โครงการศึกษาความเหมาะสมทางด้าน
เศรษฐกิจ วิศวกรรม และสิ่งแวดล้อม
เส้นทางรถไฟชุมพร - ท่าเรือน้ำลึกระนอง

รายงานการออกแบบเบื้องต้น
Preliminary Design Report

AEC

สนข
สำนักงานนโยบายและแผนการขนส่งและจราจร

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กุมภาพันธ์ 2561

สนข

สำนักงานนโยบายและแผนการขนส่งและจราจร

โครงการศึกษาความเหมาะสมทางด้านเศรษฐกิจ วิศวกรรม และสิ่งแวดล้อม เส้นทางรถไฟชุมพร - ท่าเรือน้ำลึกระนอง

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บทที่ 1

บทนำ

บทที่ 1
บทนำ

1.1 ความเป็นมาโครงการ

จากการประชุมคณะรัฐมนตรี เมื่อวันที่ 11 ตุลาคม 2559 คณะรัฐมนตรีได้รับทราบผลการประชุมร่วมระหว่างนายกรัฐมนตรี กับคณะกรรมการร่วมภาครัฐและเอกชนเพื่อแก้ไขปัญหาทางเศรษฐกิจส่วนกลางและกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน เมื่อวันที่ 16 กันยายน 2559 โดยมอบให้กระทรวงคมนาคม (คค.) พิจารณาดำเนินการตามข้อเสนอคณะกรรมการร่วมภาครัฐและเอกชนเพื่อแก้ไขปัญหาทางเศรษฐกิจ ส่วนกลางและกลุ่มจังหวัดภาคใต้อันดามัน ในการพัฒนาและขยายโครงข่ายเส้นทางรถไฟสายใต้จากจังหวัดชุมพร – จังหวัดระนอง ระยะทางประมาณ 125 กิโลเมตร เพื่อพัฒนาแนวเส้นทางรถไฟสายใหม่ฝั่งอ่าวไทยกับฝั่งทะเลอันดามันอีกเส้นทางหนึ่งสำหรับการคมนาคมขนส่งและส่งเสริมการท่องเที่ยวสองฝั่งทะเล รวมทั้งสามารถให้เชื่อมโยงไปยังท่าเรือน้ำลึกจังหวัดระนองเพื่อรองรับการเป็นประตูสู่ BIMSTEC ในอนาคต

การพัฒนาและขยายโครงข่ายเส้นทางรถไฟสายใหม่จากจังหวัดชุมพร-จังหวัดระนอง เชื่อมโยงอ่าวไทยกับฝั่งทะเลอันดามัน สอดคล้องกับนโยบายรัฐบาลในข้อ 6 ด้านการเพิ่มศักยภาพทางเศรษฐกิจของประเทศ ในส่วนของการพัฒนาโครงสร้างพื้นฐานคมนาคมขนส่งให้มีความสะดวก รวดเร็วและปลอดภัยมากขึ้น เพื่อยกระดับคุณภาพชีวิตความเป็นอยู่ของประชาชน และสอดคล้องกับแผนพัฒนาเศรษฐกิจและสังคมแห่งชาติ ฉบับที่ 12 ยุทธศาสตร์ที่ 7 การพัฒนาโครงสร้างพื้นฐานและระบบโลจิสติกส์ ในส่วนของแนวทางการพัฒนาโครงข่ายทางราง โดยให้ศึกษาความเหมาะสมของการก่อสร้างรถไฟสายใหม่ เพื่อเชื่อมโยงการเดินทางและขนส่งสินค้าในระบบรถไฟ (Feeder Line) จากพื้นที่เศรษฐกิจและอุตสาหกรรมของจังหวัดต่างๆ เข้ากับโครงข่ายหลักของประเทศ ทั้งนี้ คค. ได้บรรจุโครงการดังกล่าวไว้ในแผนงานในภารกิจหลักของ คค. ภายใต้ (ร่าง) ยุทธศาสตร์การพัฒนาระบบขนส่งของไทยระยะ 20 ปี (พ.ศ. 2560-2579)

กลุ่มจังหวัดภาคใต้เป็นกลุ่มจังหวัดที่มีศักยภาพในการพัฒนาพื้นที่ด้านเศรษฐกิจและการท่องเที่ยว จากความได้เปรียบด้านที่ตั้งทางภูมิศาสตร์ที่สามารถพัฒนาเชื่อมโยงโครงข่ายคมนาคมขนส่งชายฝั่งทะเลอ่าวไทยและฝั่งทะเลอันดามันส่งผลให้การกำหนดยุทธศาสตร์และทิศทางการพัฒนาพื้นที่ดังกล่าวให้เป็นศูนย์กลางการท่องเที่ยวทางทะเลระดับโลก และเป็นประตูเชื่อมโยงเศรษฐกิจของเอเชียใต้ ซึ่งรัฐบาลได้มุ่งเน้นให้มีการพัฒนาระบบโครงสร้างพื้นฐานด้านการคมนาคมขนส่งเชื่อมโยง 2 ฝั่งทะเล เพื่อเพิ่มศักยภาพด้านการแข่งขันให้กับกลุ่มจังหวัดภาคใต้

คค.จึงได้มอบหมายให้สำนักงานนโยบายและแผนการขนส่งและจราจร (สนข.) ดำเนินการศึกษาความเหมาะสมด้านเศรษฐกิจ วิศวกรรมและสิ่งแวดล้อม เส้นทางรถไฟชุมพร-ท่าเรือน้ำลึกระนอง เพื่อพัฒนาแนวเส้นทางรถไฟสายใหม่เชื่อมโยงฝั่งทะเลด้านอ่าวไทยและฝั่งทะเลอันดามัน สนับสนุนส่งเสริมด้านคมนาคมขนส่งและการท่องเที่ยวของประเทศ

1.2 วัตถุประสงค์ของโครงการ

การศึกษาความเหมาะสมทางด้านเศรษฐกิจ วิศวกรรม และสิ่งแวดล้อม เส้นทางรถไฟชุมพร - ท่าเรือน้ำลึกระนอง มีวัตถุประสงค์ ดังนี้

1) ศึกษาการพัฒนาโครงข่ายและการขยายเส้นทางรถไฟสายใหม่ จากจังหวัดชุมพร - จังหวัดระนอง เพื่อพัฒนาระบบคมนาคมขนส่ง
2) ออกแบบและจัดทำรายงานการศึกษาผลกระทบสิ่งแวดล้อมเบื้องต้น (Initial Environmental Examination : IEE)
3) ศึกษาความเหมาะสมด้านเศรษฐกิจ การเงิน และรูปแบบการลงทุน
4) สร้างกระบวนการรับรู้และการมีส่วนร่วมของประชาชนในการพัฒนาพื้นที่ตามแนวเส้นทางรถไฟเส้นทางจังหวัดชุมพร-จังหวัดระนอง

1.3 ขอบเขตของงานบริการที่ปรึกษา

1.3.1 งานส่วนที่ 1 : ศึกษา สำรวจ รวบรวม และวิเคราะห์ข้อมูลในด้านต่าง ๆ เพื่อการพัฒนาโครงข่ายและขยายเส้นทางรถไฟสายใหม่ จากจังหวัดชุมพร-จังหวัดระนอง ดังนี้

1) การทบทวนนโยบาย ยุทธศาสตร์การลงทุนพัฒนาด้านโครงสร้างพื้นฐานและบริการระบบขนส่ง
2) การรวบรวมข้อมูลพื้นฐาน
3) การสำรวจและรวบรวมข้อมูลด้านการขนส่งและปัญหาพื้นที่ศึกษา

1.3.2 งานส่วนที่ 2 : ออกแบบและจัดทำรายงานการศึกษาผลกระทบสิ่งแวดล้อมเบื้องต้น (Initial Environmental Examination : IEE) ดังนี้

1) การพิจารณาความเหมาะสมของเส้นทางรถไฟ
2) การศึกษาและออกแบบแนวคิดหรือแบบขั้นต้น
3) การวิเคราะห์และเสนอแนะตำแหน่งสถานีผู้โดยสาร สถานีกองเก็บตู้สินค้า หรือสถานีบรรจุและแยกสินค้ากล่อง
4) การศึกษาผลกระทบสิ่งแวดล้อมเบื้องต้น (Initial Environmental Examination : IEE)
5) การประเมินราคาขั้นต้น (Initial Cost)
6) การวิเคราะห์/ประเมิน/คัดเลือกแนวเส้นทางที่เหมาะสมที่สุด
7) การจัดทำแบบเขตทางและข้อมูลการจัดกรรมสิทธิ์ที่ดิน
8) การออกแบบเบื้องต้น (Preliminary Design)
9) การออกแบบเบื้องต้นโครงสร้างพื้นฐาน
10) การประเมินราคาเบื้องต้น (Preliminary Cost)

1.3.3 งานส่วนที่ 3 : ศึกษาความเหมาะสมด้านเศรษฐกิจ การเงิน และรูปแบบการลงทุน ดังนี้

1) การวิเคราะห์ด้านเศรษฐกิจและการเงิน
2) การจัดทำข้อเสนอแนะแนวทางการให้เอกชนร่วมลงทุน
3) การจัดทำรายงานการศึกษาความเหมาะสมสำหรับการลงทุน การจัดทำงบประมาณ การวิเคราะห์ผลตอบแทนด้านการเงินและเศรษฐกิจ

1.3.4 งานส่วนที่ 4 : การสร้างกระบวนการรับรู้และการมีส่วนร่วมของประชาชนในการพัฒนาพื้นที่ตามแนวเส้นทางรถไฟ เส้นทางจังหวัดชุมพร – จังหวัดระนอง ดังนี้

1) การจัดคณะบุคลากรหลัก
2) การดำเนินการให้ประชาชนมีส่วนร่วม
3) การจัดทำแผนการประชาสัมพันธ์โครงการ

บทที่ 2

การออกแบบเบื้องต้น

บทที่ 2
การออกแบบเบื้องต้น

2.1 การออกแบบแนวเส้นทาง

การออกแบบเชิงเรขาคณิตของแนวเส้นทางรถไฟ เป็นไปตามหลักเกณฑ์และมาตรฐานในการออกแบบ (Detailed Design Criteria and Standards) ซึ่งอ้างอิงจากมาตรฐานของการรถไฟแห่งประเทศไทย (รฟท.) และมาตรฐานที่สอดคล้องกันในระดับสากล เช่น European Norm, British and American Standards, International Standards Organisation (ISO), The Union Internationale des Chemins de fers (UIC) และ AREMA (American Railway Engineers and Maintenance of Way Association ดังแสดงใน**ตารางที่ 2.1-1**

ตารางที่ 2.1-1 เกณฑ์การออกแบบแนวเส้นทาง

รายการ		รายละเอียด
มาตรฐานทั่วไป	ความเร็วออกแบบสูงสุด (Vmax) -พื้นที่ทั่วไป -พื้นที่ในเขตเมือง	 160 กม./ชม. 120 กม./ชม.
	ขนาดทาง (G)	1,000 มม. (ระยะต่ำสุดระหว่างราง) (1,060 มม. ในการคำนวณทางเรขาคณิต)
	เขตโครงสร้างทาง	ทั่วไป กว้าง 3,700 มม. x สูง 5,900 มม. สำหรับชานชาลา กว้าง 3,060 มม.
	เขตบรรทุก	ทั่วไป กว้าง 2,920 มม. x สูง 5,650 มม. สำหรับชานชาลา กว้าง 2,920 มม. (ความเร็ว > 120 กม./ชม.) กว้าง 2,860 มม. (ความเร็ว ≤ 120 กม./ชม.)
	ความยาวรถ	ปกติ 20 ม. สำหรับขบวนรถชานเมือง 18 ~ 25 ม. สำหรับ รฟท. (ใช้ในการคำนวณเท่านั้น)
	น้ำหนักกดเพลาสูงสุด	16 tf (ขบวนรถโดยสารและหัวรถจักรของ รฟท.) 20 tf (ขบวนรถสินค้าของ รฟท.)
	ชุดขบวนรถและความยาวสูงสุด	ขบวนรถโดยสารของ รฟท. 20 คัน (ความยาวสูงสุด 480 ม.) ขบวนรถสินค้าของ รฟท 40 คัน (ความยาวสูงสุด 620 ม.)
แนวเส้นทาง	รัศมีโค้งทางราบต่ำสุด (R)	1. ทางประธาน (รัศมี ≥ 2,000 ม. เป็นที่ต้องการ) 1,600 ม. สำหรับความเร็วสูงสุดที่ 160 กม./ชม. 900 ม. สำหรับความเร็วสูงสุดที่ 120 กม./ชม. (ในกรณีพิเศษ 400 ม.) 2. ศูนย์ซ่อมบำรุงและทางหลีก 200 ม.

ตารางที่ 2.1-1 เกณฑ์การออกแบบแนวเส้นทาง (ต่อ)

รายการ		รายละเอียด
แนวเส้นทาง (ต่อ)	รัศมีโค้งทางราบต่ำสุดที่สถานี	1. ทางตรงสำหรับทางประธาน 2. กรณีทั่วไปในทางหลีกและกรณีพิเศษสำหรับทางประธาน 1,000 ม. (600 ม. ในกรณีจำเป็น) (ระยะห่างระหว่างแนวศูนย์กลางทางรถไฟและชานชาลาต้องขยายออกไปตามความเร็วสูงสุด รัศมีโค้งและค่ายกโค้ง)
	รัศมีโค้งทางดิ่งต่ำสุด	ทางประธาน 5,000 ม. (ความเร็ว $\leq$ 120 กม./ชม.) 10,000 ม. (ความเร็ว > 120 กม./ชม.)
	ความลาดชันสูงสุดสำหรับทางประธาน	1% (1.2% ในกรณีจำเป็น)
	ความลาดชันสูงสุดที่สถานี	ปกติ 0% (0.12% ในกรณีจำเป็น)
	ค่ายกโค้งสูงสุด (Cmax)	ต่ำสุด 90 มม., $G^2/(0.006H)$ (H = ความสูงของจุดศูนย์ถ่วงของล้อเลื่อน หรือ 1.70 ม..)
	ส่วนขาดค่ายกโค้งสูงสุด	50 มม.
	ส่วนเกินค่ายกโค้งสูงสุด	65 มม.
	ค่ายกโค้งใช้งาน (Co)	1. ทางใช้หินโรยทาง $Co = (2/3) \times 8.338 (Vm+5)^2/R < 90$ มม. Vm : ความเร็วออกแบบที่โค้ง 2. ทางไม่ใช้หินโรยทาง $Co = 8.338\ Vo^2/R < 90$ มม. Vo : ความเร็วเฉลี่ยที่โค้งประมาณ 0.8Vmax Vmax : $((90+50)\ R/8.338)^{1/2} < 120$ กม./ชม.) อย่างไรก็ดีความเร็วสูงสุดที่เป็นไปได้ต้องตรวจสอบโดย Cd
	รูปแบบโค้งต่อ	Half Sine curve (Vmax >120 กม./ชม. และความยาวโค้งต่อ $\geq$ 50 ม.) Half Sine หรือ Cubic Parabola (Vmax $\leq$ 120 กม./ชม. และความยาวโค้งต่อ < 50 ม.) Cubic Parabola (ความยาวโค้งต่อ < 50 ม.)
	ความยาวโค้งต่อต่ำสุด (TCL)	L = Max (L1, L2, L3) : L1 = 1.0C, L2 = 0.011CV, L3 = 0.0095CdV (ในกรณีจำเป็น Vomax > 75 กม./ชม.): L1 = 0.6C, L2 = 0.0085CV, L3 = 0.0074CdV (ในกรณีจำเป็น Vomax $\leq$ 75 กม./ชม.):

ตารางที่ 2.1-1 เกณฑ์การออกแบบแนวเส้นทาง (ต่อ)

รายการ		รายละเอียด
แนวเส้นทาง (ต่อ)	ความยาวโค้งต่อต่ำสุด (TCL)	L1 = 0.4C, L2 = 0.074CV, L3 = 0.0074CdV เมื่อ C = 8.338 Vo^2/R < 90 มม. V = Vmax ที่โค้ง Vo = 0.8Vmax หรือความเร็วเฉลี่ย Vmax : $((90+50)\ R/8.338)^{1/2}$ < 120 กม./ชม.) Cd = 8.338 V^2/R – C < 50 มม. (หมายเหตุ Vmax ไม่ใช่ความเร็วเดินรถจริง เว้นแต่ในกรณีจำเป็น)
	ความยาวแนวทางตรงต่ำสุด	1. Vmax > 120 กม./ชม. : 50 ม. ถ้าเป็นไปไม่ได้โค้งสองโค้งเชื่อมต่อกันด้วยโค้งต่อได้โดยไม่ต้องมีทางตรง 2. Vmax < 120 กม./ชม. : 20-25 ม. (ขึ้นอยู่กับความยาวของรถ) ถ้าเป็นไปไม่ได้ โค้งสองโค้งเชื่อมต่อกันด้วยโค้งต่อได้โดยไม่ต้องมีทางตรง
	ความยาวโค้งกลมต่ำสุด	1. Vmax > 120 กม./ชม. : 50 ม. ถ้าเป็นไปไม่ได้โค้งสองโค้งเชื่อมต่อกันด้วยโค้งต่อได้โดยไม่ต้องมีทางตรง 2. Vmax < 120 กม./ชม. : 20-25 ม. (ขึ้นอยู่กับความยาวของรถ) ถ้าเป็นไปไม่ได้ โค้งสองโค้งเชื่อมต่อกันด้วยโค้งต่อได้โดยไม่ต้องมีทางตรง
	ระยะห่างระหว่างจุดศูนย์กลางทางต่ำสุด	4.0 ม. นอกย่านสถานี 5.0 ม. ระหว่างทางประธานและทางหลีก 4.5 ม. ระหว่างทางหลีก
	การขยายของเขตโครงสร้าง	เขตโครงสร้างและความกว้างพื้นทางควรขยายออกให้สอดคล้องกับรัศมีโค้งแนวนอนและค่ายกโค้งใช้งาน เขตโครงสร้างและความกว้างพื้นทางจำเป็นต้องได้รับการขยายออกให้สอดคล้องกับพิกัดรัศมีโค้งแนวนอนและค่ายกโค้งใช้งาน

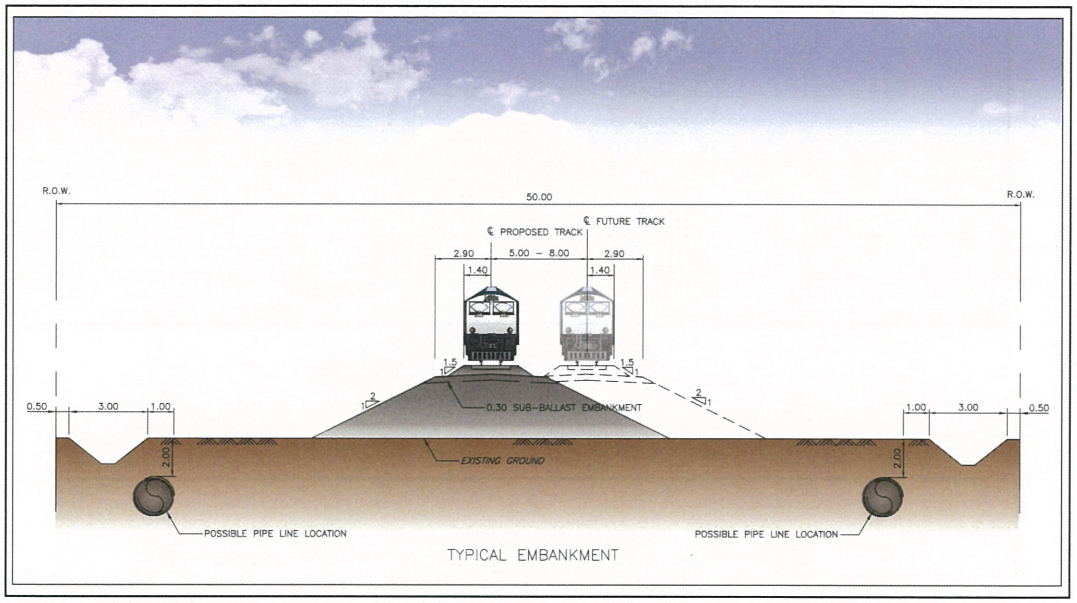
ตารางที่ 2.1-1 เกณฑ์การออกแบบแนวเส้นทาง (ต่อ)

รายการ		รายละเอียด
โครงสร้างทาง	รูปตัดราง	UIC 54
	ความเอียงของราง	ทางประธาน 1:40 ศูนย์ซ่อมบำรุง 1:40
	รางเชื่อมยาว (CWR)	1. ทางใช้หินโรยทาง R ≥ 500 ม. 2. ทางไม่ใช้หินโรยทาง R ≥ 400 ม.
	แรงยึดเหนี่ยว (ตามปกติ)	ทางไม่ใช้หินโรยทาง : 0.5 ตัน/ราง/ม.
	ความหนาหินโรยทางต่ำสุดและคอนกรีตพื้นทางใต้ราง	1. ทางประธาน 300 มม. 2. ทางหลีก 250 มม. 3. ศูนย์ซ่อมบำรุง 200 มม. 4. หินโรยทางชนิดดีที่ความหนา 150 มม. สำหรับทางไม่ใช้หินโรยทางจะใช้สำหรับการออกแบบงานโยธา
	ความหนาพื้นทางคอนกรีตต่ำสุด	100 มม. (100-150 มม. ใต้ราง)
	ความยาวขบวนรถสินค้า	สูงสุด 600 ม.
	ขนาดปกติของประแจ	1. ทางประธาน Vomax > 120 กม./ชม. : 1:16 Vomax < 120 กม./ชม. : 1:12 2. ทางหลีกและศูนย์ซ่อมบำรุง : 1:8, 1:10
	หมอนรองราง	- คอนกรีตอัดแรง - พลาสติก (ตามที่ รฟท. เห็นชอบ) - หมอนไม้ (สำหรับศูนย์ซ่อมบำรุงเท่านั้น)
สถานี	ความสูงของชานชาลา	มาตรฐาน รฟท.
	ความกว้างชานชาลาต่ำสุด	กว้างกว่า 5 ม. บริเวณพื้นที่ปลายชานชาลาและกว้าง 8 ม. บริเวณพื้นที่ตรงกลางชานชาลา 4 ม. ใช้สำหรับทางเดี่ยว (2.0 ม. ในกรณีจำเป็น) 5 ม. ใช้สำหรับทางคู่ (3.0 ม. ในกรณีจำเป็น) ในกรณีที่มีการใช้กำแพงป้องกัน ต้องขยายความกว้างของชานชาลา
	ระยะระหว่างโครงสร้างและขอบของชานชาลาต่ำสุด	- ใช้ 2 ม. (ไม่มีกำแพงป้องกัน) - กรณีจำเป็น 1 ม. สำหรับเสา, 1 ม. สำหรับกำแพง

