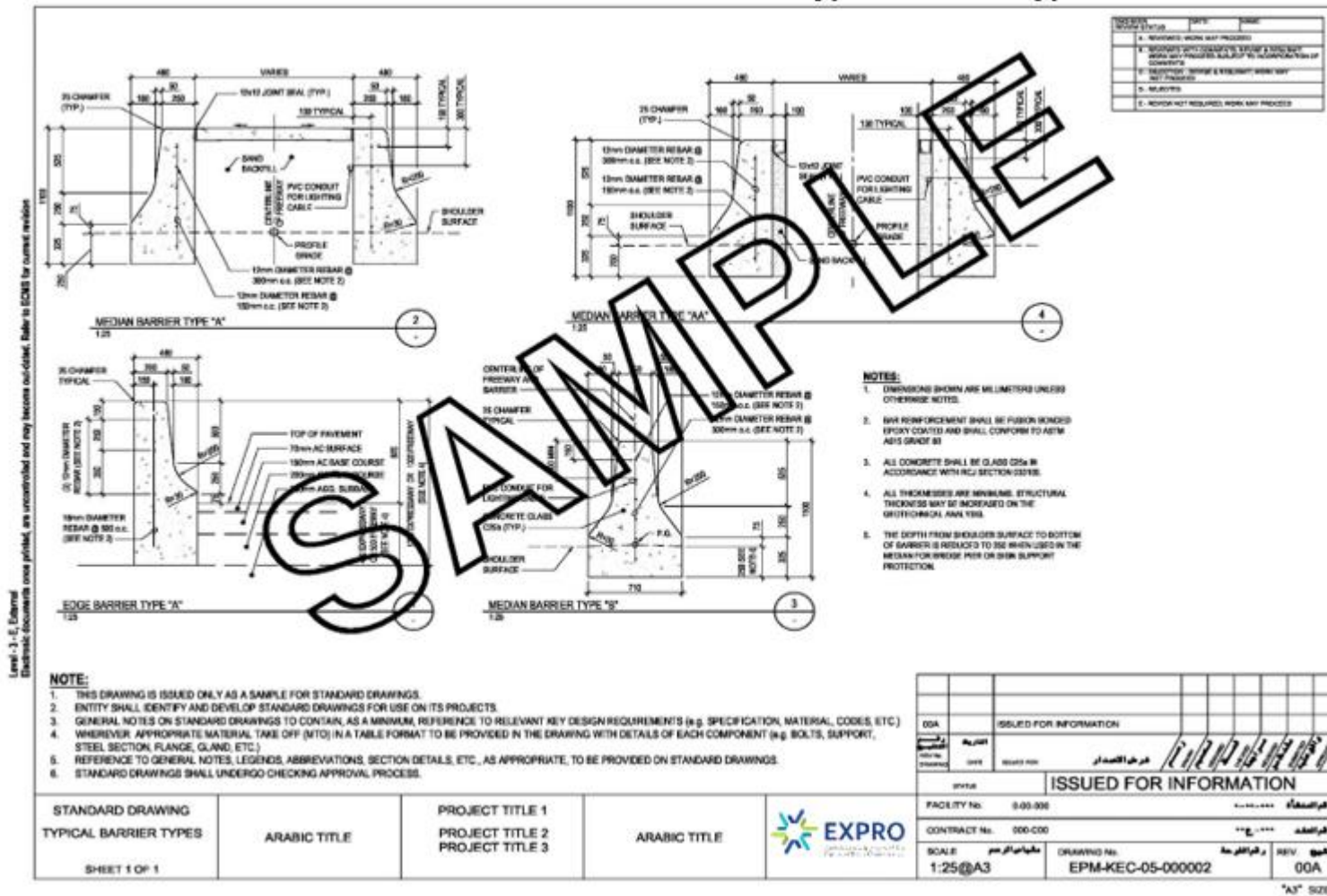
## Civil (Site Works and Roads) Design Aids