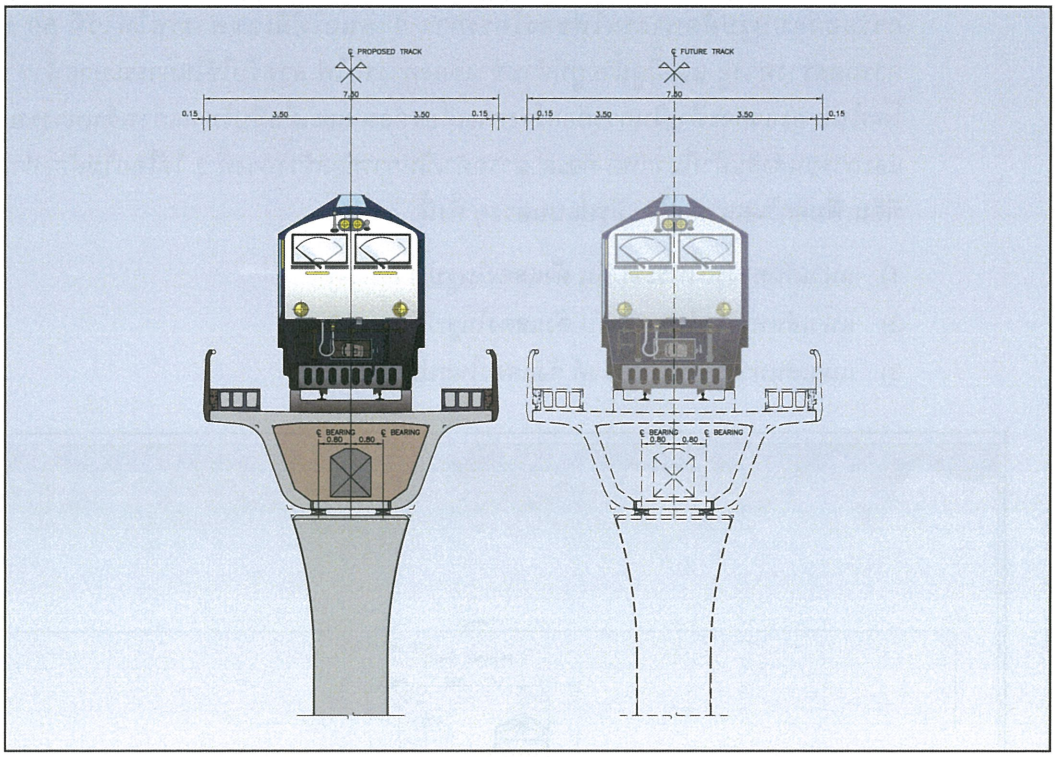
2.1.1 การออกแบบรูปตัดทางรถไฟ

การออกแบบรูปตัดทางรถไฟของโครงการ กำหนดให้มีเขตทางรถไฟไว้ที่ 50 ม. สำหรับการก่อสร้างทางคู่ และมีคูน้ำอยู่ที่ด้านข้างของทางรถไฟ สำหรับใช้ในการระบายน้ำตามแนวยาว โดยในระยะแรกจะดำเนินการก่อสร้างทางเดี่ยวก่อน และเมื่อมีปริมาณการเดินทางของผู้โดยสารและการขนส่งสินค้าที่มากพอ ก็จะสามารถดำเนินการก่อสร้างทางที่ 2 ได้โดยไม่ต้องทำการเวนคืนที่ดินเพิ่มอีกในอนาคต โดยมีรูปแบบต่างๆ ดังนี้

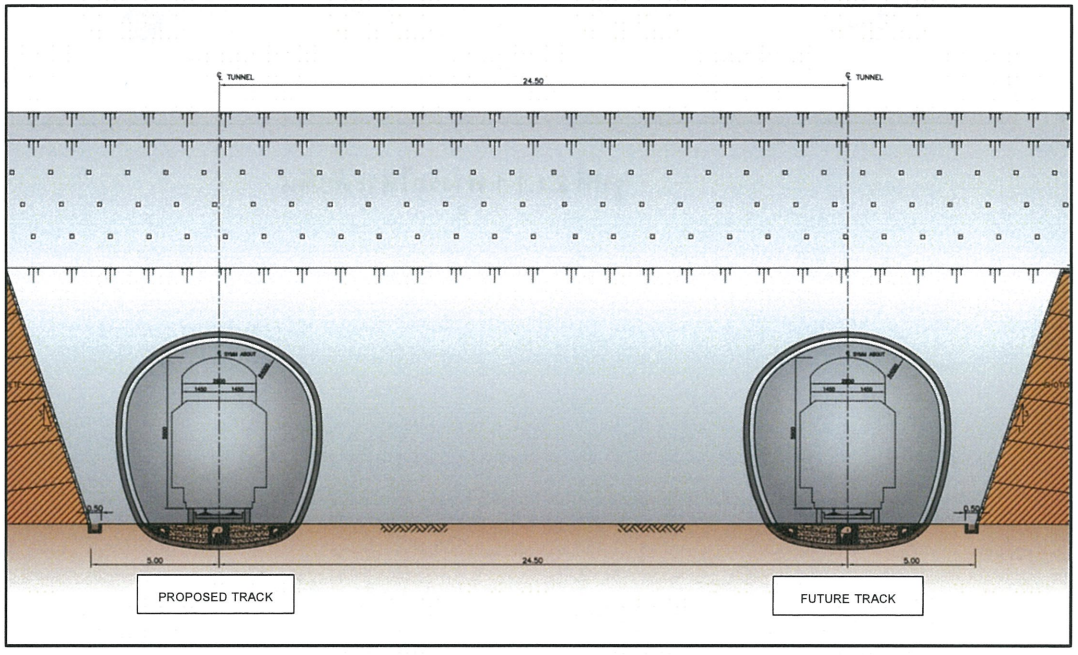
1) แนวเส้นทางรถไฟระดับดิน ดังแสดงใน**รูปที่ 2.1.1-1**
2) แนวเส้นทางรถไฟยกระดับ ดังแสดงใน**รูปที่ 2.1.1-2**
3) แนวเส้นทางรถไฟในอุโมงค์ ดังแสดงใน**รูปที่ 2.1.1-3**



รูปที่ 2.1.1-1 ทางรถไฟระดับดิน



รูปที่ 2.1.1-2 ทางรถไฟยกระดับ



รูปที่ 2.1.1-3 ทางรถไฟในอุโมงค์

2.1.2 ผลการออกแบบแนวเส้นทาง

แนวเส้นทาง แบ่งเป็น 3 เส้นทางคือ เส้นทางหลักจากชุมพร-ท่าเรือน้ำลึกระนอง (Main line) มีระยะทาง 102.797 กม. ทางเชื่อมจากรถไฟสายใต้ (สุราษฎร์ธานี) เข้าสู่เส้นทางหลัก(Chord line) มีระยะทาง 1.129 กม. และเส้นทางแยกเข้าสู่ตัวเมืองระนอง (Spur line) มีระยะทาง 5.082 กม. รวมเป็นระยะทางทั้งสิ้น 109.008 กม. สถานีรถไฟในแนวทางเลือกนี้ ประกอบด้วยสถานีทั้งสิ้น 9 สถานีคือ สถานีขุนกระทิง สถานีบ้านนา (1) สถานีบ้านนา (2) สถานีปากจั่น สถานีกระบุรี สถานีบางใหญ่ สถานีละอุ่น สถานีท่าเรือระนองและสถานีระนอง ความเร็วที่ใช้ในการออกแบบ คือ 160 กม./ชม. ในบริเวณพื้นที่ทั่วไป และ 120 กม./ชม. ในบริเวณที่มีข้อจำกัดของพื้นที่ ข้อมูลการออกแบบรัศมีโค้งแนวราบและความเร็วในการออกแบบแสดงดัง**ตารางที่ 2.1.2-1** ส่วนการออกแบบความลาดชันแสดงดัง**ตารางที่ 2.1.2-2**

ตารางที่ 2.1.2-1 รัศมีโค้งแนวราบและความเร็วในการออกแบบของแนวเส้นทาง

ลำดับที่	กม.ที่	รัศมีโค้งแนวราบ (ม.)	ความเร็วที่ใช้ในการออกแบบ (กม./ชม.)
Main line			
1	0+658.154	400	80
2	4+953.201	2,000	160
3	7+141.974	2,000	160
4	11+112.196	2,000	160
5	13+415.387	1,200	140
6	14+959.744	1,000	125
7	17+082.641	1,600	160
8	22+803.883	3,000	160
9	28+558.103	1,283	145
10	33+478.342	1,600	160
11	39+297.631	2,000	160
12	46+723.203	5,000	160
13	54+490.793	3,000	160
14	58+367.632	2,000	160
15	60+204.311	3,000	160
16	63+107.432	3,000	160
17	65+076.159	2,000	160
18	68+002.321	1,600	160
19	69+571.574	1,600	160
20	72+750.369	2,000	160

ตารางที่ 2.1.2-1 รัศมีโค้งแนวราบและความเร็วในการออกแบบของแนวเส้นทาง(ต่อ)

ลำดับที่	กม.ที่	รัศมีโค้งแนวราบ (ม.)	ความเร็วที่ใช้ในการออกแบบ (กม./ชม.)
17	65+076.159	2,000	160
18	68+002.321	1,600	160
19	69+571.574	1,600	160
20	72+750.369	2,000	160
21	74+827.468	2,000	160
22	76+293.453	2,000	160
23	78+118.409	3,000	160
24	82+600.650	3,000	160
25	84+717.304	2,000	160
26	87+223.826	3,500	160
27	94+258.179	1,000	125
28	95+852.147	1,500	155
29	97+532.327	2,000	160
30	99+360.894	1,200	140
31	99+970.372	1,200	140
32	101+871.445	400	80
Chord line			
1	0+781.876	400	80
Spur line			
1	0+700.034	1,000	125
2	2+425.995	2,000	160
3	4+220.548	500	90

ตารางที่ 2.1.2-2 ความลาดชันและรัศมีโค้งทางดิ่งในการออกแบบแนวเส้นทาง

PVI.CH.	Crest	G1	G2	Rvc (used)	Lvc
	Sag	(%)	(%)	(m)	(m)
Main line					
0+000.000	-	-	0	-	-
1+249.000	sag	0	+0.25	119,989	300
1+902.000	crest	+0.25	0	119,989	300
4+896.000	sag	0	+1.2	25,000	300
5+966.000	crest	+1.2	0	25,000	300
8+868.000	sag	0	+1.2	25,000	300

ตารางที่ 2.1.2-2 ความลาดชันและรัศมีโค้งทางดิ่งในการออกแบบแนวเส้นทาง(ต่อ)

PVI.CH.	Crest	G1	G2	Rvc (used)	Lvc
	Sag	(%)	(%)	(m)	(m)
10+233.000	crest	+1.2	0	25,000	300
16+124.000	sag	0	+1.0	30,001	300
18+018.000	crest	+1.0	0	30,001	300
23+253.000	sag	0	+1.0	30,001	300
26+613.000	crest	+1.0	0	30,001	300
31+820.000	crest	0	-1.2	25,000	300
34+891.000	sag	-1.2	0	25,000	300
36+154.000	crest	0	-1.2	25,000	300
38+585.000	sag	-1.2	0	25,000	300
46+950.000	sag	0	+1.0	30,000	300
47+523.000	crest	+1.0	0	30,000	300
53+555.000	sag	0	+1.2	25,000	300
55+806.000	crest	+1.2	0	25,000	300
58+764.000	crest	0	-1.2	25,000	300
62+307.000	sag	-1.2	0	25,000	300
68+151.000	sag	0	+0.5	60,000	300
69+651.000	crest	+0.5	0	60,000	300
74+422.000	crest	0	-1.0	30,000	300
75+122.000	sag	-1.0	0	30,000	300
82+290.000	sag	0	+1.2	25,000	300
83+423.000	crest	+1.2	0	25,000	300
84+758.000	crest	0	-1.2	25,000	300
85+970.000	sag	-1.2	0	25,000	300
92+095.000	sag	0	+1.2	25,000	300
94+007.000	crest	+1.2	0	25,000	300
95+560.120	crest	0	-1.0	30,000	300
96+059.000	sag	-1.0	0	30,000	300
98+785.000	sag	0	+1.0	30,000	300
99+285.000	crest	+1.0	0	30,000	300
100+821.900	crest	0	-1.2	16,666	200
102+071.900	sag	-1.2	0	16,666	200
102+797.580	-	0	-	-	-

ตารางที่ 2.1.2-2 ความลาดชันและรัศมีโค้งทางดิ่งในการออกแบบแนวเส้นทาง(ต่อ)

PVI.CH.	Crest	G1	G2	Rvc (used)	Lvc
	Sag	(%)	(%)	(m)	(m)
Chord line					
0+000.000	-	-	0	-	-
0+427.000	sag	0	+1.0	20,000	200
0+762.533	crest	+1.0	0	20,000	200
1+129.964	-	0	-	-	-
Spur line					
0+000.000	-	-	0	-	-
0+309.000	sag	0	+1.0	30,000	300
0+809.000	crest	+1.0	0	30,000	300
2+957.000	crest	0	-1.5	25,000	300
4+205.000	sag	-1.5	0	25,000	300
5+082.176	-	0	-	-	-

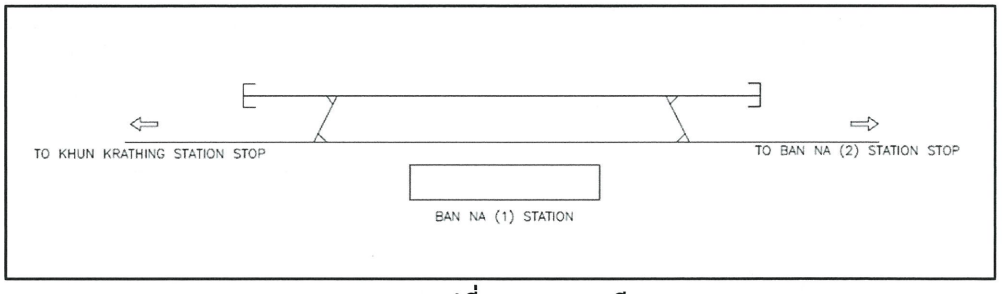
2.2 การออกแบบผังทางรถไฟ (Track Layout)

1) ทางหลีก ดังแสดงใน**รูปที่ 2.2-1**

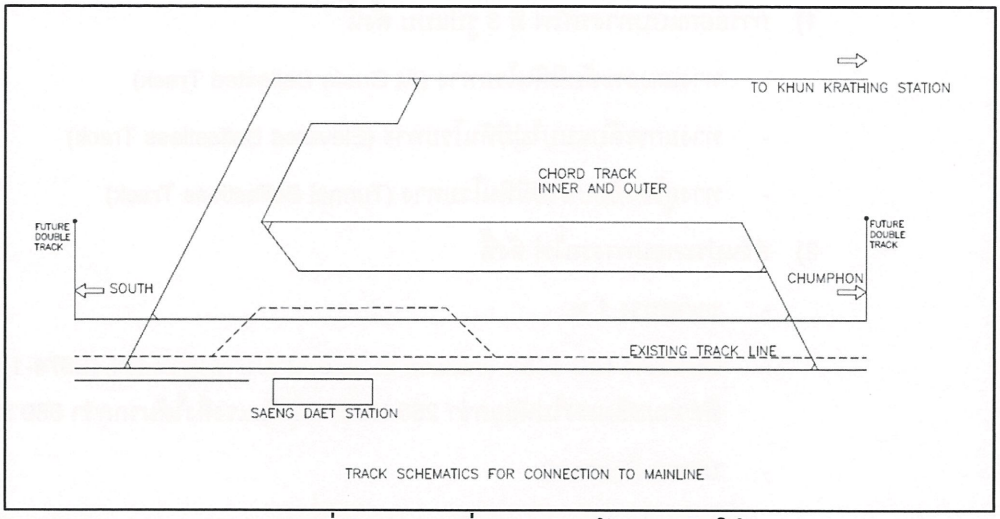
2) การเชื่อมต่อกับเส้นทางสายใต้ ดังแสดงใน**รูปที่ 2.2-2**

3) สถานีปลายทางระนอง ดังแสดงใน**รูปที่ 2.2-3**

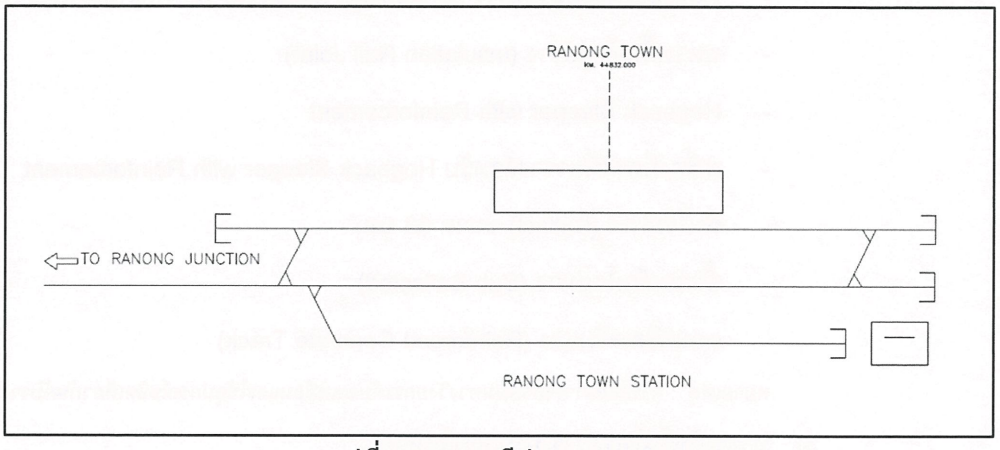
4) สถานีกองเก็บตู้สินค้า (Container Yard : CY) ดังแสดงใน**รูปที่ 2.2-4**



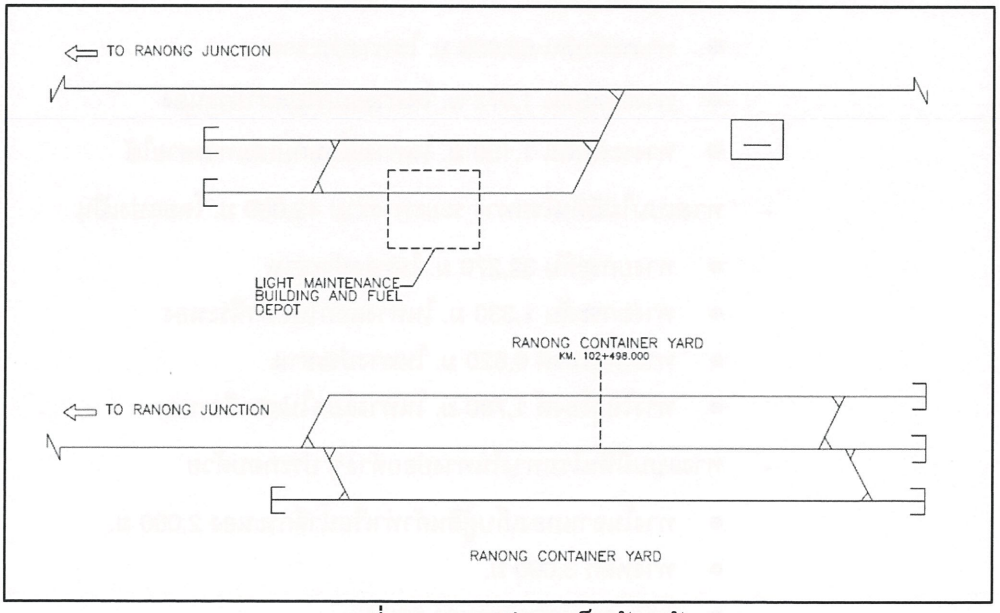
รูปที่ 2.2-1 ทางหลีก



รูปที่ 2.2-2 การเชื่อมต่อกับเส้นทางสายใต้



รูปที่ 2.2-3 สถานีปลายทางระนอง



รูปที่ 2.2-4 สถานีกองเก็บตู้สินค้า

2.3 การออกแบบทางรถไฟ (Trackwork Design)

1) การออกแบบทางรถไฟ มี 3 รูปแบบ ดังนี้

- ทางเสมอระดับมีหินโรยทาง (At Grade Ballasted Track)
- ทางยกระดับแบบไม่มีหินโรยทาง (Elevated Ballastless Track)
- ทางอุโมงค์แบบไม่มีหินโรยทาง (Tunnel Ballastless Track)

2) ส่วนประกอบทางรถไฟ ดังนี้

- ขนาดทาง 1 ม.
- ขนาดราง UIC 54E1 (inclined at 1:40) ตามมาตรฐาน EN 13674-1 เป็นแบบเชื่อมยาว มีความแข็งแรงไม่น้อยกว่า 260 HBW และรับแรงดึงได้มากกว่า 880 N/mm2
- ประแจ (Turnout)
- เครื่องยึดเหนี่ยวราง (Fastener for Monoblock Sleepers) เกณฑ์การพิจารณา
- หมอนคอนกรีตแบบยาว (Monoblock Sleepers) รองรับน้ำหนักเพลาได้ 20 ตัน
- ฉนวนกั้นหัวต่อราง (Insulation Rail Joint)
- Hogback Sleeper with Reinforcement
- เครื่องยึดเหนี่ยวรางสำหรับ Hogback Sleeper with Reinforcement
- หินโรยทาง (Ballast) ขนาด 63 มม.
- ชั้นรองหินโรยทาง (Sub-Ballasted)
- คอนกรีตเสริมแรง (Reinforced Concrete Track)

หมายเหตุ : การติดตั้งรางรถไฟบนทางวิ่งยกระดับจะเหมือนและใช้อุปกรณ์ชนิดเดียวกันกับรางรถไฟในอุโมงค์

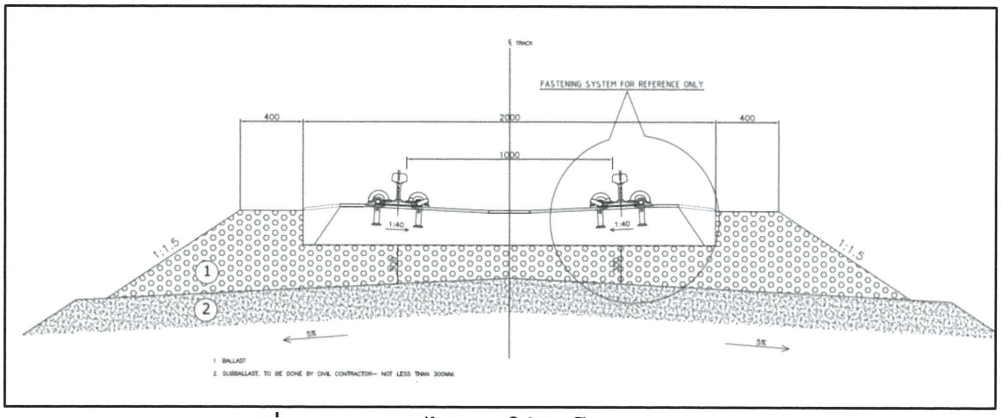
3) ทางรถไฟในโครงการ ประกอบไปด้วย

- ทางแบบมีหินโรยทาง ระยะทางรวม 67,010 ม. โดยแบ่งเป็น
  - ทางระดับดิน 63,908 ม. ในทางประธาน
  - ทางระดับดิน 1,972 ม. ในทางแยกไปสถานีระนอง
  - ทางระดับดิน 1,130 ม. ในทางเชื่อมกับเส้นทางสายใต้
- ทางแบบไม่มีหินโรยทาง ระยะทางรวม 42,000 ม. โดยแบ่งเป็น
  - ทางยกระดับ 32,270 ม. ในทางประธาน
  - ทางยกระดับ 1,330 ม. ในทางแยกไปสถานีระนอง
  - ทางในอุโมงค์ 6,620 ม. ในทางประธาน
  - ทางในอุโมงค์ 1,780 ม. ในทางแยกไปสถานีระนอง
- ทางแบบมีหินโรยทางในทางย่อยต่างๆ ประกอบด้วย
  - ทางในลานกองเก็บตู้สินค้าท่าเรือน้ำลึกระนอง 2,000 ม.
  - ทางหลีก 3,000 ม.
  - ทางภายในสถานีระนอง 900 ม.

4) ทางรถไฟแบบใช้หินโรยทาง (Ballasted Track) มีส่วนประกอบดังนี้

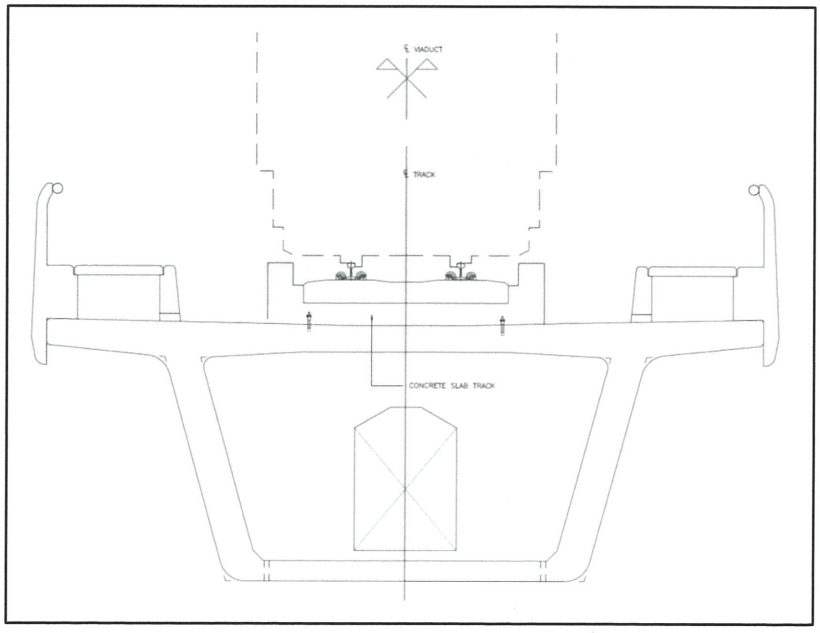
- หมอนคอนกรีต ระยะห่าง 600 มม.
- เครื่องยึดเหนี่ยวราง (Clamped or Bolted Type)
- หินโรยทางขนาดไม่เล็กกว่า 25 มม. โรยอยู่ใต้รางบนหินโรยทางขนาด 30 มม.
- ประแจ
- ฉนวนกั้นราง IRJ 6 Hole Type (Glued)
- แป้นประทะ (Buffer Stops) แบบเลื่อนได้

รายละเอียดดังแสดงใน**รูปที่ 2.3-1**



รูปที่ 2.3-1 ทางรถไฟแบบใช้หินโรยทาง

5) ทางรถไฟแบบไม่ใช้หินโรยทาง (Non-Ballasted Track) จะเป็นช่วงเส้นทางยกระดับ อุโมงค์ และในย่านสถานีกองเก็บตู้สินค้า โดยรางรถไฟจะติดตั้งลงบนหมอนคอนกรีตเสริมเหล็ก ดังแสดงใน**รูปที่ 2.3-2**



รูปที่ 2.3-2 ทางรถไฟแบบไม่ใช้หินโรยทาง

6) อายุของส่วนประกอบทางรถไฟ (Component Design Life) มีอายุการใช้งานดังนี้

- เครื่องยึดหนี่ยวราง 15 ปี
- รางบริเวณโค้งรัศมีน้อยกว่า 400 ม. 10 ปี
- รางบริเวณทางเชื่อมโค้ง 25 ปี
- ชุดเครื่องยึดเหนี่ยวรางบนทางยกระดับและอุโมงค์
  - แผ่นรอง 10 ปี
  - น็อตยึด 15 ปี
  - ตัวยึดเหนี่ยว 10 ปี
  - ฉนวนรองราง 10 ปี
- หมอนคอนกรีตเสริมแรง 15 ปี
- ประแจ
  - Switch blades and stock rails 10 ปี
  - แผ่นรองราง 10 ปี
  - ตะเฆ่ Manganese steel crossing nose 20 ปี
  - น็อตยึด 20 ปี
  - คอนกรีตเสริมแรงกันตก 15 ปี
- ฉนวนต่อราง IRJ (glued type) 15 ปี

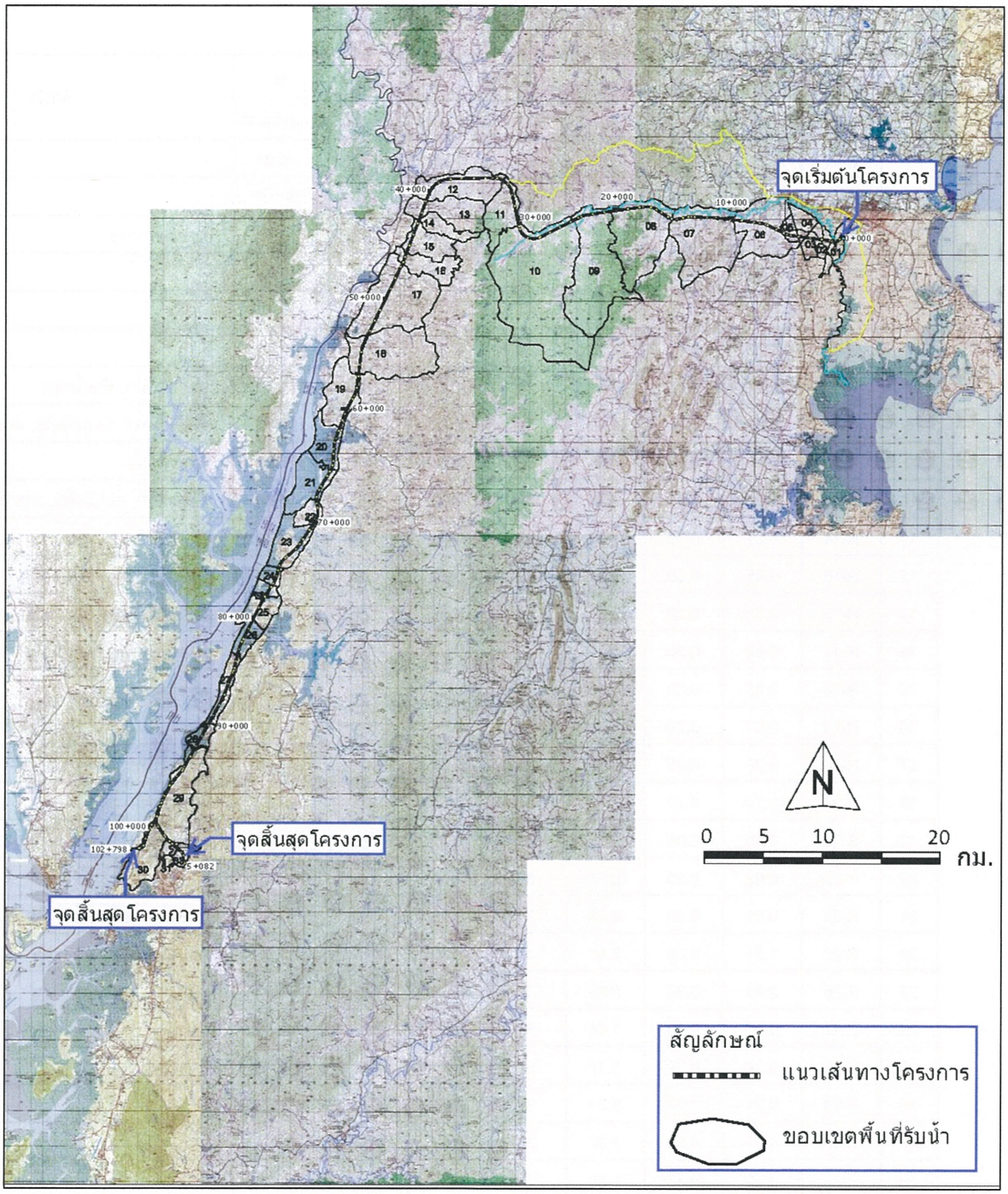
2.4 การออกแบบระบบระบายน้ำ

ระบบการระบายน้ำหลักตามแนวเส้นทางรถไฟ ประกอบด้วย 2 ส่วน คือ

1) ระบบการระบายน้ำตามแนวขนานเส้นทางรถไฟ

2) ระบบการระบายน้ำตามแนวขวางเส้นทางรถไฟ

ผลการศึกษาด้านอุทกวิทยาและผลการประเมินขนาดของอาคารระบายน้ำ โดยมีขนาดพื้นที่รับน้ำตามแนวเส้นทางรถไฟได้แสดงรูปร่างพื้นที่รับน้ำและทิศทางการไหลไว้ดัง**รูปที่ 2.4-1** ผลการประเมินขนาดของอาคารระบายน้ำคำนวณได้จาก**ตารางที่ 2.4-1** และ**ตารางที่ 2.4.-2** การออกแบบอาคารระบายน้ำแต่ละแห่งได้แสดงไว้ใน**ตารางที่ 2.4-3**



รูปที่ 2.4-1 ขอบเขตพื้นที่รับน้ำฝนของลำน้ำและทิศทางการไหลตัดผ่านแนวเส้นทางรถไฟ

ตารางที่ 2.4-1 การคำนวณปริมาณน้ำหลากสำหรับพื้นที่รับน้ำน้อยกว่า 25 ตร.กม.

(โดย Rational Method)

ลำดับ	พื้นที่รับน้ำ		C	$Tc = (0.87 L^3/H)^{0.385}$			I_{25}	Q	ลำน้ำ
	ตำแหน่ง	($กม^2$)		L (กม.)	H (ม.)	Tc (ชม.)	(mm./hr)	(ลบ.ม/วินาที)	
1	R-01	4.61	0.30	0.96	25	0.26	183	70.20	-
2	R-02	1.98	0.30	0.92	15	0.30	183	30.15	-
3	R-03	2.92	0.30	1.45	23	0.44	183	44.47	คลองนาคราช
4	R-04	3.97	0.30	0.91	51	0.19	183	60.46	-
5	R-05	2.28	0.30	1.46	34	0.38	183	34.72	-
6	R-06	21.73	0.30	2.11	36	0.57	122	221.10	-
7	R-07	19.67	0.30	3.51	20	1.27	86	141.41	คลองชุมพร, ห้วยโคลน
8	R-11	12.13	0.30	2.31	98	0.43	122	123.42	คลองชุมพร, คลองหินใส, สาขาคลองชุมพร
9	R-12	15.42	0.30	3.48	62	0.82	122	156.90	คลองหินวัว
10	R-13	6.88	0.30	2.33	38	0.62	122	70.00	คลองหลีก, คลองหลีก, สาขาคลองจั่น, คลองวัน
11	R-14	0.02	0.30	1.10	21	0.33	183	0.30	-
12	R-15	6.45	0.30	2.39	68	0.51	122	65.63	คลองไม่มีชื่อ
13	R-16	6.52	0.30	2.39	69	0.51	122	66.34	คลองไม่มีชื่อ, คลองตาปรือ, คลองน้ำจืด
14	R-17	6.98	0.30	2.71	75	0.57	122	71.02	คลองปากหนาม, ลำน้ำไม่มีชื่อ, คลองผักหนาม
15	R-18	3.85	0.30	4.10	140	0.72	101	32.30	คลองละอุ่น
16	R-19	0.61	0.30	3.29	54	0.81	101	5.12	คลองบางสองรา, ลำน้ำไม่มีชื่อ
17	R-20	9.28	0.30	2.42	41	0.63	101	77.86	คลองสิบทา, ลำน้ำไม่มีชื่อ
18	R-21	11.15	0.30	2.41	61	0.54	101	93.55	คลองบางใหญ่เหนือ
19	R-22	8.55	0.30	1.33	77	0.25	122	86.99	คอลงบางใหญ่, คลองหินกอง
20	R-23	0.02	0.30	2.66	89	0.52	122	0.20	-
21	R-24	0.01	0.30	0.73	31	0.18	183	0.15	คลองลัด, คลองละอุ่น, คลองไม่มีชื่อ
22	R-25	1.81	0.30	5.81	37	1.80	86	13.01	คลองไม่มีชื่อ
23	R-26	2.49	0.30	0.50	2	0.33	183	37.92	คลองไม่มีชื่อ
24	R-27	0.17	0.30	1.54	61	0.32	183	2.59	-
25	R-28	0.29	0.30	1.17	57	0.24	183	4.42	คลองไม่มีชื่อ
26	R-29	0.31	0.30	2.71	35	0.76	101	2.60	-
27	R-30	4.21	0.30	2.37	38	0.63	122	42.84	-
28	R-31	0.52	0.30	1.80	20	0.59	122	5.29	ลำราง
29	R-32	0.23	0.30	4.86	20	1.86	86	1.65	คลองบางนอน
30	R-33	2.12	0.30	1.60	22	0.50	183	32.29	คลองบางนอน

ตารางที่ 2.4-2 การคำนวณปริมาณน้ำหลากสำหรับพื้นที่รับน้ำอยู่ระหว่าง 25-1,000 ตร.กม. (โดย Snyder's Equations)

ลำดับ	พื้นที่รับน้ำ		L	L_C	L_1	t_r	K_p	q_p	Φ	α	I_{100}	$Q_{Snyder's\ Eq.}$	ลำน้ำ
	ตำแหน่ง	($กม^2$)	(กม.)	(กม.)	(กม.)	(ชม.)		($l/s/km^2$)			(mm./hr)	(cu.m./sec.)	
1	R-08	28.55	6.49	0.35	0.05	0.20	30	150.72	40	90%	183	106.50	ห้วยโคลน, ห้วยแพะ, คลองห้วยลึก, คลองชุมพร
2	R-09	37.44	11.21	0.89	0.08	0.26	30	113.91	40	90%	183	139.66	สาขาคลองชุมพร, คลองของ, คลองของ
3	R-10	71.50	9.90	1.61	0.16	0.31	30	95.36	40	90%	183	266.71	คลองชุมพร, คลองหินใส, สาขาคลองชุมพร

ตารางที่ 2.4-3 ผลการออกแบบอาคารระบายน้ำที่ตัดผ่านแนวเส้นทางรถไฟ

ลำดับ	กม.	พื้นที่รับน้ำ (ตร.ม.)	Q (ลบ.ม/วินาที)	พื้นที่ช่องเปิดที่ต้องการ (ตร.ม.)	กำหนดความลึก (ม.)	ความกว้างช่องเปิดโดยประมาณ (ม.)	ลำน้ำ	ชนิดอาคารระบายน้ำที่เหมาะสม
1	0+850	R-01	70.20	35.10	2	17.55		ท่อเหลี่ยม
2	1+250	R-02	30.15	15.08	2	7.54		ท่อเหลี่ยม
3	2+235	R-03	44.47	22.23	2	11.12	คลองนาคราช	สะพานยกระดับ
4	3+375	R-04	60.46	30.23	2	15.11		ท่อเหลี่ยม
5	5+674	R-05	34.72	17.36	2	8.68		ท่อเหลี่ยม
6	6+840	R-06	221.10	110.55	2	55.27		สะพานยกระดับ
	7+800							ท่อเหลี่ยม
	8+375							ท่อเหลี่ยม
7	9+573	R-07	141.41	70.70	2	35.35	คลองชุมพร,	ท่อเหลี่ยม
	14+641						ห้วยโคลน	ท่อเหลี่ยม
8	15+310	R-08	106.50	53.25	2	26.62	*ห้วยโคลน, ห้วย*	สะพานยกระดับ
	16+209						*แพะ, คลองห้วย*	ท่อเหลี่ยม
	17+553						*ลึก, คลองชุมพร*	สะพานยกระดับ
	19+745							สะพานยกระดับ
9	21+050	R-09	139.66	69.83	2	34.91	*สาขาคลองชุมพร*	สะพานยกระดับ
	21+593						*, คลองของ*	สะพานยกระดับ
	21+949							ท่อเหลี่ยม
	22+328							ท่อเหลี่ยม
10	24+556	R-10	266.71	133.35	2	66.68	*คลองชุมพร,*	ท่อเหลี่ยม
	25+110						*คลองหินใส,*	สะพานยกระดับ
	25+773						*สาขาคลองชุมพร*	สะพานยกระดับ
	27+198							สะพานยกระดับ
	27+878							สะพานยกระดับ
	28+840							สะพานยกระดับ
11	29+918	R-11	123.42	61.71	2	30.86	คลองชุมพร,	ท่อเหลี่ยม
	33+173						คลองหินใส,	สะพานยกระดับ
12	34+283	R-12	156.90	78.45	2	39.22	คลองหินวัว	สะพานยกระดับ
	35+333							สะพานยกระดับ
	36+360							สะพานยกระดับ
	38+233							สะพานยกระดับ
	38+735							ท่อเหลี่ยม
	39+810							สะพานยกระดับ
13	42+025	R-13	70.00	35.00	2	17.50	คลองหลีก, สาขาคลองจั่น, คลองวัน	สะพานยกระดับ
14	42+585	R-14	0.30	0.15	2	0.08		ท่อเหลี่ยม
15	44+808	R-15	65.63	32.81	2	16.41	คลองไม่มีชื่อ	ท่อเหลี่ยม

ตารางที่ 2.4-3 ผลการออกแบบอาคารระบายน้ำที่ตัดผ่านแนวเส้นทางรถไฟ (ต่อ)

ลำดับ	กม.	พื้นที่รับน้ำ (ตร.ม.)	Q (ลบ.ม/วินาที)	พื้นที่ช่องเปิดที่ต้องการ (ตร.ม.)	กำหนดความลึก (ม.)	ความกว้างช่องเปิดโดยประมาณ (ม.)	ลำน้ำ	ชนิดอาคารระบายน้ำที่เหมาะสม
16	45+805	R-16	66.34	33.17	2	16.58	คลองไม่มีชื่อ, คลองตาปรือ, คลองน้ำจืด	สะพานยกระดับ
	46+765							สะพานยกระดับ
	48+098							สะพานยกระดับ
	49+190							สะพานยกระดับ
	50+590							สะพานยกระดับ
	50+970							ท่อเหลี่ยม
	51+470							สะพานยกระดับ
	51+703							ท่อเหลี่ยม
	52+500							ท่อเหลี่ยม
	53+196							ท่อเหลี่ยม
	54+070							สะพานยกระดับ
	55+663							สะพานยกระดับ
17	56+835	R-17	71.02	35.51	2	17.76	คลองปากหนาม, ลำน้ำไม่มีชื่อ, คลองผักหนาม	สะพานยกระดับ
	57+135							ท่อเหลี่ยม
	57+950							ท่อเหลี่ยม
	57+868							ท่อเหลี่ยม
	58+643							สะพานยกระดับ
	60+430							สะพานยกระดับ
18	63+381	R-18	32.30	16.15	2	8.08		ท่อเหลี่ยม
19	63+728	R-19	5.12	2.56	2	1.28	คลองบางสองรา, ลำน้ำไม่มีชื่อ	สะพานยกระดับ
20	66+425	R-20	77.86	38.93	2	19.46	คลองสิบทา, ลำน้ำไม่มีชื่อ	สะพานยกระดับ
	66+910							ท่อเหลี่ยม
	67+440							สะพานยกระดับ
21	68+625	R-21	93.55	46.77	2	23.39	คลองบางใหญ่เหนือ	สะพานยกระดับ
22	72+048	R-22	86.99	43.50	2	21.75	คอลงบางใหญ่, คลองหินกอง	ท่อเหลี่ยม
23	75+010	R-23	0.20	0.10	2	0.05		สะพานยกระดับ
	75+820							สะพานยกระดับ
	76+109							ท่อเหลี่ยม
	76+651							ท่อเหลี่ยม
24	77+000	R-24	0.15	0.08	2	0.04	คลองลัด, คลองละอุ่น, คลองไม่มีชื่อ	ท่อเหลี่ยม
	77+438							ท่อเหลี่ยม
	81+668							สะพานยกระดับ
	84+262							ท่อเหลี่ยม

ตารางที่ 2.4-3 ผลการออกแบบอาคารระบายน้ำที่ตัดผ่านแนวเส้นทางรถไฟ (ต่อ)

ลำดับ	กม.	พื้นที่รับน้ำ (ตร.ม.)	Q (ลบ.ม/วินาที)	พื้นที่ช่องเปิดที่ต้องการ (ตร.ม.)	กำหนดความลึก (ม.)	ความกว้างช่องเปิดโดยประมาณ (ม.)	ลำน้ำ	ชนิดอาคารระบายน้ำที่เหมาะสม
25	84+500	R-25	13.01	6.51	2	3.25	คลองไม่มีชื่อ	ท่อเหลี่ยม
	85+500							ท่อเหลี่ยม
	86+125							สะพานยกระดับ
	88+645							สะพานยกระดับ
26	90+015	R-26	37.92	18.96	2	9.48	คลองไม่มีชื่อ	สะพานยกระดับ
	90+895							ท่อเหลี่ยม
	91+738							ท่อเหลี่ยม
27	92+130	R-27	2.59	1.29	2	0.65		ท่อเหลี่ยม
	92+878							สะพานยกระดับ
	93+941							ท่อเหลี่ยม
	96+103							สะพานยกระดับ
	96+583							ท่อเหลี่ยม
	97+000							ท่อเหลี่ยม
	97+598							สะพานยกระดับ
	98+538							สะพานยกระดับ
28	99+135	R-28	4.42	2.21	2	1.10	คลองไม่มีชื่อ	ท่อเหลี่ยม
	102+332							ท่อเหลี่ยม
29	2+500	R-29	2.60	1.30	2	0.65		ท่อเหลี่ยม
30	2+750	R-30	42.84	21.42	2	10.71		ท่อเหลี่ยม
31	0+000	R-31	5.29	2.65	2	1.32	ลำราง	ท่อเหลี่ยม
32	3+436	R-32	1.65	0.83	2	0.41	คลองบางนอน	ท่อเหลี่ยม
	3+955							สะพานยกระดับ
33	4+500	R-33	32.29	16.14	2	8.07	คลองบางนอน	ท่อเหลี่ยม

2.5 การออกแบบสถานีรถไฟ

กำหนดขนาดสถานีของโครงการเป็น 2 ขนาด ประกอบไปด้วย

1) สถานีรูปแบบ A (TYPE A) เป็นสถานีระดับจังหวัด ซึ่งเป็นสถานีขนาดกลาง รองรับผู้โดยสาร 5,000 คนต่อวันขึ้นไป จำนวน 1 แห่ง (โดยใช้เกณฑ์การคาดการณ์ปริมาณผู้โดยสารสูงสุดปี 2597)

2) สถานีรูปแบบ B (TYPE B) เป็นสถานีระดับอำเภอ/ตำบล ซึ่งเป็นสถานีที่มีขนาดเล็ก รองรับผู้โดยสารไม่เกิน 5,000 คนต่อวัน จำนวน 7 แห่ง (โดยใช้เกณฑ์การคาดการณ์ปริมาณผู้โดยสารสูงสุดปี 2597)