### Attachment 13 - EPM-KEC-05-000001 - Typical Cross-Section-Residential Road



## Civil (Site Works and Roads) Design Aids

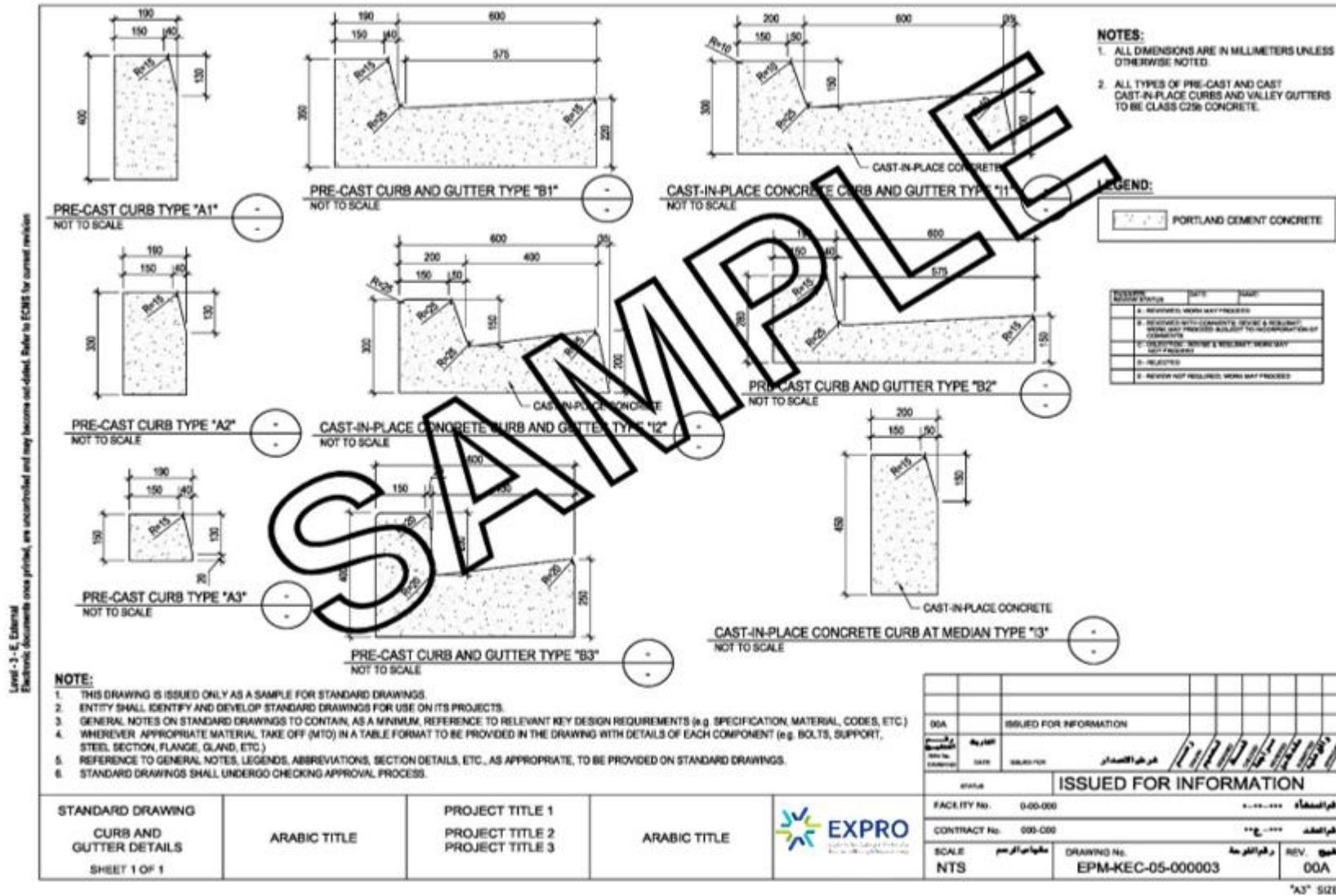
## Attachment 14 - EPM-KEC-05-000002 - Typical Barrier Types