รายละเอียดของขนาดสถานีแต่ละแห่ง แสดงไว้ใน**ตารางที่ 2.5-1**

ตารางที่ 2.5-1 รายชื่อสถานี ตำแหน่งและรูปแบบของแต่ละสถานี

รหัสสถานี	สถานี	รูปแบบสถานี	ตำแหน่งสถานี
S-01	สถานีขุนกระทิง	TYPE B	KM. 003+688
S-02	สถานีบ้านนา 1	TYPE B	KM. 014+067
S-03	สถานีบ้านนา 2	TYPE B	KM. 022+000
S-04	สถานีปากจั่น	TYPE B	KM. 042+950
S-05	สถานีกระบุรี	TYPE B	KM. 052+900
S-06	สถานีบางใหญ่	TYPE B	KM. 070+839
S-07	สถานีละอุ่น	TYPE B	KM. 078+869
S-08	สถานีท่าเรือระนอง	-	KM. 102+498
S-09	สถานีระนอง	TYPE A	KM. 004+832

หมายเหตุ : สถานีท่าเรือระนองเป็นสถานีเพื่อการขนส่ง จึงไม่มีจุดรับ-ส่งสำหรับผู้โดยสาร

การออกแบบสถาปัตยกรรมได้กำหนดพื้นที่ใช้สอยของพื้นที่ปฏิบัติงานแต่ละส่วนของสถานีและย่านสถานี สรุปรายการปริมาณพื้นที่หรือจำนวนของแต่ละรายการพื้นที่ ใน**ตารางที่ 2.5-2**

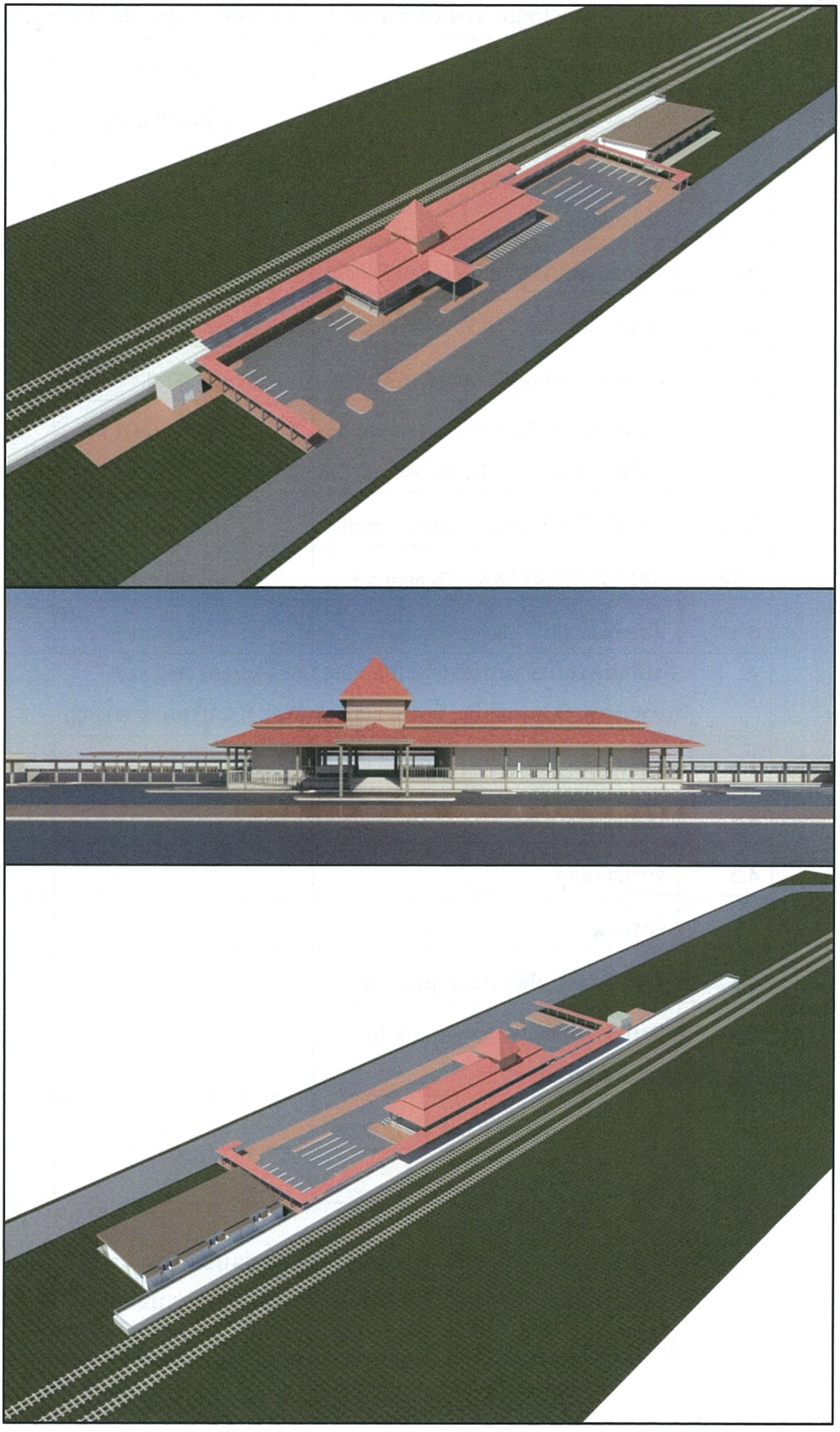
ตารางที่ 2.5-2 รายการพื้นที่ใช้สอยของสถานี และรายละเอียดแต่ละรูปแบบ

ลำดับ	ชื่อห้อง	TYPE A (พื้นที่/จำนวน)	TYPE B (พื้นที่/จำนวน)
1.	**อาคารสถานี (Station Building)**		
1.1	โถงผู้โดยสาร (Lobby)	30 ตร.ม.	20 ตร.ม.
1.2	พื้นที่ผู้โดยสารพักคอย (Waiting Area)	21 ตร.ม.	12 ตร.ม.
1.3	ห้องจำหน่ายบัตรโดยสาร (Ticket Office)	14 ตร.ม.	11 ตร.ม.
1.4	พื้นที่ซื้อบัตรโดยสาร (Queueing)	30 ตร.ม.	20 ตร.ม.
1.5	ห้องนายสถานี (Master Room)	23 ตร.ม.	18 ตร.ม.
1.6	ห้องสื่อสารและอาณัติสัญญาณ (Communication and Signalling)	22 ตร.ม.	16 ตร.ม.
1.7	ห้องพัสดุไปรษณีย์ (Parcel Room)	30 ตร.ม.	15 ตร.ม.
1.8	ห้องน้ำเจ้าหน้าที่ (Staff Toilet)	30 ตร.ม.	20 ตร.ม.
1.9	ห้องน้ำผู้โดยสาร (Passenger Toilet)		
1.10	ห้องน้ำสำหรับผู้พิการและทุพลภาพ (Disabled Toilet)		
1.11	ห้องเก็บของ (Storage)	11 ตร.ม.	7 ตร.ม.
1.12	ห้องไฟฟ้า (Electrical Room)	11 ตร.ม.	6 ตร.ม.
1.13	ทางสัญจรส่วนกลาง (Circulation)	185 ตร.ม.	163 ตร.ม.
	รวมพื้นที่อาคารสถานี	**407 ตร.ม.**	**308 ตร.ม.**
2.	**ชานชาลา (Platform Area)**		
2.1	ชานชาลา (Platform)	กว้าง x ยาว 3.20 x 400 ม.	กว้าง x ยาว กว้างตามแบบ x 400 ม.
2.2	หลังคาชานชาลา (Canopy)	ยาว 80 ม.	ยาว 50 ม.
3.	**พื้นที่รอบอาคารสถานี (Station Layout Area)**		
3.1	ที่จอดรถโดยสารสาธารณะ (รถสองแถว)	5 คัน	3 คัน
3.2	รถยนต์ส่วนบุคคล	17 คัน	15 คัน
3.3	จักรยานยนต์	18 คัน	10 คัน
3.4	จักรยาน	10 คัน	10 คัน
3.5	จอดรถสำหรับผู้พิการและทุพลภาพ	2 คัน	2 คัน

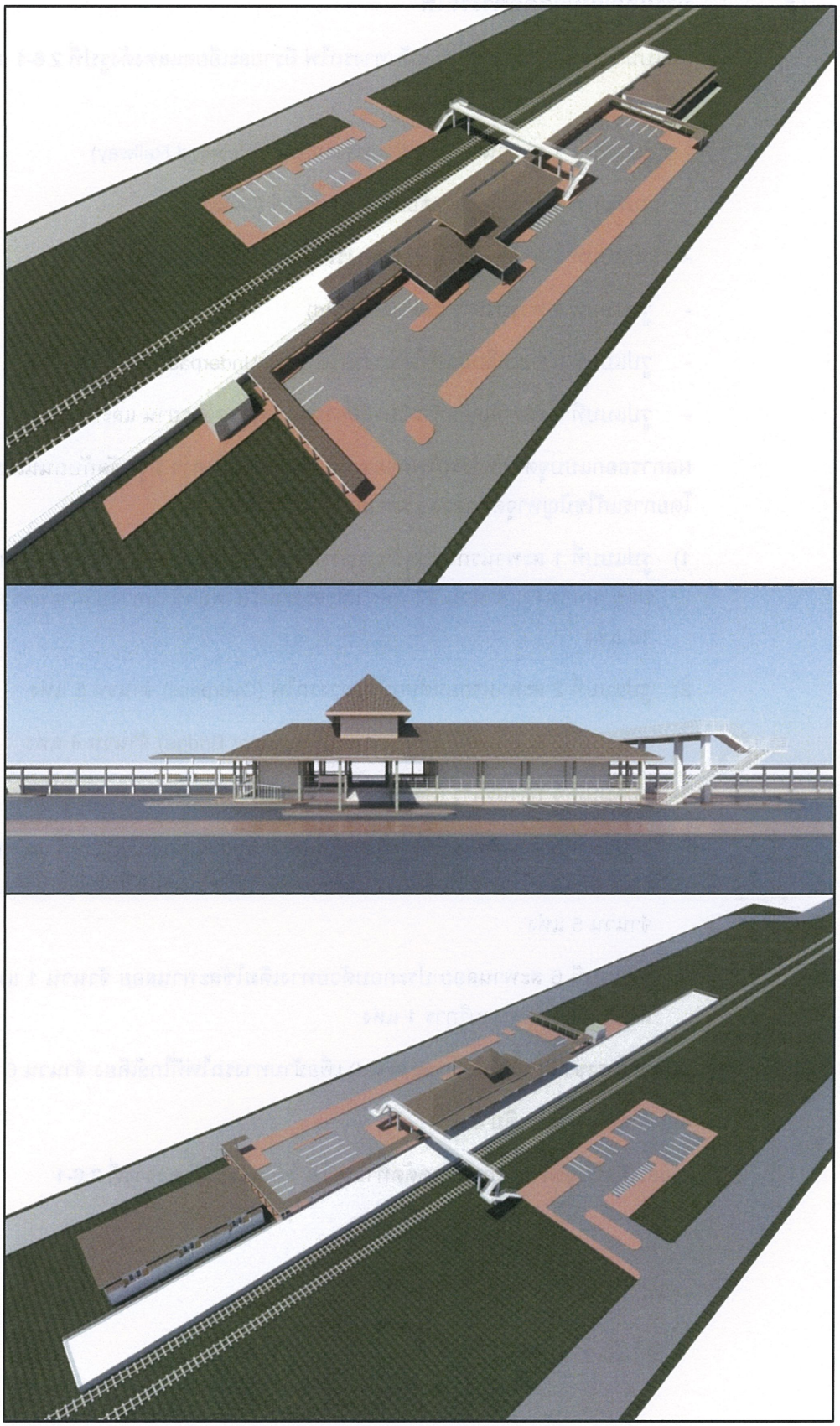
ตารางที่ 2.5-2 รายการพื้นที่ใช้สอยของสถานี และรายละเอียดแต่ละรูปแบบ (ต่อ)

ลำดับ	ชื่อห้อง	TYPE A (พื้นที่/จำนวน)	TYPE B (พื้นที่/จำนวน)
3.6	ป้อมเจ้าหน้าที่รักษาความปลอดภัย (Guardhouse)	1 หลัง	1 หลัง
3.7	รั้วรอบ และประตูรั้ว (Gate and Fence)	450 ม.	450 ม.
3.8	ถนนทางเข้าจากทางสาธารณะ	ตามแบบแต่ละสถานี	ตามแบบแต่ละสถานี
3.9	ทางเดินเท้าในร่ม (Covered Walkway)	50 ม.	50 ม.
3.10	งานจัดภูมิสถาปัตยกรรม สวนหย่อม และต้นไม้ให้ร่มเงา (Landscape Works)	4,200 ตร.ม.	4,000 ตร.ม.
3.11	บ้านพักเจ้าหน้าที่ (Staff Dormitories)	400 ตร.ม.	400 ตร.ม.
3.12	ห้องเครื่องกำเนิดไฟฟ้า (Generator)	20 ตร.ม.	20 ตร.ม.
3.13	ห้องเครื่องสูบน้ำ (Pump Room)	16 ตร.ม.	16 ตร.ม.
4.	**พื้นที่จอดรถฝั่งข้ามทางรถไฟ (Parking Lot –Across Railway) (เฉพาะสถานี ขุนกระทิง, บ้านนา (1), ปากจั่น, กระบุรีและบางใหญ่)**		
4.1	ที่จอดรถโดยสารสาธารณะ (รถสองแถว)	-	3 คัน
4.2	รถยนต์ส่วนบุคคล	-	12 คัน
4.3	จักรยานยนต์	-	15 คัน
4.4	จักรยาน	-	10 คัน
4.5	จอดรถสำหรับผู้พิการและทุพลภาพ	-	2 คัน
4.6	ป้อมเจ้าหน้าที่รักษาความปลอดภัย (Guardhouse)	-	1 หลัง
4.7	รั้วรอบ และประตูรั้ว (Gate and Fence)	-	100 ม.
4.8	ถนนทางเข้าจากทางสาธารณะ	-	ตามแบบแต่ละสถานี

รูปแบบของอาคารสถานีระดับจังหวัด ซึ่งเป็นรูปแบบสถานีขนาดกลาง (TYPE A) ดังแสดงใน **รูปที่ 2.5-1** และสถานีทั่วไป ระดับอำเภอ/ตำบล ซึ่งเป็นรูปแบบสถานีขนาดเล็ก (TYPE B) ดังแสดงใน **รูปที่ 2.5-2**



รูปที่ 2.5-1 ทัศนียภาพสถานีรูปแบบ A (Type A)



รูปที่ 2.5-2 ทัศนียภาพสถานีรูปแบบ B (Type B)

2.6 การออกแบบจุดตัดทางรถไฟ

รูปแบบการแก้ปัญหาจุดตัดถนนกับทางรถไฟ มีรายละเอียดแสดงดัง**รูปที่ 2.6-1** แบ่งเป็น 6 รูปแบบ ดังนี้

- รูปแบบที่ 1 สะพานรถไฟยกข้ามทางรถยนต์ (Elevated Railway)
- รูปแบบที่ 2 สะพานรถยนต์ยกข้ามทางรถไฟ (Overpass)
- รูปแบบที่ 3 สะพานรถยนต์ข้ามทางรถไฟ (Minor Bridge)
- รูปแบบที่ 4 ทางบริการ (Service Road)
- รูปแบบที่ 5 ท่อเหลี่ยมลอดใต้ทางรถไฟ (Box Underpass)
- รูปแบบที่ 6 สะพานลอยสำหรับรถจักรยานยนต์ รถจักรยาน และคน

ผลการออกแบบจุดตัดทางรถไฟตลอดแนวเส้นทางโครงการ มีจุดตัดกับถนนเดิมทั้งหมด 84 แห่ง โดยการแก้ไขปัญหาจุดตัดต่างๆ มีรายละเอียดดังนี้

1) รูปแบบที่ 1 สะพานรถไฟยกข้ามทางรถยนต์ (Elevated Railway) ประกอบด้วยสะพานรถไฟยกข้ามทางเดิม จำนวน 27 แห่ง และสะพานรถไฟยกข้ามทางบริการที่สร้างเพิ่มเติม จำนวน 10 แห่ง
2) รูปแบบที่ 2 สะพานรถยนต์ยกข้ามทางรถไฟ (Overpass) จำนวน 5 แห่ง
3) รูปแบบที่ 3 สะพานรถยนต์ข้ามทางรถไฟ (Minor Bridge) จำนวน 4 แห่ง
4) รูปแบบที่ 4 ทางบริการ (Service Road) จำนวน 32 แห่ง
5) รูปแบบที่ 5 ท่อเหลี่ยมลอดใต้ทางรถไฟ (Box Underpass) ประกอบด้วยถนนเดิมใช้ท่อเหลี่ยมลอดใต้ทางรถไฟจำนวน 5 แห่ง และทางบริการที่สร้างเพิ่มเติมใช้ท่อเหลี่ยมลอดใต้ทางรถไฟ จำนวน 5 แห่ง
6) รูปแบบที่ 6 สะพานลอย ประกอบด้วยทางเดิมใช้สะพานลอย จำนวน 1 แห่ง และสร้างเสริมสะพานลอยตรงทางบริการ 1 แห่ง
7) ใช้โครงข่ายถนนเดิม (Local Road) เพื่อข้ามทางรถไฟที่ใกล้เคียง จำนวน 6 แห่ง
8) ยกเลิกเส้นทางเดิม 4 แห่ง

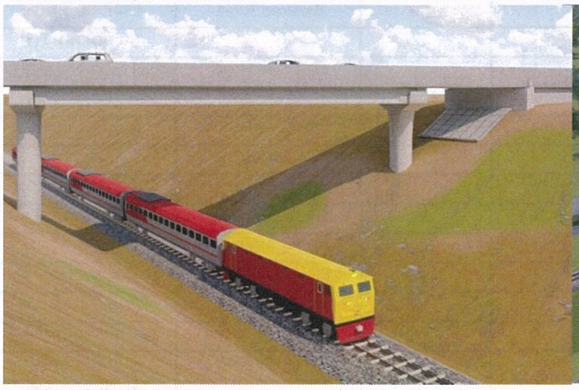
รายละเอียดของการออกแบบจุดตัดทางรถไฟ ได้แสดงไว้ดัง**ตารางที่ 2.6-1**



รูปแบบที่ 1 สะพานรถไฟยกข้ามทางรถยนต์ (Elevated Railway)



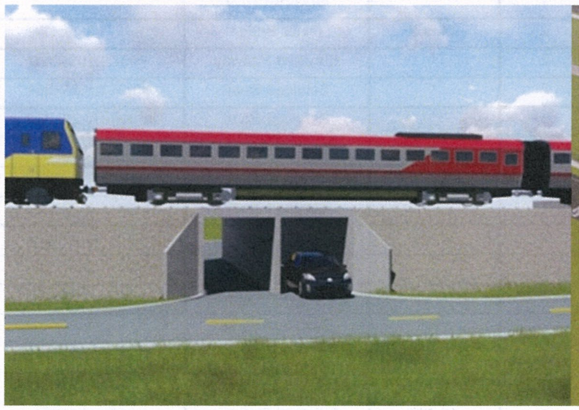
รูปแบบที่ 2 สะพานรถยนต์ยกข้ามทางรถไฟ (Overpass)



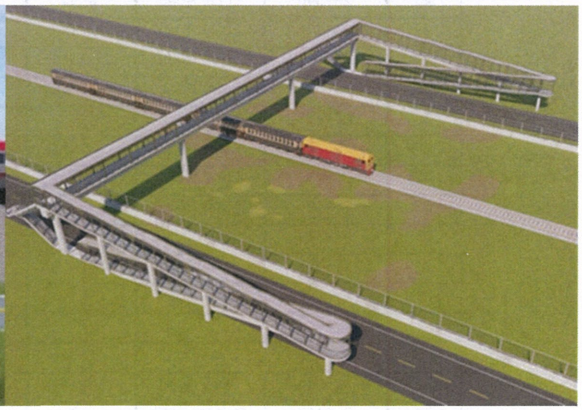
รูปแบบที่ 3 สะพานรถยนต์ข้ามทางรถไฟ (Minor Bridge)



รูปแบบที่ 4 ทางบริการ (Service Road)



รูปแบบที่ 5 ท่อเหลี่ยมลอดใต้ทางรถไฟ (Box Underpass)



รูปแบบที่ 6 สะพานลอย สำหรับรถจักรยานยนต์ รถจักรยาน และคน

รูปที่ 2.6-1 รูปแบบจุดตัดทางรถไฟกับถนน

ตารางที่ 2.6-1 ผลการออกแบบแก้ไขปัญหาจุดตัดทางรถไฟ

Main Line							
ลำดับ	จุดตัด (กม.)	ชื่อถนน	ประเภท	จำนวนช่องจราจร	ปริมาณจราจร TM. (ปี2568)	รายละเอียดการแก้ปัญหาจุดตัด	หมายเหตุ
1	1+159	ชพ 3009	AC	2	267,512	Overpass	
2	1+958	Local Road	ลูกรัง	1	*	Local Road	ข้ามที่ กม.1+159
3	3+406	Local Road	Concrete	2	*	Serviced Road	ข้ามที่ กม.4+032
	3+688	-	-	-		-	**สถานีขุนกระทิง**
4	4+032	ทล 41	AC	4	524,538	Overpass	
5	4+830	Local Road	ลูกรัง	1	*	Local Road	ข้ามที่ กม.4+032
6	6+000	Local Road	Concrete	2	*	Pedestrain Bridge	
7	7+303	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.7+635
8	7+635	Local Road	Concrete	2	6,202	Box Underpass	
	8+305	-	-	-		Box Underpass	
9	9+795	รพช.ชพ.2121	AC	2	7,882	Elevated Railway	คงสภาพถนนเดิม
10	10+223	ชพ.1045	AC	2	8,775	Serviced Road	ข้ามที่ กม.9+795
11	11+186	Local Road	AC	2	7,070	Serviced Road	ข้ามที่ กม.12+088
12	12+075	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.12+088
	12+088	-	-	-		Elevated Railway	ตัดถนนใหม่
13	13+297	Local Road	หินคลุก	1	*	Serviced Road	ข้ามที่ กม.12+088
	14+067	-	-	-		-	**สถานีบ้านนา (1)**
14	14+374	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.12+088/กม.14+945
15	14+945	ชพ.1005	AC	2	29,545	Overpass	
16	15+889	Local Road	Concrete	1	*	Serviced Road	ข้ามที่ กม.16+190
	16+190	-	-	-		Box Underpass	
17	16+487	Local Road	ลูกรัง	1	*	Local Road	ข้ามที่ กม.16+190
18	17+656	Local Road	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
19	18+648	Local Road	ลูกรัง	1	*	ยกเลิกเส้นทาง	
20	19+657	Local Road	Concrete	1	13,259	Elevated Railway	คงสภาพถนนเดิม
21	21+236	Local Road	Concrete	1	*	Serviced Road	ข้ามที่ กม.21+550
	21+550	-	-	-		Elevated Railway	ตัดถนนใหม่
22	21+680	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.21+550
	22+000	-	-	-		-	**สถานีบ้านนา (2)**
23	22+289	Local Road	ลูกรัง	1	*	ยกเลิกเส้นทาง	
24	22+422	Local Road	ลูกรัง	1	*	ยกเลิกเส้นทาง	
25	23+340	Local Road	ลูกรัง	1	*	ยกเลิกเส้นทาง	
26	23+849	Local Road	Concrete	2	14,562	Minor Bridge	
27	25+364	Local Road	Concrete	2	*	Elevated Railway	คงสภาพถนนเดิม
28	25+595	Local Road	Concrete	2	*	Serviced Road	ข้ามที่ กม.25+364
29	25+721	Local Road	หินคลุก	1	*	Serviced Road	ข้ามที่ กม.25+364
30	27+769	Local Road	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
31	28+032	Local Road	AC	2	*	Elevated Railway	คงสภาพถนนเดิม
32	28+161	Local Road	Concrete	1	*	Serviced Road	ข้ามที่ กม.28+032
33	28+619	ยช.ชพ.2052	AC	2	12,492	Local Road	ข้ามที่ กม.28+032
34	29+372	Local Road	ทางหินคลุก	1	*	Serviced Road	ข้ามที่ กม.29+620
35	29+620	Local Road	ลูกรัง	1	*	Minor Bridge	
	29+970	-	-	-		Box Underpass	
36	30+017	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.29+970
37	32+984	Local Road	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
38	33+418	รพช.รน.3117	AC	2	13,489	Elevated Railway	คงสภาพถนนเดิม
39	34+299	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
40	35+878	รน.1017	AC	2	12,282	Elevated Railway	คงสภาพถนนเดิม
41	38+835	Local Road	Concrete	1	*	Box Underpass	
42	39+583	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.39+820
	39+820	-	-	-		Elevated Railway	ตัดถนนใหม่
	40+870	-	-	-		Pedestrain Bridge	
43	40+904	Local Road	Concrete	1	17,052	Serviced Road	ข้ามที่ กม.39+820
44	41+617	รน.1003	AC	2	22,963	Local Road	ข้ามที่ กม.42+587
45	42+587	รน.1003	AC	2	22,963	Overpass	
	42+950	-	-	-		-	**สถานีปากจั่น**

ตารางที่ 2.6-1 ผลการออกแบบแก้ไขปัญหาจุดตัดทางรถไฟ (ต่อ)

ลำดับ	จุดตัด (กม.)	ชื่อถนน	ประเภท	จำนวนช่องจราจร	ปริมาณจราจร TM. (ปี2568)	รายละเอียดการแก้ปัญหาจุดตัด	หมายเหตุ
46	45+725	รน.1003	AC	2	22,963	Serviced Road	ข้ามที่ กม.45+780/กม.46+688
47	46+158	Local Road	AC	1	17,474	Serviced Road	ข้ามที่ กม.46+688
48	46+688	Local Road	AC	2	*	Elevated Railway	คงสภาพถนนเดิม
49	46+977	Local Road	AC	2	*	Serviced Road	ข้ามที่ กม.46+688
50	47+850	รน.1018	AC	2	15,731	Elevated Railway	คงสภาพถนนเดิม
	48+391	-	-	-		Elevated Railway	ตัดถนนใหม่
51	48+597	Local Road	AC	2	*	Serviced Road	ข้ามที่ กม.48+391
52	51+660	Local Road	Concrete	1	*	Box Underpass	
53	52+119	Local Road	AC	2	19,601	Elevated Railway	คงสภาพถนนเดิม
	52+900	-	-	-		-	**สถานีกระบุรี**
54	53+377	รน.1014	AC	2	720	Overpass	
55	54+110	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
56	56+771	รน.1008	AC	2	15,903	Elevated Railway	คงสภาพถนนเดิม
57	56+859	ทล. 4	AC	4	154,717	Elevated Railway	คงสภาพถนนเดิม
58	61+661	Local Road	AC	2	15,903	Serviced Road	ข้ามที่ กม.61+865
	61+865	-	-	-		Elevated Railway	ตัดถนนใหม่
59	62+555	Local Road	Concrete	2	*	Elevated Railway	คงสภาพถนนเดิม
60	62+969	ถนนในที่ส่วนบุคคล	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
61	69+162	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
62	70+559	Local Road	Concrete	1	*	Serviced Road	ข้ามที่ กม.71+170
	70+839	-	-	-		-	**สถานีบางใหญ่**
	71+170	-	-	-		Elevated Railway	ตัดถนนใหม่
63	74+568	Local Road	AC	2	*	Serviced Road	ข้ามที่ กม.74+600
	74+600					Elevated Railway	ตัดถนนใหม่
	76+685	-	-	-		Box Underpass	
64	76+884	รน.3080	AC	2	*	Serviced Road	ข้ามที่ กม.76+685
	78+580	-	-	-		Elevated Railway	ตัดถนนใหม่
65	78+669	รพช.รน.3028	Concrete	2	*	Serviced Road	ข้ามที่ กม.78+580
	78+869	-	-	-		-	**สถานีละอุ่น**
66	79+149	รพช.รน.3028	Concrete	2	*	Serviced Road	ข้ามที่ กม.78+580
67	83+260	Local Road	AC	2	*	Elevated Railway	คงสภาพถนนเดิม
68	85+229	Local Road	ลูกรัง	1	*	Local Road	ข้ามที่ กม.85+463
69	85+463	Local Road	Concrete	1	*	Box Underpass	
70	85+999	ถนนในที่ส่วนบุคคล	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
71	87+354	รพช.รน.4076	AC	2	*	Minor Bridge	
72	89+055	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
73	93+248	รน.4010	AC	2	*	Elevated Railway	คงสภาพถนนเดิม
74	95+931	Local Road	ลูกรัง	1	*	Elevated Railway	คงสภาพถนนเดิม
75	96+353	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
76	96+629	Local Road	Concrete	1	*	Box Underpass	
77	96+722	Local Road	ลูกรัง	1	*	Serviced Road	ข้ามที่ กม.96+629
78	98+428	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
79	102+107	รน.4010	AC	2	33,912	Minor Bridge	
80	102+357	รน.4010	AC	2	*	Serviced Road	ข้ามที่ กม.102+107
	102+498	-	-	-		-	**สถานีท่าเรือระนอง**
Spur Line							
ลำดับ	จุดตัด (กม.)	ชื่อถนน	ประเภท	จำนวนช่องจราจร	ปริมาณจราจร TM. (ปี2568)	รายละเอียดการแก้ปัญหาจุดตัด	หมายเหตุ
81	2+552	รน.1002	AC	2	15,539	Serviced Road	ข้ามที่ กม.2+732
	2+732	-	-	-		Elevated Railway	ตัดถนนใหม่
82	2+942	Local Road	Concrete	1	*	Elevated Railway	คงสภาพถนนเดิม
83	3+540	Local Road	AC	2	*	Serviced Road	ข้ามที่ กม.3+760
	3+760	-	-	-		Elevated Railway	ตัดถนนใหม่
84	4+400	Local Road	Concrete	2	*	Serviced Road	ข้ามที่ กม.4+452
	4+452	-	-	-		Box Underpass	
	4+832	-	-	-		-	**สถานีระนอง**

หมายเหตุ * หมายถึงปริมาณจราจร (TM.) น้อยกว่า 10,000 คันต่อวัน

2.7 การออกแบบด้านวิศวกรรมปฐพี

2.7.1 งานสำรวจทางปฐพีวิทยาและธรณีวิทยา

1) งานสำรวจทดสอบวัสดุคันทางสำหรับคันทางรถไฟระดับดิน จำนวน 10 หลุม ดังแสดงใน **ตารางที่ 2.7.1-1**

ตารางที่ 2.7.1-1 รายชื่อหลุมขุด Test Pit ตามแนวสายทาง

No.	Chainage	Test Pit No.
1	4+000	TP-1
2	10+000	TP-2
3	20+000	TP-3
4	30+000	TP-4
5	41+000	TP-5
6	52+000	TP-6
7	58+000	TP-7
8	76+000	TP-8
9	90+000	TP-9
10	99+000	TP-10

2) งานเจาะสำรวจดินและหินสำหรับฐานรากบริเวณโครงสร้างสะพาน จำนวนหลุมเจาะ 9 หลุม ดังแสดงใน**ตารางที่ 2.7.1-2**

ตารางที่ 2.7.1-2 รายชื่อหลุมเจาะตามแนวสายทางและสะพานรถไฟ

No.	Chainage	Borehole	Elevation	Depth/Thickness, m		Ground Water
		No.	m	Soil	Rock	Level*, m
1	15+792	BH-1	45.0	5.0	2.0	3.0
2	22+481	BH-2	71.0	7.0	2.0	3.5
3	32+226	BH-3	45.0	6.0	2.0	4.0
4	44+925	BH-4	20.0	12.0	2.0	3.5
5	59+751	BH-5	20.0	8.4	2.0	3.0
6	65+678	BH-6	15.0	8.0	3.0	4.0
7	79+873	BH-7	19.0	13.0	3.0	3.5
8	88+577	BH-8	12.5	10.0	3.0	2.5
9	101+709	BH-9	35.0	19.0	3.0	3.0

*หมายเหตุ *ระดับน้ำใต้ดินวัดเทียบจากปากหลุมเจาะ ณ ขณะเจาะสำรวจในช่วงเวลานั้นๆ*

3) งานตรวจสอบและวิเคราะห์ตัวอย่างดิน ลักษณะชั้นดินที่พบตามแนวสายทางโครงการสามารถสรุปไว้ใน**ตารางที่ 2.7.1-3** และผลการทดสอบดินจากการทำ Test Pit ดังแสดงใน **รูปที่ 2.7.1-1**

ตารางที่ 2.7.1-3 สรุปลักษณะชั้นดินที่พบตามแนวสายทางโครงการ

กม. (โดยประมาณ)	ลักษณะชั้นดิน
กม.0 ถึง กม.45 บริเวณพื้นที่ อ.เมือง จ.ชุมพร และพื้นที่ อ.กระบุรี จ.ระนอง	ชั้นดินเหนียวปนซิลท์/ดินเหนียวปนทราย (Stiff to Very Stiff Silty/Sandy CLAY) มีความหนาประมาณ 0.5 – 5.5 ม. หลังจากนั้นเป็นชั้นดินเหนียวปนซิลท์/ดินเหนียวปนทรายดานแข็งมาก (Hard Silty/Sandy CLAY) หนาประมาณ 1.5 – 11.5 ม. ที่ กม.32+226 หลุม BH-1 พบเป็นชั้นทรายแน่นปานกลางถึงแน่น (Medium Dense to Dense SAND) ตั้งแต่ผิวดินจนถึงระดับความลึก 6 ม. หลังจากนั้นถัดลงไปเป็นชั้นหินจนสิ้นสุดหลุมเจาะ ซึ่งพบทั้งหิน CLAYSTONE TUFF และ GRANITE
กม.45 ถึง กม.66 บริเวณพื้นที่ อ.กระบุรี จ.ระนอง	ชั้นดินเหนียวปนซิลท์/ดินเหนียวปนทราย แข็งถึงแข็งมาก (Stiff to Very Stiff Silty/Sandy CLAY) หนาประมาณ 3 - 4 ม. ถัดลงไปเป็นชั้นทราย แน่นปานกลางถึงแน่นมาก (Medium Dense to Very Dense SAND) หนาประมาณ 4 – 5 ม. หลังจากนั้นเป็นชั้นหินจนสิ้นสุดหลุมเจาะ โดยพบเป็นหิน SANDSTONE
กม.66 ถึง กม.102 บริเวณพื้นที่ อ.กระบุรี อ.ละอุ่น อ.เมือง จ.ระนอง	ชั้นดินเหนียวปนซิลท์/ดินเหนียวปนทราย แข็งถึงแข็งมาก (Stiff to Very Stiff Silty/Sandy CLAY) หนาประมาณ 7 - 10 ม. ยกเว้นที่ กม.88+577 หลุม BH-8 พบเป็นชั้นดินเหนียวอ่อน (Soft CLAY) แทน ถัดลงไปเป็นชั้นดินเหนียวปนซิลท์/ดินเหนียวปนทรายดานแข็งมาก (Hard Silty/Sandy CLAY) หนาประมาณ 2 – 9 ม. หลังจากนั้นพบชั้นหินจนสิ้นสุดหลุมเจาะ พบเป็นหิน GNEISS GRANODIORITE และ HORNFELS

Summary of Test Pit Results

Test Pit No.	Sta.	Sample Discription	Atterberg Limits (%)			Sieve Analysis % Passing (US Standard Sieve)									Classification			Compaction Test[1]		CBR Test[1]		Direct Shear		
															USCS	AASHTO	UIC 719R	MDD[2]	OMC[3]	CBR	Swell	c	c	Φ
			LL	PL	PI	1"	3/4"	1/2"	3/8"	#4	#10	#40	#100	#200	Group	Group	Class	(t/m^3)	(%)	(%)	(%)	(t/m^2)	(kPa)	(deg.)
TP-1	4+000	Silty CLAY	65.4	36.0	29.4					100	98	96	87	85	CH	A-7-5 (33)	QS1 [1.1]	1.415	28.2	2.5	2.298	3.95	38.7	10.0
TP-2	10+000	Sandy CLAY	37.5	20.0	17.5			100	90	88	81	74	69	65	CL	A-6 (9)	QS1 [1.1]	1.702	18.7	8.7	0.211			
TP-3	20+000	Silty SAND	54.4	32.8	21.6	100	92	87	84	63	42	31	25	23	SM	A-2-7 (1)	QS1 [1.3]	1.685	20.2	9.7	0.000	2.92	28.6	21.3
TP-4	30+000	Sandy CLAY	37.6	21.2	16.4					100	98	78	60	56	CL	A-6 (7)	QS1 [1.1]	1.711	18.0	7.1	0.145			
TP-5	41+000	Silty CLAY	54.0	31.0	23.0				100	99	98	96	84	81	CH	A-7-6 (22)	QS1 [1.1]	1.448	28.2	3.8	0.109	2.39	23.4	17.3
TP-6	52+000	Sandy CLAY	44.6	27.8	16.8					100	100	96	65	62	CL	A-7-6 (10)	QS1 [1.1]	1.565	22.9	6.6	0.138			
TP-7	58+000	Silty CLAY	36.5	21.2	15.3				100	100	100	97	83	79	CL	A-6 (11)	QS1 [1.1]	1.673	20.4	8.0	0.196	2.09	20.5	19.1
TP-8	76+000	Silty CLAY	60.2	36.8	23.4					100	100	99	96	95	CH	A-7-6 (35)	QS1 [1.1]	1.386	31.2	2.7	0.175			
TP-9	90+000	Sandy CLAY	56.4	29.3	27.1					100	100	76	65	63	CH	A-7-6 (16)	QS1 [1.1]	1.600	22.4	5.9	0.196	2.48	24.3	17.7
TP-10	99+000	Clayey SAND	34.5	22.7	11.8	100	94	90	88	84	78	60	48	46	SC	A-6 (2)	QS1 [1.1]	1.680	18.8	6.9	0.167			

Note:
1 Compaction test followed AASHTO T 99 (Standard) and 4 days soaked CBR is reported at 95 % maximum dry density for each sample.
2 MDD : Maximum Dry Density
3 OMC : Optimum Moisture Content
4 Degree of dispersion
Non. = Nondispersive (% of dispersive < 30)
Int. = Intermediate (% of dispersive 30 - 50)
Disp. = Dispersive (% of dispersive > 50)

รูปที่ 2.7.1-1 ผลทดสอบดินจาก Test Pit

2.7.2 การออกแบบโครงสร้างคันทางรถไฟ

1) โครงสร้างคันทางรถไฟประกอบด้วย

- ชั้นดินคันทาง (Embankment Fill)
- ชั้นดินเตรียมคันทาง (Prepared Subgrade) หนา 500 มม.
- ชั้นทรายระบายน้ำ (Sand Drain) หนา 100 มม. รองด้วยแผ่นใยสังเคราะห์ Geotextile
- ชั้นรองพื้นทาง (Subbase) หนา 200 มม.
- ชั้นรองหินโรยทาง (Subballast) หนา 300 มม.
- หินโรยทางรถไฟ (Ballast) หนา 300 มม.

2) งานออกแบบระบบป้องกันดินพังทลายและการทรุดตัว มีการตรวจสอบดังนี้

(1) การพังทลายเนื่องจากกำลังรับน้ำหนักของดินเดิม ค่ากำลังรับน้ำหนักบรรทุกสำหรับชั้นดินเหนียวและชั้นทรายแสดงดัง**ตารางที่ 2.7.2-1** และ **2.7.2-2**

(2) การพังทลายของลาดดินคันทาง การวิเคราะห์เสถียรภาพของดินคันทาง ดัง**รูปที่ 2.7.2-1** ถึง**รูปที่ 2.7.2-4** สำหรับดินเหนียวและทรายตามลำดับ และจากผลการวิเคราะห์เสถียรภาพสามารถสรุปได้ดัง**ตารางที่ 2.7.2-3**

(3) การทรุดตัวของคันทาง จากผลการคำนวณค่าการทรุดตัวภายหลังการก่อสร้างคันดินแล้วเสร็จ 2 ปี พบว่าค่าการทรุดตัวที่เหลืออยู่จะอยู่ในช่วงไม่เกิน 20 ซม. รายละเอียดผลการคำนวณแสดงใน**ตารางที่ 2.7.2-4** ค่ากำลังรับน้ำหนักบรรทุกและเสถียรภาพของคันดินรายละเอียดผลการคำนวณแสดงใน**ตารางที่ 2.7.2-5**

(4) การป้องกันการกัดเซาะของดินบริเวณลาดคันทาง

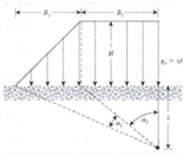
- การปลูกพืชคลุมดิน เช่น หญ้าแฝก หรืออื่นๆ เป็นต้น
- เกราะป้องกันผิวหน้า เช่น Mattress/Gabion หรือ Shotcrete หรือ Rip-rap

ตารางที่ 2.7.2-1 ตารางคำนวณค่ากำลังรับน้ำหนักบรรทุกของดินที่ความสูงคันทางต่าง ๆ สำหรับชั้นดินเหนียว

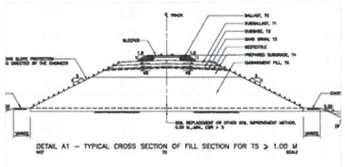
Stress Distribution on Ground at Center Line of Single Track Calculation

Live Load from Track 68 kN/m²

Case No.	H of Emb. Z, m	Track Width, B	α_1	α_2	$((B_1+B_2)/B_2)(\alpha_1-\alpha_2)-(B_1/B_2)(\alpha_2)$	I	Δσ kN/m²	2Δσ kN/m²
1	1.0	3	0.00	1.25	1.55	0.493	33.5	67.1
2	2.0	3	0.00	0.98	1.44	0.460	31.3	62.5
3	3.0	3	0.00	0.79	1.29	0.409	27.8	55.6
4	4.0	3	0.00	0.64	1.12	0.358	24.3	48.6
5	5.0	3	0.00	0.54	0.98	0.312	21.2	42.5



$$\Delta\sigma_z = \frac{q_s}{\pi}\left[\left(\frac{B_1+B_2}{B_2}\right)(\alpha_1+\alpha_2)-\frac{B_1}{B_2}(\alpha_2)\right]$$



Case No	Embankment Hight, H (m)	Embankment Width, B (m)	Depth[1] Df (m)	Soil Type	Density (γ) (t/m³)	Avg SPT (blows/ft)	Angle of Friction (∅)	Cohesion (c, t/m²)	Surcharge (q', t/m²)	Nc[2] or N'c	Nq[2] or N'q	Nγ[2] or N'γ	q_a[3] (t/m²)	Load on Ground DL (t/m²)	Load on Ground LL (t/m²)	Load on Ground DL+LL (t/m²)	Factor of Safety DL+LL min.1.5	Factor of Safety DL min.2.0
1	1	11.50	0.0	CLAY	1.60	4	-	2.5	0.0	5.70	1.00	0.00	9.5	1.9	6.8	8.7	**1.1**	5.0
	2	12.50	0.0	CLAY	1.60	4	-	2.5	0.0	5.70	1.00	0.00	9.5	3.8	6.4	10.2	**0.9**	2.5
	3	13.50	0.0	CLAY	1.60	4	-	2.5	0.0	5.70	1.00	0.00	9.5	5.7	5.7	11.4	**0.8**	**1.7**
	4	14.50	0.0	CLAY	1.60	4	-	2.5	0.0	5.70	1.00	0.00	9.5	7.6	5.0	12.6	**0.8**	**1.3**
	5	15.50	0.0	CLAY	1.60	4	-	2.5	0.0	5.70	1.00	0.00	9.5	9.5	4.3	13.8	**0.7**	**1.0**
2	1	11.50	0.0	CLAY	1.70	5	-	3.1	0.0	5.70	1.00	0.00	11.9	1.9	6.8	8.7	**1.4**	6.3
	2	12.50	0.0	CLAY	1.70	5	-	3.1	0.0	5.70	1.00	0.00	11.9	3.8	6.4	10.2	**1.2**	3.1
	3	13.50	0.0	CLAY	1.70	5	-	3.1	0.0	5.70	1.00	0.00	11.9	5.7	5.7	11.4	**1.0**	2.1
	4	14.50	0.0	CLAY	1.70	5	-	3.1	0.0	5.70	1.00	0.00	11.9	7.6	5.0	12.6	**0.9**	**1.6**
	5	15.50	0.0	CLAY	1.70	5	-	3.1	0.0	5.70	1.00	0.00	11.9	9.5	4.3	13.8	**0.9**	**1.3**
3	1	11.50	0.0	CLAY	1.80	6	-	3.8	0.0	5.70	1.00	0.00	14.3	1.9	6.8	8.7	1.6	7.5
	2	12.50	0.0	CLAY	1.80	6	-	3.8	0.0	5.70	1.00	0.00	14.3	3.8	6.4	10.2	**1.4**	3.8
	3	13.50	0.0	CLAY	1.80	6	-	3.8	0.0	5.70	1.00	0.00	14.3	5.7	5.7	11.4	**1.3**	2.5
	4	14.50	0.0	CLAY	1.80	6	-	3.8	0.0	5.70	1.00	0.00	14.3	7.6	5.0	12.6	**1.1**	**1.9**
	5	15.50	0.0	CLAY	1.80	6	-	3.8	0.0	5.70	1.00	0.00	14.3	9.5	4.3	13.8	**1.0**	**1.5**
4	1	11.50	0.0	CLAY	1.90	7	-	4.4	0.0	5.70	1.00	0.00	16.6	1.9	6.8	8.7	1.9	8.8
	2	12.50	0.0	CLAY	1.90	7	-	4.4	0.0	5.70	1.00	0.00	16.6	3.8	6.4	10.2	1.6	4.4
	3	13.50	0.0	CLAY	1.90	7	-	4.4	0.0	5.70	1.00	0.00	16.6	5.7	5.7	11.4	1.5	2.9
	4	14.50	0.0	CLAY	1.90	7	-	4.4	0.0	5.70	1.00	0.00	16.6	7.6	5.0	12.6	**1.3**	2.2
	5	15.50	0.0	CLAY	1.90	7	-	4.4	0.0	5.70	1.00	0.00	16.6	9.5	4.3	13.8	**1.2**	**1.8**
5	1	11.50	0.0	CLAY	1.90	8	-	5.0	0.0	5.70	1.00	0.00	19.0	1.9	6.8	8.7	2.2	10.0
	2	12.50	0.0	CLAY	1.90	8	-	5.0	0.0	5.70	1.00	0.00	19.0	3.8	6.4	10.2	1.9	5.0
	3	13.50	0.0	CLAY	1.90	8	-	5.0	0.0	5.70	1.00	0.00	19.0	5.7	5.7	11.4	1.7	3.3
	4	14.50	0.0	CLAY	1.90	8	-	5.0	0.0	5.70	1.00	0.00	19.0	7.6	5.0	12.6	1.5	2.5
	5	15.50	0.0	CLAY	1.90	8	-	5.0	0.0	5.70	1.00	0.00	19.0	9.5	4.3	13.8	**1.4**	2.0
6	1	11.50	0.0	CLAY	1.90	9	-	5.7	0.0	5.70	1.00	0.00	21.7	1.9	6.8	8.7	2.5	11.4
	2	12.50	0.0	CLAY	1.90	9	-	5.7	0.0	5.70	1.00	0.00	21.7	3.8	6.4	10.2	2.1	5.7
	3	13.50	0.0	CLAY	1.90	9	-	5.7	0.0	5.70	1.00	0.00	21.7	5.7	5.7	11.4	1.9	3.8
	4	14.50	0.0	CLAY	1.90	9	-	5.7	0.0	5.70	1.00	0.00	21.7	7.6	5.0	12.6	1.7	2.9
	5	15.50	0.0	CLAY	1.90	9	-	5.7	0.0	5.70	1.00	0.00	21.7	9.5	4.3	13.8	1.6	2.3