## Civil (Site Works and Roads) Design Aids

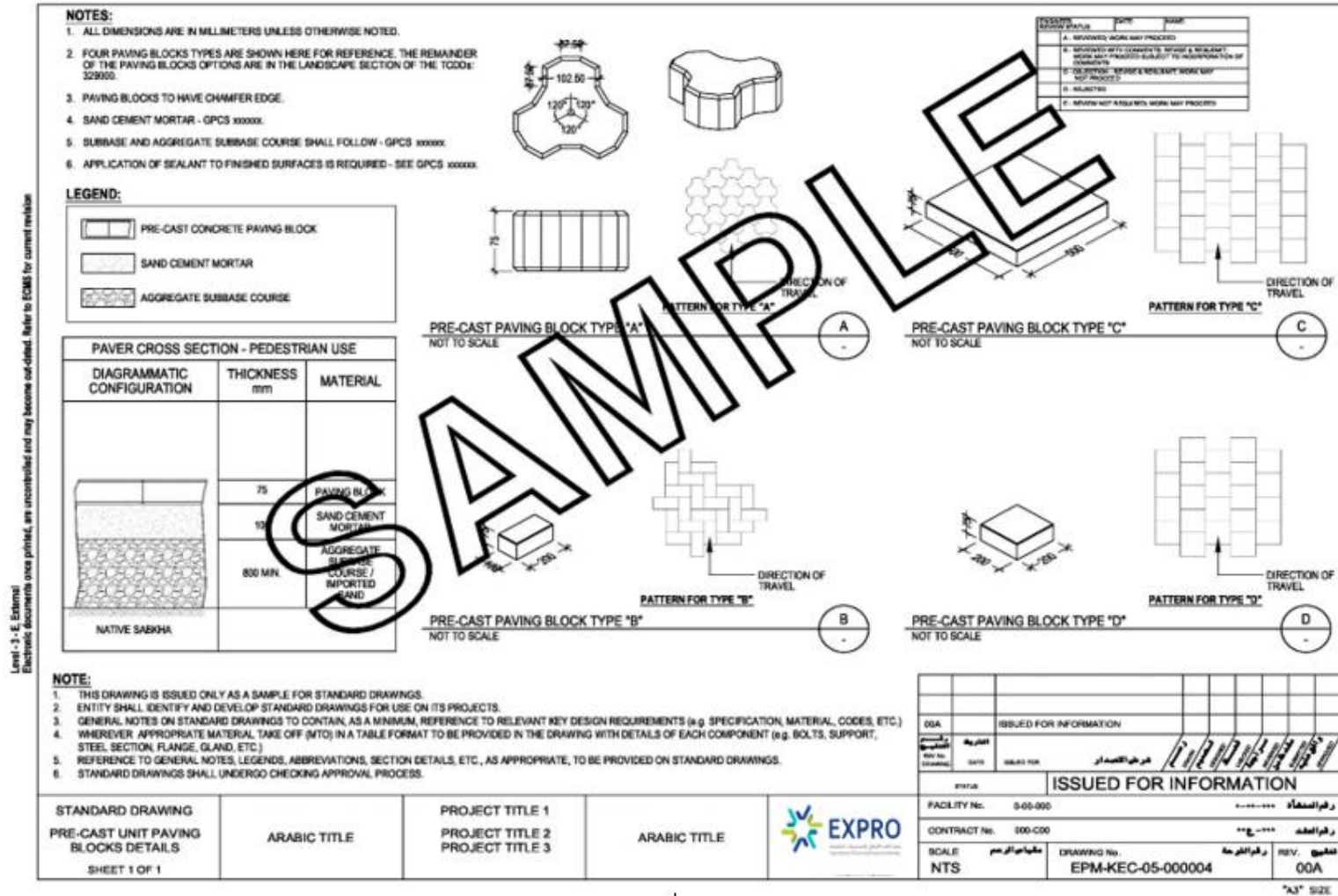
## Attachment 15 - EPM-KEC-05-000003 - Curb and Gutter Detail





## Civil (Site Works and Roads) Design Aids

### Attachment 16 - EPM-KEC-05-000004 - Pre-cast Unit Paving Blocks





## Civil (Site Works and Roads) Design Aids

### Attachment 17 - EPM-KEC-05-000005 - Sewer Line Pipeline Section