Remarks:

(1) Depth from existing ground

(2) Terzaghi's Bearing Capacity Factors (Nc, Nq, Nγ)
or Terzaghi's Modified Bearing Capacity Factors (N'c, N'q, N'γ)

(3) For General Failure : $q_u = cN_c + q'N_q + 0.5\gamma'BN_\gamma$
For Local Shear Failure : $q_u = 0.667cN'_c + q'N'_q + 0.5\gamma'BN'_\gamma$

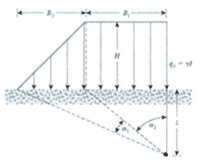
(4) $q_a = q_u$ / F.S. , Factor of Safety

ตารางที่ 2.7.2-1 ตารางคำนวณค่ากำลังรับน้ำหนักบรรทุกของดินที่ความสูงคันทางต่าง ๆ สำหรับชั้นดินเหนียว (ต่อ)

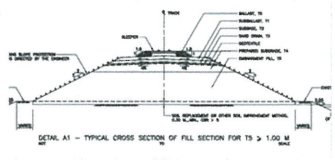
Stress Distribution on Ground at Center Line of Single Track Calculation

Live Load from Track 68 kN/m²

Case No.	H of Emb. Z, m	Track Width, B	α_1	α_2	$((B_1+B_2)/B_2)(\alpha_1+\alpha_2) - (B_1/B_2)(\alpha_2)$	I	Δσ kN/m²	2Δσ kN/m²
1	3.0	3	0.00	0.79	1.29	0.409	27.8	55.6
2	4.0	3	0.00	0.64	1.12	0.358	24.3	48.6
3	5.0	3	0.00	0.54	0.98	0.312	21.2	42.5
4	6.0	3	0.00	0.46	0.86	0.275	18.7	37.4
5	7.0	3	0.00	0.40	0.77	0.244	16.6	33.2



$$\Delta\sigma_z = \frac{q_s}{\pi}\left[\left(\frac{B_1+B_2}{B_2}\right)(\alpha_1+\alpha_2) - \frac{B_1}{B_2}(\alpha_2)\right]$$



Case No	Embankment Hight, H (m)	Embankment Width, B (m)	Depth[1] Df (m)	Soil Type	Density (γ) (t/m³)	Avg SPT (blows/ft)	Angle of Friction (∅)	Cohesion (c, t/m²)	Surcharge (q', t/m²)	Nc[2] or N'c	Nq[2] or N'q	Nγ[2] or Nγ	q_u[3] (t/m²)	Load on Ground DL (t/m²)	Load on Ground LL (t/m²)	Load on Ground DL+LL (t/m²)	Factor of Safety DL+LL min.1.5	Factor of Safety DL min.2.0
7	3	13.50	0.0	CLAY	1.60	10	-	6.4	0.0	5.70	1.00	0.00	24.4	5.7	5.7	11.4	2.1	4.3
	4	14.50	0.0	CLAY	1.60	10	-	6.4	0.0	5.70	1.00	0.00	24.4	7.6	5.0	12.6	1.9	3.2
	5	15.50	0.0	CLAY	1.60	10	-	6.4	0.0	5.70	1.00	0.00	24.4	9.5	4.3	13.8	1.8	2.6
	6	16.50	0.0	CLAY	1.60	10	-	6.4	0.0	5.70	1.00	0.00	24.4	11.4	3.8	15.2	1.6	2.1
	7	17.50	0.0	CLAY	1.60	10	-	6.4	0.0	5.70	1.00	0.00	24.4	13.3	3.4	16.7	1.5	**1.8**
8	3	13.50	0.0	CLAY	1.70	11	-	7.1	0.0	5.70	1.00	0.00	27.1	5.7	5.7	11.4	2.4	4.8
	4	14.50	0.0	CLAY	1.70	11	-	7.1	0.0	5.70	1.00	0.00	27.1	7.6	5.0	12.6	2.2	3.6
	5	15.50	0.0	CLAY	1.70	11	-	7.1	0.0	5.70	1.00	0.00	27.1	9.5	4.3	13.8	2.0	2.9
	6	16.50	0.0	CLAY	1.70	11	-	7.1	0.0	5.70	1.00	0.00	27.1	11.4	3.8	15.2	1.8	2.4
	7	17.50	0.0	CLAY	1.70	11	-	7.1	0.0	5.70	1.00	0.00	27.1	13.3	3.4	16.7	1.6	2.0
9	3	13.50	0.0	CLAY	1.80	12	-	7.9	0.0	5.70	1.00	0.00	29.9	5.7	5.7	11.4	2.6	5.2
	4	14.50	0.0	CLAY	1.80	12	-	7.9	0.0	5.70	1.00	0.00	29.9	7.6	5.0	12.6	2.4	3.9
	5	15.50	0.0	CLAY	1.80	12	-	7.9	0.0	5.70	1.00	0.00	29.9	9.5	4.3	13.8	2.2	3.1
	6	16.50	0.0	CLAY	1.80	12	-	7.9	0.0	5.70	1.00	0.00	29.9	11.4	3.8	15.2	2.0	2.6
	7	17.50	0.0	CLAY	1.80	12	-	7.9	0.0	5.70	1.00	0.00	29.9	13.3	3.4	16.7	1.8	2.2
10	3	13.50	0.0	CLAY	1.90	13	-	8.6	0.0	5.70	1.00	0.00	32.6	5.7	5.7	11.4	2.9	5.7
	4	14.50	0.0	CLAY	1.90	13	-	8.6	0.0	5.70	1.00	0.00	32.6	7.6	5.0	12.6	2.6	4.3
	5	15.50	0.0	CLAY	1.90	13	-	8.6	0.0	5.70	1.00	0.00	32.6	9.5	4.3	13.8	2.4	3.4
	6	16.50	0.0	CLAY	1.90	13	-	8.6	0.0	5.70	1.00	0.00	32.6	11.4	3.8	15.2	2.1	2.9
	7	17.50	0.0	CLAY	1.90	13	-	8.6	0.0	5.70	1.00	0.00	32.6	13.3	3.4	16.7	2.0	2.4
11	3	13.50	0.0	CLAY	1.90	14	-	9.3	0.0	5.70	1.00	0.00	35.3	5.7	5.7	11.4	3.1	6.2
	4	14.50	0.0	CLAY	1.90	14	-	9.3	0.0	5.70	1.00	0.00	35.3	7.6	5.0	12.6	2.8	4.6
	5	15.50	0.0	CLAY	1.90	14	-	9.3	0.0	5.70	1.00	0.00	35.3	9.5	4.3	13.8	2.6	3.7
	6	16.50	0.0	CLAY	1.90	14	-	9.3	0.0	5.70	1.00	0.00	35.3	11.4	3.8	15.2	2.3	3.1
	7	17.50	0.0	CLAY	1.90	14	-	9.3	0.0	5.70	1.00	0.00	35.3	13.3	3.4	16.7	2.1	**2.7**
12	3	13.50	0.0	CLAY	1.90	15	-	10.0	0.0	5.70	1.00	0.00	38.0	5.7	5.7	11.4	3.3	6.7
	4	14.50	0.0	CLAY	1.90	15	-	10.0	0.0	5.70	1.00	0.00	38.0	7.6	5.0	12.6	3.0	5.0
	5	15.50	0.0	CLAY	1.90	15	-	10.0	0.0	5.70	1.00	0.00	38.0	9.5	4.3	13.8	2.7	4.0
	6	16.50	0.0	CLAY	1.90	15	-	10.0	0.0	5.70	1.00	0.00	38.0	11.4	3.8	15.2	2.5	3.3
	7	17.50	0.0	CLAY	1.90	15	-	10.0	0.0	5.70	1.00	0.00	38.0	13.3	3.4	16.7	2.3	2.9

Remarks:

(1) Depth from existing ground

(2) Terzaghi's Bearing Capacity Factors (Nc, Nq, Nγ)
or Terzaghi's Modified Bearing Capacity Factors (N'c, N'q, N'γ)

(3) For General Failure : $q_u = cN_c + q'N_q + 0.5\gamma' BN_\gamma$
For Local Shear Failure : $q_u = 0.667cN'_c + q'N'_q + 0.5\gamma' BN'_\gamma$

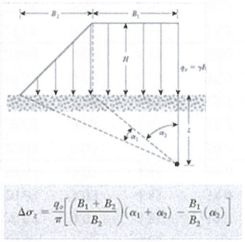
(4) $q_a = q_u$ / F.S. , Factor of Safety

ตารางที่ 2.7.2-2 ตารางคำนวณค่ากำลังรับน้ำหนักบรรทุกของดินที่ความสูงคันทางต่าง ๆ สำหรับชั้นทราย

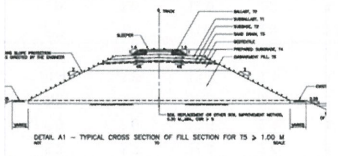
Stress Distribution on Ground at Center Line of Single Track Calculation

Live Load from Track 68 kN/m²

Case No.	H of Emb. Z, m	Track Width, B	α_1	α_2	$((B_1+B_2)/B_2)(\alpha_1+\alpha_2)-(B_1/B_2)(\alpha_2)$	I	Δσ kN/m²	2Δσ kN/m²
1	1.0	3	0.00	1.25	1.55	0.493	33.5	67.1
2	2.0	3	0.00	0.98	1.44	0.460	31.3	62.5
3	3.0	3	0.00	0.79	1.29	0.409	27.8	55.6
4	4.0	3	0.00	0.64	1.12	0.358	24.3	48.6
5	5.0	3	0.00	0.54	0.98	0.312	21.2	42.5



$$\Delta\sigma_z = \frac{q_s}{\pi}\left[\left(\frac{B_1+B_2}{B_2}\right)(\alpha_1+\alpha_2) - \frac{B_1}{B_2}(\alpha_2)\right]$$



Case No	Embankment Hight, H (m)	Embankment Width, B (m)	Depth(1) Df (m)	Soil Type	Density (γ) (t / m³)	Avg SPT (blows/ft)	Angle of Friction (∅)	Cohesion (c, t/m²)	Surcharge (q', t/m²)	Nc(2) or N'c	Nq(2) or N'q	Nγ(2) or N'γ	q_u(3) (t/m²)	Load on Ground DL (t/m²)	Load on Ground LL (t/m²)	Load on Ground DL+LL (t/m²)	Factor of Safety DL+LL min.1.5	Factor of Safety DL min.2.0
1	1	11.50	0.0	SAND	1.70	4	28.0	-	0.0	17.13	7.07	3.29	13.2	1.9	6.8	8.7	1.5	7.0
	2	12.50	0.0	SAND	1.70	4	28.0	-	0.0	17.13	7.07	3.29	14.4	3.8	6.4	10.2	**1.4**	3.8
	3	13.50	0.0	SAND	1.70	4	28.0	-	0.0	17.13	7.07	3.29	15.5	5.7	5.7	11.4	**1.4**	2.7
	4	14.50	0.0	SAND	1.70	4	28.0	-	0.0	17.13	7.07	3.29	16.7	7.6	5.0	12.6	**1.3**	2.2
	5	15.50	0.0	SAND	1.70	4	28.0	-	0.0	17.13	7.07	3.29	17.8	9.5	4.3	13.8	**1.3**	**1.9**
2	1	11.50	0.0	SAND	1.70	5	28.3	-	0.0	17.13	7.07	3.29	13.2	1.9	6.8	8.7	1.5	7.0
	2	12.50	0.0	SAND	1.70	5	28.3	-	0.0	17.13	7.07	3.29	14.4	3.8	6.4	10.2	**1.4**	3.8
	3	13.50	0.0	SAND	1.70	5	28.3	-	0.0	17.13	7.07	3.29	15.5	5.7	5.7	11.4	**1.4**	2.7
	4	14.50	0.0	SAND	1.70	5	28.3	-	0.0	17.13	7.07	3.29	16.7	7.6	5.0	12.6	**1.3**	2.2
	5	15.50	0.0	SAND	1.70	5	28.3	-	0.0	17.13	7.07	3.29	17.8	9.5	4.3	13.8	**1.3**	**1.9**
3	1	11.50	0.0	SAND	1.80	6	28.7	-	0.0	18.03	7.66	3.76	17.3	1.9	6.8	8.7	2.0	9.1
	2	12.50	0.0	SAND	1.80	6	28.7	-	0.0	18.03	7.66	3.76	18.8	3.8	6.4	10.2	1.8	4.9
	3	13.50	0.0	SAND	1.80	6	28.7	-	0.0	18.03	7.66	3.76	20.3	5.7	5.7	11.4	1.8	3.6
	4	14.50	0.0	SAND	1.80	6	28.7	-	0.0	18.03	7.66	3.76	21.8	7.6	5.0	12.6	1.7	2.9
	5	15.50	0.0	SAND	1.80	6	28.7	-	0.0	18.03	7.66	3.76	23.3	9.5	4.3	13.8	1.7	2.5
4	1	11.50	0.0	SAND	1.90	7	29.0	-	0.0	18.03	7.66	3.76	19.5	1.9	6.8	8.7	2.2	10.2
	2	12.50	0.0	SAND	1.90	7	29.0	-	0.0	18.03	7.66	3.76	21.2	3.8	6.4	10.2	2.1	5.6
	3	13.50	0.0	SAND	1.90	7	29.0	-	0.0	18.03	7.66	3.76	22.8	5.7	5.7	11.4	2.0	4.0
	4	14.50	0.0	SAND	1.90	7	29.0	-	0.0	18.03	7.66	3.76	24.5	7.6	5.0	12.6	2.0	3.2
	5	15.50	0.0	SAND	1.90	7	29.0	-	0.0	18.03	7.66	3.76	26.2	9.5	4.3	13.8	1.9	2.8
5	1	11.50	0.0	SAND	1.90	8	29.3	-	0.0	18.03	7.66	3.76	19.5	1.9	6.8	8.7	2.2	10.2
	2	12.50	0.0	SAND	1.90	8	29.3	-	0.0	18.03	7.66	3.76	21.2	3.8	6.4	10.2	2.1	5.6
	3	13.50	0.0	SAND	1.90	8	29.3	-	0.0	18.03	7.66	3.76	22.8	5.7	5.7	11.4	2.0	4.0
	4	14.50	0.0	SAND	1.90	8	29.3	-	0.0	18.03	7.66	3.76	24.5	7.6	5.0	12.6	2.0	3.2
	5	15.50	0.0	SAND	1.90	8	29.3	-	0.0	18.03	7.66	3.76	26.2	9.5	4.3	13.8	1.9	2.8
6	1	11.50	0.0	SAND	1.90	9	29.7	-	0.0	18.99	8.31	4.39	22.7	1.9	6.8	8.7	2.6	12.0
	2	12.50	0.0	SAND	1.90	9	29.7	-	0.0	18.99	8.31	4.39	24.7	3.8	6.4	10.2	2.4	6.5
	3	13.50	0.0	SAND	1.90	9	29.7	-	0.0	18.99	8.31	4.39	26.7	5.7	5.7	11.4	2.3	4.7
	4	14.50	0.0	SAND	1.90	9	29.7	-	0.0	18.99	8.31	4.39	28.6	7.6	5.0	12.6	2.3	3.8
	5	15.50	0.0	SAND	1.90	9	29.7	-	0.0	18.99	8.31	4.39	30.6	9.5	4.3	13.8	2.2	3.2

Remarks:

(1) Depth from existing ground

(2) Terzaghi's Bearing Capacity Factors (Nc, Nq, Nγ)
or Terzaghi's Modified Bearing Capacity Factors (N'c, N'q, N'γ)

(3) For General Failure : $q_u = cN_c + q'N_q + 0.5\gamma'BN_\gamma$
For Local Shear Failure : $q_u = 0.667cN'_c + q'N'_q + 0.5\gamma'BN'_\gamma$

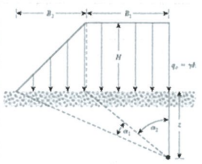
(4) $q_a = q_u$ / F.S. , Factor of Safety

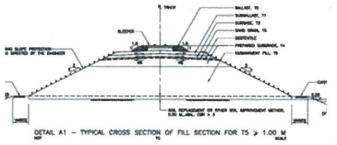
ตารางที่ 2.7.2-2 ตารางคำนวณค่ากำลังรับน้ำหนักบรรทุกของดินที่ความสูงคันทางต่าง ๆ สำหรับชั้นทราย (ต่อ)

Stress Distribution on Ground at Center Line of Single Track Calculation

Live Load from Track 68 kN/m²

Case No.	H of Emb. Z, m	Track Width, B	α_1	α_2	$((B_1+B_2)/B_2)(\alpha_1+\alpha_2)-(B_1/B_2)(\alpha_2)$	I	$\Delta\sigma$ kN/m²	$2\Delta\sigma$ kN/m²
1	3.0	3	0.00	0.79	1.29	0.409	27.8	55.6
2	4.0	3	0.00	0.64	1.12	0.358	24.3	48.6
3	5.0	3	0.00	0.54	0.98	0.312	21.2	42.5
4	6.0	3	0.00	0.46	0.86	0.275	18.7	37.4
5	7.0	3	0.00	0.40	0.77	0.244	16.6	33.2





$$\Delta\sigma_z = \frac{q_s}{\pi}\left[\left(\frac{B_1+B_2}{B_2}\right)(\alpha_1+\alpha_2)-\frac{B_1}{B_2}(\alpha_2)\right]$$

Case No	Embankment Hight, H (m)	Embankment Width, B (m)	Depth[1] Df (m)	Soil Type	Density (γ) (t / m³)	Avg SPT (blows/ft)	Angle of Friction (∅)	Cohesion (c, t/m²)	Surcharge (q', t/m²)	Nc[2] or N'c	Nq[2] or N'q	Nγ[2] or N'γ	q_a[3] (t/m²)	Load on Ground DL (t/m²)	Load on Ground LL (t/m²)	Load on Ground DL+LL (t/m²)	Factor of Safety DL+LL min.1.5	Factor of Safety DL min.2.0
7	3	13.50	0.0	SAND	1.70	10	30.0	-	0.0	18.99	8.31	4.39	20.7	5.7	5.7	11.4	1.8	3.6
	4	14.50	0.0	SAND	1.70	10	30.0	-	0.0	18.99	8.31	4.39	22.3	7.6	5.0	12.6	1.8	2.9
	5	15.50	0.0	SAND	1.70	10	30.0	-	0.0	18.99	8.31	4.39	23.8	9.5	4.3	13.8	1.7	2.5
	6	16.50	0.0	SAND	1.70	10	30.0	-	0.0	18.99	8.31	4.39	25.4	11.4	3.8	15.2	1.7	2.2
	7	17.50	0.0	SAND	1.70	10	30.0	-	0.0	18.99	8.31	4.39	26.9	13.3	3.4	16.7	1.6	2.0
8	3	13.50	0.0	SAND	1.70	11	30.3	-	0.0	18.99	8.31	4.39	20.7	5.7	5.7	11.4	1.8	3.6
	4	14.50	0.0	SAND	1.70	11	30.3	-	0.0	18.99	8.31	4.39	22.3	7.6	5.0	12.6	1.8	2.9
	5	15.50	0.0	SAND	1.70	11	30.3	-	0.0	18.99	8.31	4.39	23.8	9.5	4.3	13.8	1.7	2.5
	6	16.50	0.0	SAND	1.70	11	30.3	-	0.0	18.99	8.31	4.39	25.4	11.4	3.8	15.2	1.7	2.2
	7	17.50	0.0	SAND	1.70	11	30.3	-	0.0	18.99	8.31	4.39	26.9	13.3	3.4	16.7	1.6	2.0
9	3	13.50	0.0	SAND	1.80	12	30.6	-	0.0	20.03	9.03	4.83	26.1	5.7	5.7	11.4	2.3	4.6
	4	14.50	0.0	SAND	1.80	12	30.6	-	0.0	20.03	9.03	4.83	28.0	7.6	5.0	12.6	2.2	3.7
	5	15.50	0.0	SAND	1.80	12	30.6	-	0.0	20.03	9.03	4.83	29.9	9.5	4.3	13.8	2.2	3.2
	6	16.50	0.0	SAND	1.80	12	30.6	-	0.0	20.03	9.03	4.83	31.9	11.4	3.8	15.2	2.1	2.8
	7	17.50	0.0	SAND	1.80	12	30.6	-	0.0	20.03	9.03	4.83	33.8	13.3	3.4	16.7	2.0	2.5
10	3	13.50	0.0	SAND	1.90	13	30.9	-	0.0	20.03	9.03	4.83	29.3	5.7	5.7	11.4	2.6	5.1
	4	14.50	0.0	SAND	1.90	13	30.9	-	0.0	20.03	9.03	4.83	31.5	7.6	5.0	12.6	2.5	4.1
	5	15.50	0.0	SAND	1.90	13	30.9	-	0.0	20.03	9.03	4.83	33.7	9.5	4.3	13.8	2.4	3.5
	6	16.50	0.0	SAND	1.90	13	30.9	-	0.0	20.03	9.03	4.83	35.9	11.4	3.8	15.2	2.4	3.1
	7	17.50	0.0	SAND	1.90	13	30.9	-	0.0	20.03	9.03	4.83	38.0	13.3	3.4	16.7	2.3	2.9
11	3	13.50	0.0	SAND	1.90	14	31.2	-	0.0	20.03	9.03	4.83	29.3	5.7	5.7	11.4	2.6	5.1
	4	14.50	0.0	SAND	1.90	14	31.2	-	0.0	20.03	9.03	4.83	31.5	7.6	5.0	12.6	2.5	4.1
	5	15.50	0.0	SAND	1.90	14	31.2	-	0.0	20.03	9.03	4.83	33.7	9.5	4.3	13.8	2.4	3.5
	6	16.50	0.0	SAND	1.90	14	31.2	-	0.0	20.03	9.03	4.83	35.9	11.4	3.8	15.2	2.4	3.1
	7	17.50	0.0	SAND	1.90	14	31.2	-	0.0	20.03	9.03	4.83	38.0	13.3	3.4	16.7	2.3	2.9
12	3	13.50	0.0	SAND	1.90	15	31.5	-	0.0	21.16	9.82	5.51	33.5	5.7	5.7	11.4	2.9	5.9
	4	14.50	0.0	SAND	1.90	15	31.5	-	0.0	21.16	9.82	5.51	36.0	7.6	5.0	12.6	2.9	4.7
	5	15.50	0.0	SAND	1.90	15	31.5	-	0.0	21.16	9.82	5.51	38.4	9.5	4.3	13.8	2.8	4.0
	6	16.50	0.0	SAND	1.90	15	31.5	-	0.0	21.16	9.82	5.51	40.9	11.4	3.8	15.2	2.7	3.6
	7	17.50	0.0	SAND	1.90	15	31.5	-	0.0	21.16	9.82	5.51	43.4	13.3	3.4	16.7	2.6	3.3

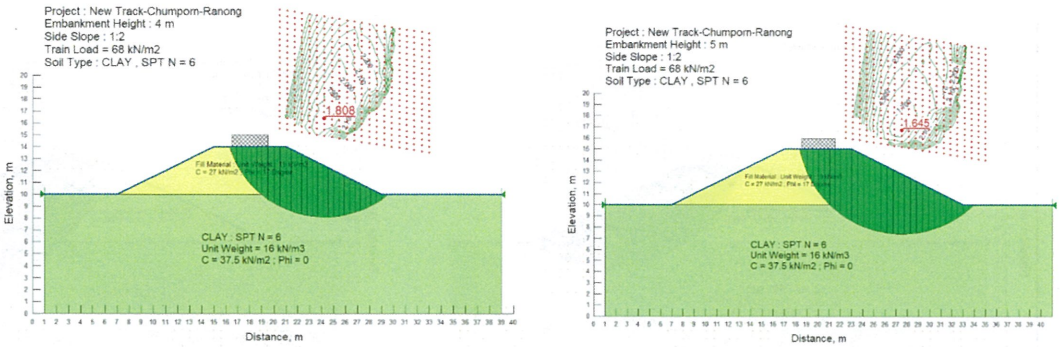
Remarks:

(1) Depth from existing ground

(2) Terzaghi's Bearing Capacity Factors (Nc, Nq, Nγ)
or Terzaghi's Modified Bearing Capacity Factors (N'c, N'q, N'γ)

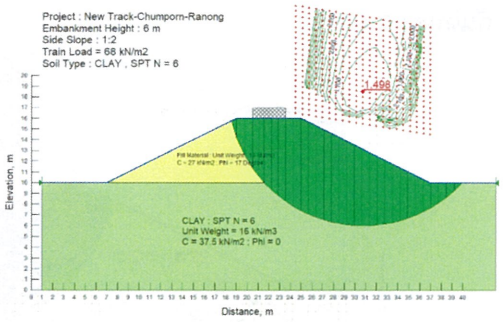
(3) For General Failure : $q_u = cN_c + q'N_q + 0.5\gamma'BN_\gamma$
For Local Shear Failure : $q_u = 0.667cN'_c + q'N'_q + 0.5\gamma'BN'_\gamma$

(4) $q_a = q_u$ / F.S. , Factor of Safety



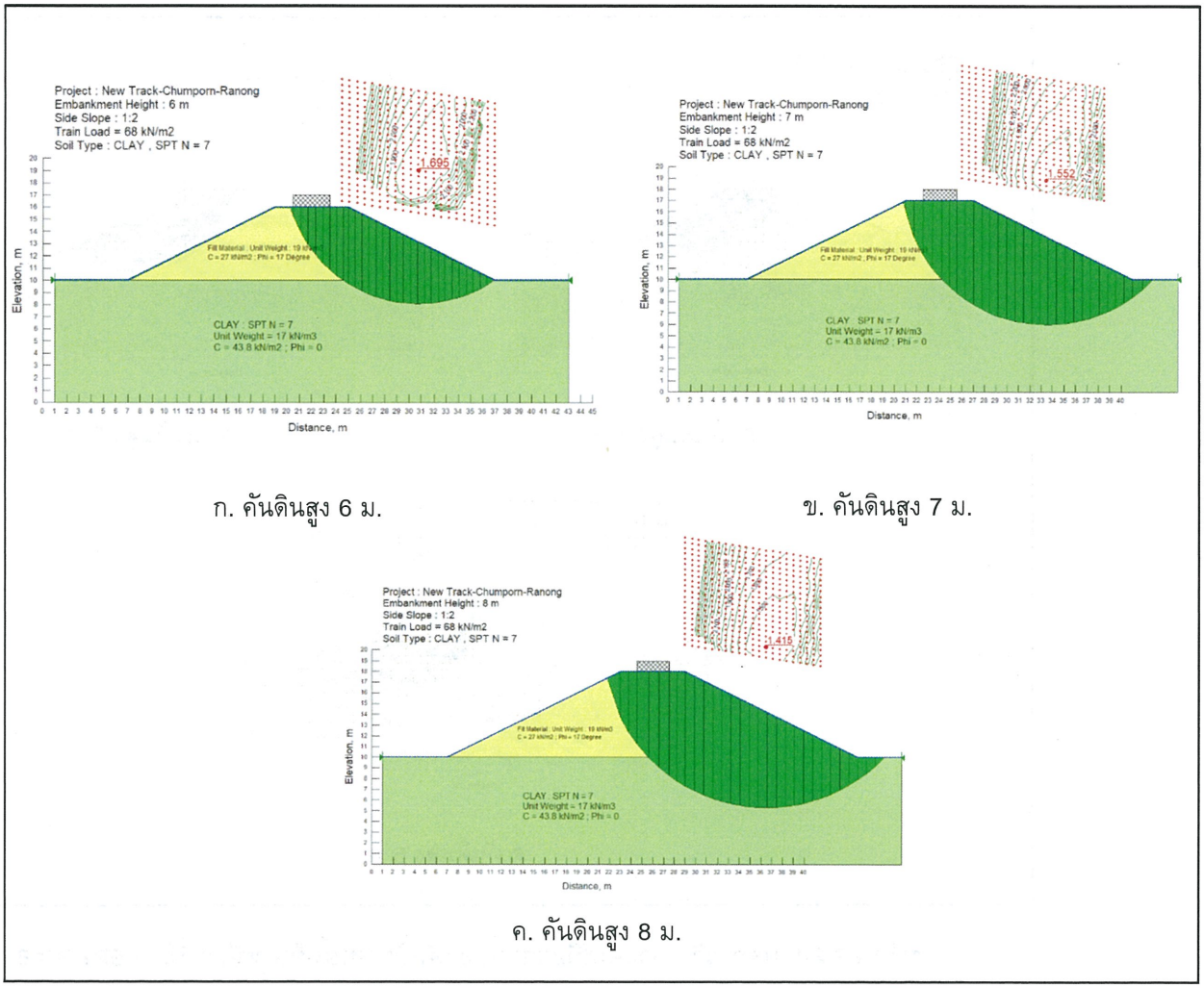
ก. คันดินสูง 4 ม.

ข. คันดินสูง 5 ม.



ค.คันดินสูง 6 ม.

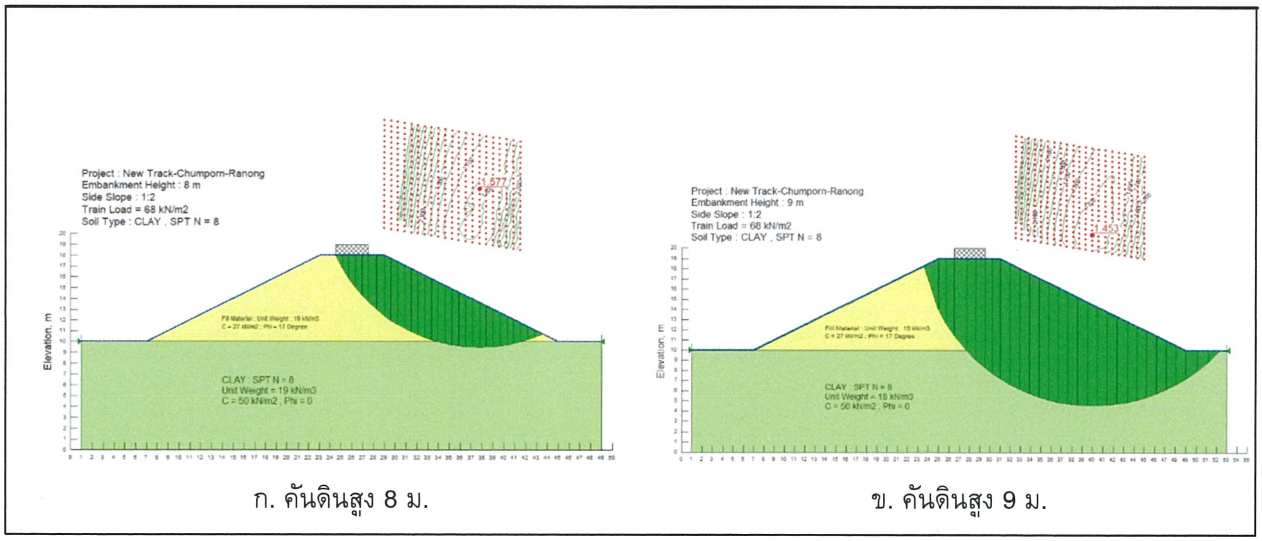
รูปที่ 2.7.2-1 ผลการวิเคราะห์เสถียรภาพของคันดินบนชั้นดินเหนียวที่มีค่า SPT N = 6



ก. คันดินสูง 6 ม. ข. คันดินสูง 7 ม.

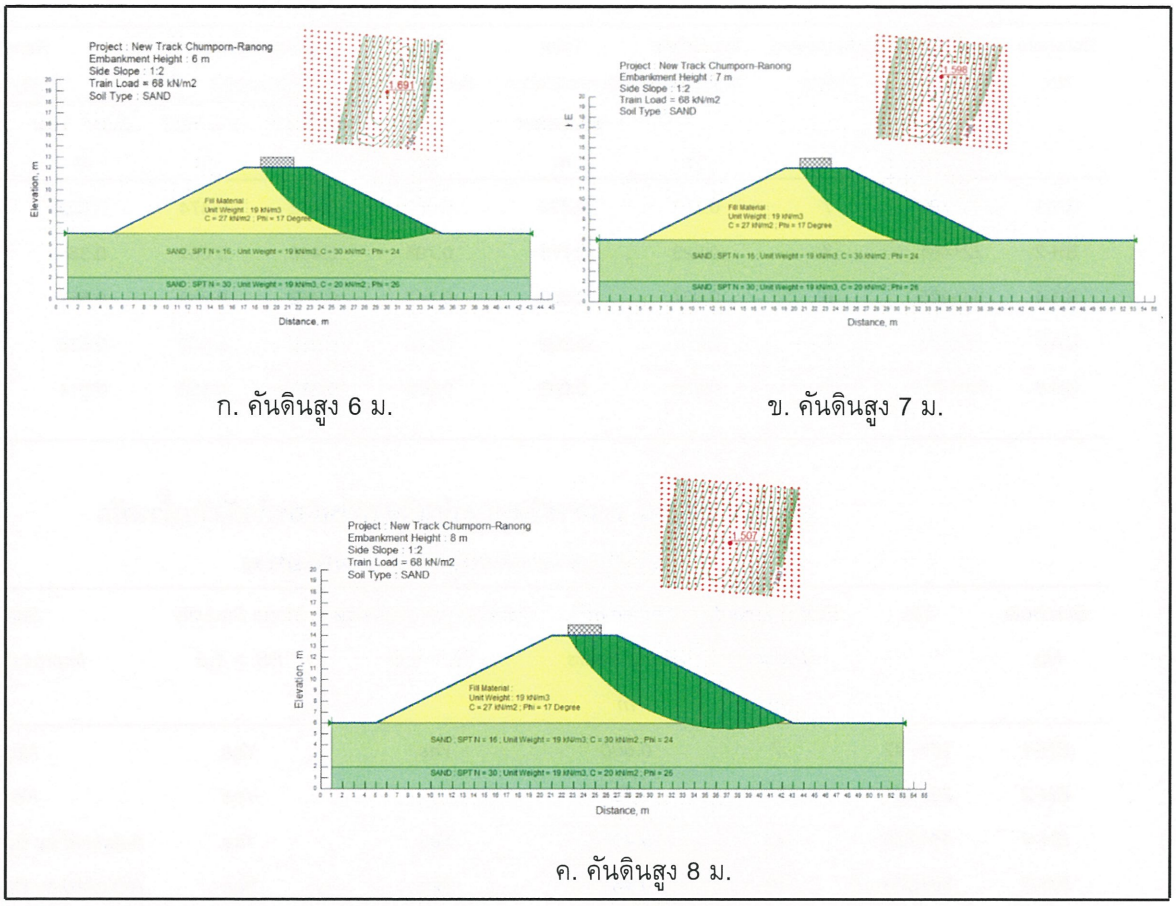
ค. คันดินสูง 8 ม.

รูปที่ 2.7.2-2 ผลการวิเคราะห์เสถียรภาพของคันดินบนชั้นดินเหนียวที่มีค่า SPT N = 7



ก. คันดินสูง 8 ม. ข. คันดินสูง 9 ม.

รูปที่ 2.7.2-3 ผลการวิเคราะห์เสถียรภาพของคันดินบนชั้นดินเหนียวที่มีค่า SPT N = 8



ก. คันดินสูง 6 ม. ข. คันดินสูง 7 ม.

ค. คันดินสูง 8 ม.

รูปที่ 2.7.2-4 ผลการวิเคราะห์เสถียรภาพของคันดินบนชั้นทรายที่มีค่า SPT N = 16

ตารางที่ 2.7.2-3 สรุปผลการวิเคราะห์เสถียรภาพของลาดดินคันทางตามค่า Standard Penetration Test

Soil Type	SPT N	Factor of Safety for Embankment Height, m.					
		H = 4	H = 5	H = 6	H = 7	H = 8	H = 9
Clay	N = 6	1.808	1.645	1.498			
	N = 7			1.695	1.552	1.415	
	N = 8					1.577	1.453
Sand	N = 16			1.691	1.598	1.507	

ตารางที่ 2.7.2-4 ค่าการทรุดตัวของดินคันทางตามแนวหลุมเจาะสายทาง

Borehole No.	Sta.	Embankment Height	Immediate Settlement	Total Consolidation Settlement	Total Settlement	Consolidation Settlement		Remain Settlement	
						at 1 Year	at 2 Year	after 1 Year	after 2 Year
		M	m	m	m	m	m	m	m
BH-1	15+792	7	0.014	0.474	0.488	0.472	0.474	0.002	0.000
BH-2	22+481	7	0.023	0.775	0.798	0.438	0.581	0.337	0.194
BH-4	44+925	6	0.027	0.820	0.847	0.262	0.369	0.558	0.451
BH-7	79+873	6	0.027	0.820	0.847	0.262	0.369	0.558	0.451
BH-9	101+709	7	0.032	0.903	0.935	0.289	0.406	0.614	0.497

ตารางที่ 2.7.2-5 ผลการวิเคราะห์เสถียรภาพและกำลังรับน้ำหนักบรรทุกตามแนวหลุมเจาะตามสายทาง

Borehole No.	*Sta.*	*Embankment Height*	*Settlement after 2 Years*	*Soil Bearing Capacity FS. > 1.5*	*Slope Stability FS. > 1.5*	*Soil Improvement*
		m	*m*			
BH-1	*15+792*	*7*	*0.000*	*Yes*	*Yes*	*No*
BH-2	*22+481*	*7*	*0.194*	*Yes*	*Yes*	*No*
BH-4	*44+925*	*6*	*0.451*	*Yes*	*Yes*	*Adjusted by Ballast Filling*
BH-7	*79+873*	*6*	*0.451*	*Yes*	*Yes*	*Adjusted by Ballast Filling*
BH-9	*101+709*	*7*	*0.497*	*Yes*	*Yes*	*Adjusted by Ballast Filling*

2.7.3 การวิเคราะห์และออกแบบฐานรากเสาเข็ม

ผลการออกแบบระดับความลึกปลายเสาเข็ม ได้แสดงไว้ใน**ตารางที่ 2.7.3-1**

ตารางที่ 2.7.3-1 ระดับความลึกปลายเสาเข็มที่สามารถรับน้ำหนักบรรทุกตามที่ออกแบบ

Type of Pile		*Driven Pile*		*Bored Pile*	
		Square 0.35	*Square 0.40*	*ϕ 1.00*	*ϕ 1.20*
Factor of Safety, FS.		*2.5*	*2.5*	*2.5*	*2.5*
Required Service Load (tons)/Pile		*50*	*50*	*450*	*650*
Borehole	**Km.**	**Pile Tip for Required Service Load (m)**			
BH-1	15+792	6 (41.5)	6 (49.5)	7 (313.4)	7 (424.1)
BH-2	22+481	7 (48.1)	7	9 (326.3)	9 (439.5)
BH-3	32+226	6 (19.6)	6 (25.0)	8 (264.5)	8 (365.3)
BH-4	44+925	7	6	14 (385.7)	14 (510.6)
BH-5	59+751	7 (49.9)	6	10 (279.6)	10 (383.4)
BH-6	65+678	8	8	11 (330.8)	11 (444.8)
BH-7	79+873	9	8	16 (413.8)	16 (544.3)
BH-8	88+577	10 (34.9)	10 (41.9)	13 (334.6)	13 (449.3)
BH-9	101+709	11	9	22	22 (619.2)

หมายเหตุ : ตัวเลขในวงเล็บคือกำลังรับน้ำหนักบรรทุกปลอดภัยของเข็มต่อต้นที่มีค่าน้อยกว่าน้ำหนักบรรทุกปลอดภัยที่ต้องการ

2.7.4 การออกแบบอุโมงค์

การออกแบบและการเลือกระบบค้ำยันที่ใช้ภายในอุโมงค์นั้น จะต้องมีการสำรวจและประเมินสภาพหิน การประเมินสภาพหินและระบบค้ำยันจะใช้ระบบการจำแนกหินแบบ Rock Mass Rating (RMR) แบ่งหินออกเป็น 5 ชนิด ดังแสดงใน**ตารางที่ 2.7.4-1**

การออกแบบระบบประกอบอุโมงค์ ประกอบด้วย

- ระบบระบายอากาศ (Ventilation System)
- ระบบฉุกเฉินและการป้องกันอัคคีภัย (Emergency System)
- ระบบระบายน้ำ (Drainage System)

รายละเอียดตำแหน่งและขนาดการออกแบบอุโมงค์ดังแสดงใน**ตารางที่ 2.7.4-2**

ตารางที่ 2.7.4-1 การจำแนกระดับหินในรูปแบบ Rock Mass Rating (RMR) และการติดตั้งระบบค้ำยันที่แนะนำ (Bieniawski, 1989)

RMR Class	การขุดอุโมงค์ (Excavation)	การติดตั้งRock bolts	การพ่น Shotcrete	การติดตั้ง Steel set
I - หินสภาพดีมาก (Very good rock) RMR: 81-100	Full face, 3 m advance. Complete support 20 m from face	No support required except spot bolting		
II - หินสภาพดี (Good rock) RMR: 61-80	Top heading and bench 1.5 - 3 m advance in top heading. Commence support after each blast. Complete support 20 m from face.	Bolts in crown 3 m long spaced 2.5 m with occasional wire mesh	50 mm in crown where required	None
III - หินสภาพปานกลาง (Fair rock) RMR: 41–60	Top heading and bench 1.5 - 3 m advance in top heading. Commence support after each blast. Complete support 10 m from face.	Systematic bolts 4 m long spaced 1.5 - 2 m in crown and walls with wire mesh in crown	50 - 100 mm in crown and 30 mm in sides	None
IV - หินสภาพแย่ (Poor rock) RMR: 21 - 40	Top heading and bench 1 - 1.5 m advance in top heading. Install support concurrently with excavation, 10 m from face.	Systematic bolts 4- 5 m long, spaced 1 - 1.5 m in crown and walls with wire mesh	100-150 mm in crown and 100 mm in sides	Light to medium rib spaced 1.5 m where required.
V - หินสภาพแย่มาก (Very poor rock) RMR: <20	Multiple drifts 0.5 - 1.5 m advance in top heading. Install support concurrently with excavation. Shotcrete as soon as possible after blasting	Systematic bolts 5-6 m long spaced 1-1.5 m in crown and walls with wire mesh. Bolt invert.	150 - 200 mm in crown, 150 mm in sides, and 50 mm on face.	Medium to heavy rib spaced 0.75 m with steel lagging and fore poling if required. Close invert

ตารางที่ 2.7.4-2 ตำแหน่งและขนาดการออกแบบอุโมงค์

อุโมงค์	กม.		ความยาว (ม.)	พื้นที่
	เริ่มต้น	สิ้นสุด		
อุโมงค์ที่ 1	30+815	32+480	1,665	ต.จ.ป.ร. อ.กระบุรี
อุโมงค์ที่ 2	55+925	56+660	735	ต.น้ำจืด อ.กระบุรี
อุโมงค์ที่ 3	58+815	59+185	370	ต.น้ำจืด อ.กระบุรี
อุโมงค์ที่ 4	60+945	61+465	520	ต.ลำเลียง อ.กระบุรี
อุโมงค์ที่ 5	94+120	95+635	1,515	ต.ปากน้ำ อ.เมืองระนอง
อุโมงค์ที่ 6	100+185	102+000	1,815	ต.ปากน้ำ อ.เมืองระนอง
อุโมงค์ที่ 7 (Spur Line)	0+530	2+310	1,780	ต.ปากน้ำ และ ต.บางนอน อ.เมืองระนอง

2.8 การออกแบบโครงสร้าง

ผลการออกแบบโครงสร้างจำแนกได้ดังนี้

1) การออกแบบโครงสร้างสะพานรถไฟ ตำแหน่งและชนิดของโครงสร้างสะพานรถไฟ แสดงไว้ใน **ตารางที่ 2.8-1**

2) การออกแบบโครงสร้างสะพานรถยนต์ ตำแหน่งและชนิดของโครงสร้างสะพานรถยนต์และทางลอดทางรถไฟ แสดงไว้ใน**ตารางที่ 2.8-2** และ**ตารางที่ 2.8-3**

ตารางที่ 2.8-1 ตำแหน่งและชนิดของสะพานรถไฟ

Station	Proposed Bridges		
	Type	Total Span (m)	Superstructure Type
KM 2+117 TO KM 2+327	EL, PC	6X 35.00m.	SG
KM 6+490 TO KM 7+190	EL, PC	20X 35.00m.	SG
KM 9+135 TO KM 10+010	EL, PC	25X 35.00m.	SG
KM 11+650 TO KM 12+280	EL, PC	18X 35.00m.	SG
KM 15+205 TO KM 15+415	EL, PC	6X 35.00m.	SG
KM 17+430 TO KM 17+675	EL, PC	7X 35.00m.	SG
KM 19+430 TO KM 20+060	EL, PC	18X 35.00m.	SG
KM 20+910 TO KM 21+190	EL, PC	8X 35.00m.	SG
KM 21+540 TO KM 21+645	EL, PC	3X 35.00m.	SG
KM 24+830 TO KM 25+390	EL, PC	16X 35.00m.	SG
KM 25+685 TO KM 25+860	EL, PC	5X 35.00m.	SG
KM 27+145 TO KM 27+250	EL, PC	3X 35.00m.	SG
KM 27+650 TO KM 28+105	EL, PC	13X 35.00m.	SG
KM 28+770 TO KM 28+910	EL, PC	4X 35.00m.	SG
KM 32+595 TO KM 33+750	EL, PC	33X 35.00m.	SG
KM 34+020 TO KM 34+545	EL, PC	15X 35.00m.	SG
KM 35+210 TO KM 35+455	EL, PC	7X 35.00m.	SG
KM 35+765 TO KM 36+955	EL, PC	34X 35.00m.	SG
KM 38+145 TO KM 38+320	EL, PC	5X 35.00m.	SG
KM 39+722 TO KM 39+897	EL, PC	5X 35.00m.	SG
KM 41+850 TO KM 42+200	EL, PC	10X 35.00m.	SG
KM 44+030 TO KM 44+345	EL, PC	9X 35.00m.	SG
KM 45+190 TO KM 45+505	EL, PC	9X 35.00m.	SG
KM 45+735 TO KM 45+875	EL, PC	4X 35.00m.	SG
KM 46+625 TO KM 46+905	EL, PC	8X 35.00m.	SG
KM 47+765 TO KM 48+430	EL, PC	19X 35.00m.	SG
KM 49+050 TO KM 49+330	EL, PC	8X 35.00m.	SG
KM 50+485 TO KM 50+695	EL, PC	6X 35.00m.	SG

ตารางที่ 2.8-1 ตำแหน่งและชนิดของสะพาน (ต่อ)

Station	Proposed Bridges		
	Type	Span (m)	Superstructure Type
KM 51+400 TO KM 51+540	EL, PC	4X 35.00m.	SG
KM 53+440 TO KM 54+700	EL, PC	36X 35.00m.	SG
KM 55+540 TO KM 55+785	EL, PC	7X 35.00m.	SG
KM 56+730 TO KM 56+940	EL, PC	6X 35.00m.	SG
KM 58+520 TO KM 58+765	EL, PC	7X 35.00m.	SG
KM 60+185 TO KM 60+675	EL, PC	14X 35.00m.	SG
KM 61+855 TO KM 65+600	EL, PC	107X 35.00m.	SG
KM 66+145 TO KM 66+705	EL, PC	16X 35.00m.	SG
KM 67+125 TO KM 67+755	EL, PC	18X 35.00m.	SG
KM 67+995 TO KM 69+255	EL, PC	36X 35.00m.	SG
KM 71+155 TO KM 72+940	EL, PC	51X 35.00m.	SG
KM 74+590 TO KM 75+430	EL, PC	24X 35.00m.	SG
KM 75+715 TO KM 75+925	EL, PC	6X 35.00m.	SG
KM 77+645 TO KM 78+590	EL, PC	27X 35.00m.	SG
KM 79+935 TO KM 83+400	EL, PC	99X 35.00m.	SG
KM 85+985 TO KM 86+265	EL, PC	8X 35.00m.	SG
KM 87+910 TO KM 89+380	EL, PC	42X 35.00m.	SG
KM 89+700 TO KM 90+330	EL, PC	18X 35.00m.	SG
KM 92+300 TO KM 93+455	EL, PC	33X 35.00m.	SG
KM 95+770 TO KM 96+435	EL, PC	19X 35.00m.	SG
KM 97+405 TO KM 97+790	EL, PC	11X 35.00m.	SG
KM 98+380 TO KM 98+695	EL, PC	9X 35.00m.	SG
KM 2+500 TO KM 3+270 at Spur Line	EL, PC	22X 35.00m.	SG
KM 3+745 TO KM 4+280 at Spur Line	EL, PC	16X 35.00m.	SG

หมายเหตุ: EL, PC หมายถึง โครงสร้างทางรถไฟยกระดับประเภทคอนกรีตอัดแรง
SG หมายถึง คานคอนกรีตเสริมเหล็กอัดแรงรูปกล่อง

ตารางที่ 2.8-2 ตำแหน่งและชนิดของสะพานสำหรับรถยนต์ที่จุดตัดกับทางรถไฟ

Station	Proposed Bridge		
	Type	Span (m)	Superstructure Type
KM 1+159	MS,PC	12X36.00 m.	IG
KM 4+032	MS,PC	15X30.00 m.	IG
KM 14+945	MS,PC	9X30.00 m.	IG
KM 42+587	MS,PC	10X30.00 m.	IG
KM 53+377	MS,PC	17X30.00 m.	IG
KM 23+849	SS,PC and RC	10.00+30.00 m.	RS + IG
KM 29+620	SS,PC and RC	10.00+30.00+10.00 m.	RS + IG
KM 87+354	SS,PC and RC	10.00+30.00+10.00 m.	RS + IG
KM 102+107	SS,PC and RC	10.00+30.00 m.	RS + IG

หมายเหตุ: MS, PC หมายถึง สะพานรถยนต์ช่วงยาวปานกลาง ประเภทคอนกรีตอัดแรง
SS, PC and RC หมายถึง สะพานรถยนต์ช่วงสั้น ประเภทคอนกรีตอัดแรงและคอนกรีตเสริมเหล็ก
IG หมายถึง คานคอนกรีตอัดแรงรูปตัวไอ
RS หมายถึง โครงสร้างแบบแผ่นพื้นคอนกรีตเสริมเหล็ก

ตารางที่ 2.8-3 ทางลอดชนิดท่อเหลี่ยมของรถยนต์ที่จุดตัดกับทางรถไฟ

Station	Type	Dimension
KM 7+635	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 8+305	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 16+190	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 29+970	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 38+835	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 51+660	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 76+685	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 85+463	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 96+629	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.
KM 4+452 at spur line	UP, CIP-RC	3.00x3.00m, 2Cells, L= 50.00m.

หมายเหตุ: UP, CIP-RC หมายถึง โครงสร้างทางลอดสำหรับรถยนต์รูปกล่อง

2.9 การออกแบบระบบอาณัติสัญญาณและระบบโทรคมนาคม (Signalling and Telecommunication Concept Design)

2.9.1 ระบบอาณัติสัญญาณ (Signalling System)

ระบบอาณัติสัญญาณออกแบบให้เป็นแบบตอนทางสะดวก (Block System) สำหรับทางเดี่ยว (Single Track) เดินรถได้สองทิศทาง (Bi-Directional) ควบคุมด้วยคอมพิวเตอร์ (Computer Based System) แบบใช้สัญญาณสี 2 และ 3 ท่าเพื่อแจ้งให้พนักงานขับรถไฟทราบสภาพเส้นทางข้างหน้า และตัดสินใจที่จะหยุดรถ หรือชะลอความเร็วเพื่อเตรียมหยุดรถต่อไป

2.9.2 ระบบโทรคมนาคม (Telecommunication System)

เทคโนโลยีตลอดจนระบบและอุปกรณ์ต่างๆ ที่แนะนำให้ใช้ในโครงการ จะต้องสอดคล้องกัน และสามารถเชื่อมต่อกับโครงการอื่นๆ ของ รฟท. ได้ ระบบย่อยต่างๆ ของระบบโทรคมนาคมที่ออกแบบสำหรับโครงการนี้ ได้แก่

1) ระบบโครงข่ายสื่อสารหลัก (Data Transmission Network) โดยจะเชื่อมต่อกับระบบสื่อสารหลักเดิมที่ชุมพร CTC
2) ระบบโทรศัพท์ (Telephone System)
3) ระบบวิทยุสื่อสาร (Radio Communication System)
4) ระบบนาฬิกาหลัก (Master Clock System)
5) ระบบจ่ายไฟฟ้าสำหรับระบบอาณัติสัญญาณและโทรคมนาคม
6) การเชื่อมต่อระบบโทรคมนาคมในอนาคต

2.10 การออกแบบด้านโครงสร้างพื้นฐาน

2.10.1 การออกแบบงานวิศวกรรมไฟฟ้า

การออกแบบงานวิศวกรรมไฟฟ้า ประกอบด้วย

- ระบบจ่ายไฟฟ้าแรงต่ำ
- ระบบไฟฟ้าแสงสว่างและเต้ารับไฟฟ้า
- ระบบไฟฟ้าแสงสว่างฉุกเฉินและป้ายทางออกฉุกเฉิน
- ระบบแหล่งจ่ายไฟฟ้าต่อเนื่อง
- ระบบป้องกันฟ้าผ่า
- ระบบการต่อลงดิน
- ระบบแจ้งเหตุเพลิงไหม้
- ระบบจ่ายไฟฟ้าให้อุปกรณ์เครื่องกล
- ระบบสายสัญญาณเต้ารับโทรศัพท์สาธารณะภายในสถานี
- ระบบเรียกฉุกเฉินสำหรับผู้พิการ

สรุปโหลดระบบไฟฟ้าสำหรับอาคารสถานีผู้โดยสาร Type A เท่ากับ 37.6 KVA และสำหรับอาคารสถานีผู้โดยสาร Type B เท่ากับ 34.2 KVA

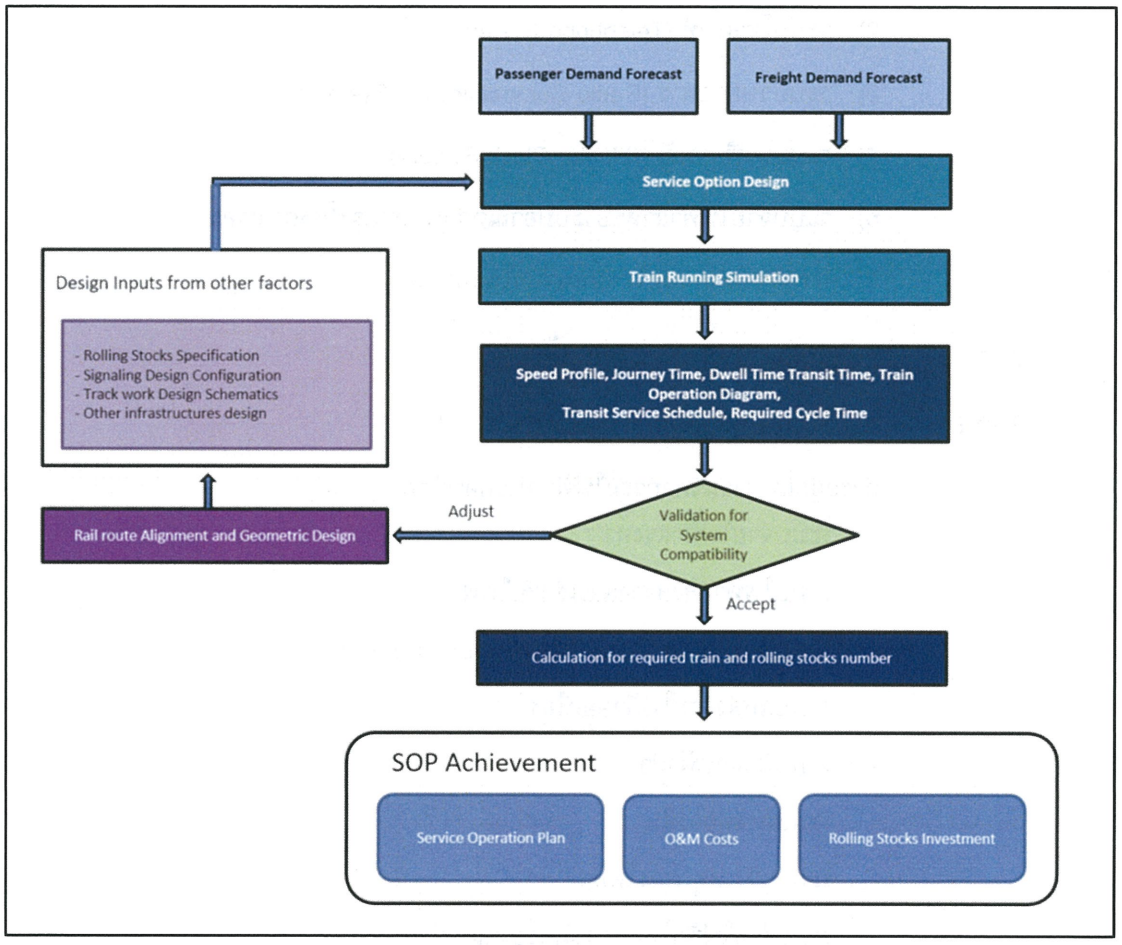
2.10.2 การออกแบบงานวิศวกรรมเครื่องกล

1) ระบบปรับอากาศและระบายอากาศ เป็นระบบปรับอากาศแบบแยกส่วน Split Type System.

2) ระบบสุขาภิบาล ประกอบด้วย ระบบจ่ายน้ำประปา ระบบระบายน้ำทิ้ง น้ำโสโครก และท่อระบายอากาศภายในอาคาร ระบบระบายน้ำฝนภายในอาคาร และระบบบำบัดน้ำเสีย สรุปปริมาณน้ำดีและน้ำเสียสำหรับอาคารผู้โดยสารทั้ง 2 ขนาด เท่ากับ 40 ลบ.ม. และ 12 ลบ.ม. ตามลำดับ

2.11 แผนการเดินรถ

ที่ปรึกษาใช้แบบจำลองการเดินรถ (Train Simulation Model) ทำการคำนวณหาความจุและจำนวนขบวนรถไฟที่จำเป็นต้องใช้ (Train Fleet Size) สำหรับการให้บริการตามตารางเดินรถที่กำหนดไว้ ดังแสดงใน**รูปที่ 2.11-1**



รูปที่ 2.11-1 ขั้นตอนการวางแผนการเดินรถ

2.11.1 การจัดทำแผนการเดินรถ

การให้บริการเดินรถที่เหมาะสมและรองรับปริมาณผู้โดยสารและสินค้าตามผลการคาดการณ์ที่ปรึกษาได้จัดลำดับความสำคัญของขบวนรถ รถด่วน รถธรรมดา และรถสินค้า เพื่อการจอดรอหลีก และการแซงบริเวณย่านสถานี และจะกำหนดสถานีการหยุดและจอดรถเพื่อรับ-ส่งผู้โดยสารและสินค้าของขบวนรถประเภทต่างๆ ดังแสดง**ตารางที่ 2.11.1-1**

ตารางที่ 2.11.1-1 สถานีและการเดินรถในโครงการทางรถไฟ สายชุมพร – ระนอง

ลำดับ	สถานี	ขนาดสถานี	ตำแหน่งสถานี (กม.)	ระยะทางระหว่างสถานี	ประเภทบริการเดินรถ	
					รถด่วนพิเศษ	รถท้องถิ่น
0	ชุมพร	ใหญ่			x	x
1	ขุนกระทิง	เล็ก	3+688	7.25		x
2	บ้านนา (1)	เล็ก	14+067	10.375	x	x
3	บ้านนา (2)	เล็ก	22+000	7.575		x
4	ปากจั่น	เล็ก	42+950	20.950	x	x
5	กระบุรี	เล็ก	52+900	9.950		x
6	บางใหญ่	เล็ก	70+839	17.970		x
7	ละอุ่น	เล็ก	78+869	8.03	x	x
8	ระนอง	กลาง	4+832 (Spur line)	25.234	x	x

2.11.2 การจัดรูปแบบขบวนรถ

1) รถโดยสารท้องถิ่น ดังแสดงใน**ตารางที่ 2.11.2-1**

2) รถไฟทางไกล แสดงใน**ตารางที่ 2.11.2-2**

ตารางที่ 2.11.2-1 การจัดรูปแบบขบวนรถธรรมดาท้องถิ่นในปีต่าง ๆ

Type of Coach	pass/ car	2568		2577		2587		2597	
		car	pass/ train	car	pass/ train	car	pass/ train	car	pass/ train
DMU Cars (seat and standing)	100	4	400	4	400	5	500	6	600

*** ออกแบบให้มีขบวนรถดีเซลราง 3 ขบวน วิ่งให้บริการสลับกันไปเพื่อรองรับผู้โดยสารช่วงเวลาเร่งด่วนเช่น เช้าและเย็น*

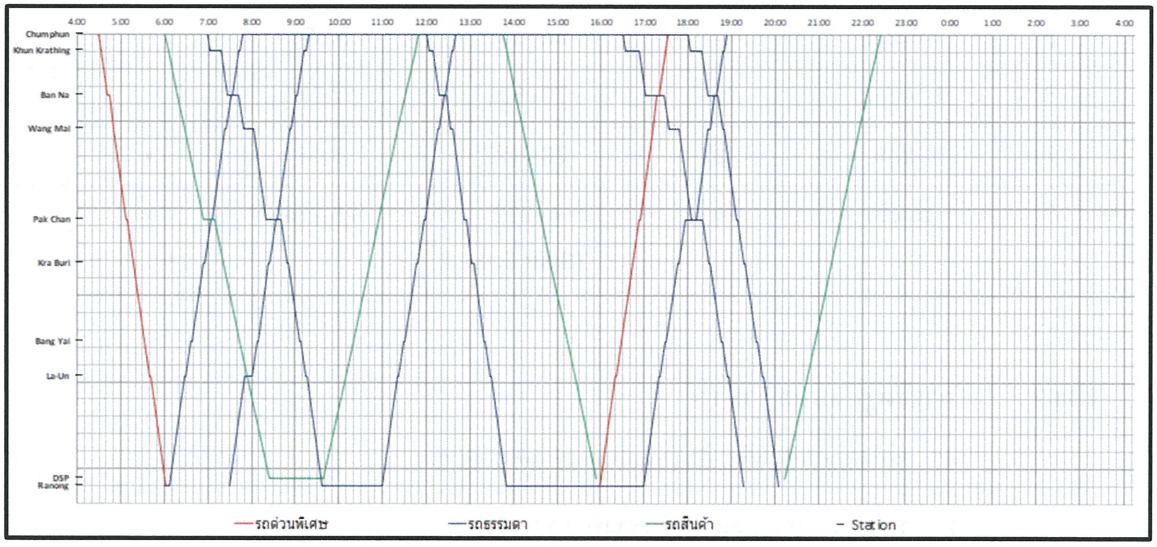
ตารางที่ 2.11.2-2 การจัดรูปแบบขบวนรถโดยสารด่วนพิเศษในปีต่าง ๆ

Type of Coach	pass/ car	2568		2577		2587		2597	
		car	pass/ train	car	pass/ train	car	pass/ train	car	pass/ train
1st class day/night	24	1	24	1	24	1	24	1	24
2nd class day/night	40	3	120	3	120	3	120	3	120
2nd seat only	80	5	400	7	560	10	800	11	880
Restaurant car	0	1	0	1	0	1	0	1	0
Total		**10**	**544**	**12**	**704**	**15**	**944**	**16**	**1,024**

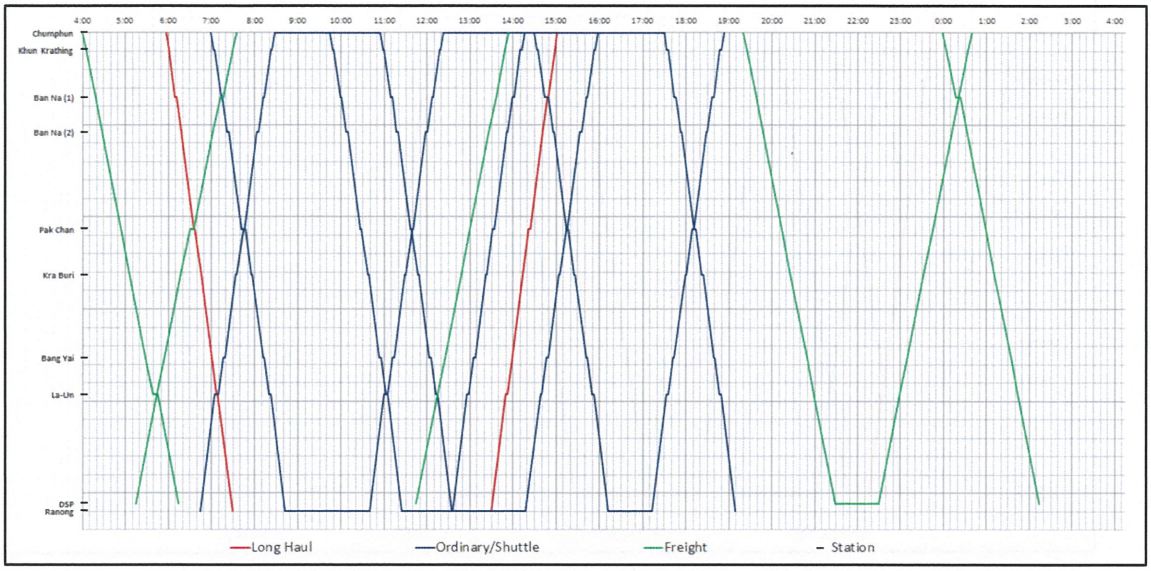
** ทั้งนี้จำนวนผู้โดยสารต่อขบวนจะขึ้นอยู่กับการจัดรูปแบบขบวนรถ

2.11.3 การวางแผนจำนวนเที่ยวการเดินรถและตารางการเดินรถ

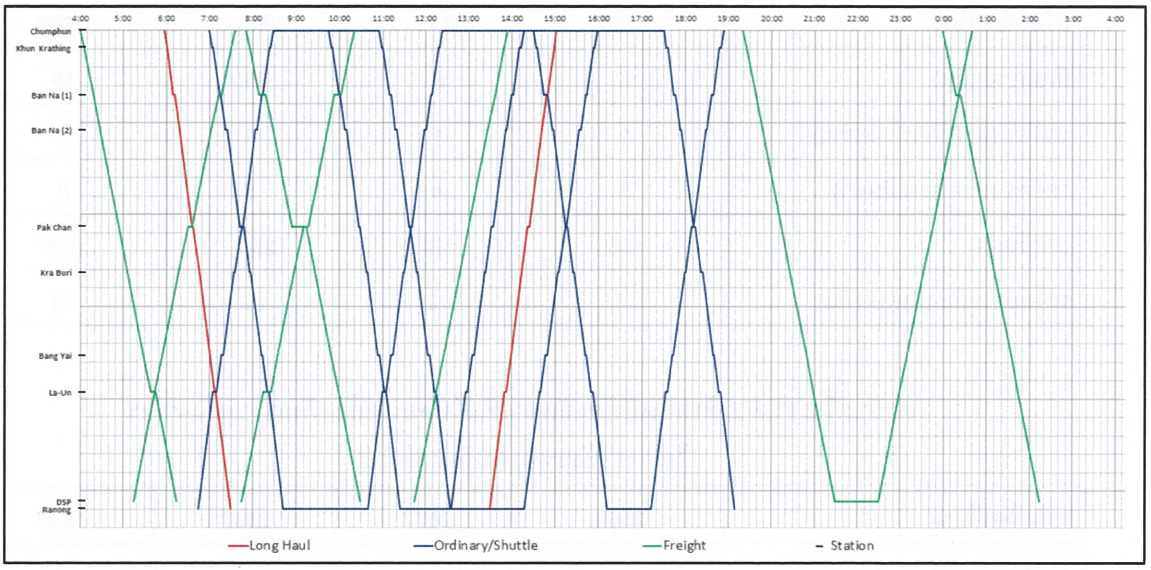
แผนการเดินรถและตารางการเดิน ดังแสดงใน**รูปที่ 2.11.3-1 ถึง 2.11.3-4** จำนวนล้อเลื่อนที่ต้องใช้งานภายในโครงการ ดังแสดงใน**ตารางที่ 2.11.3-1** และ**ตารางที่ 2.11.3-2**



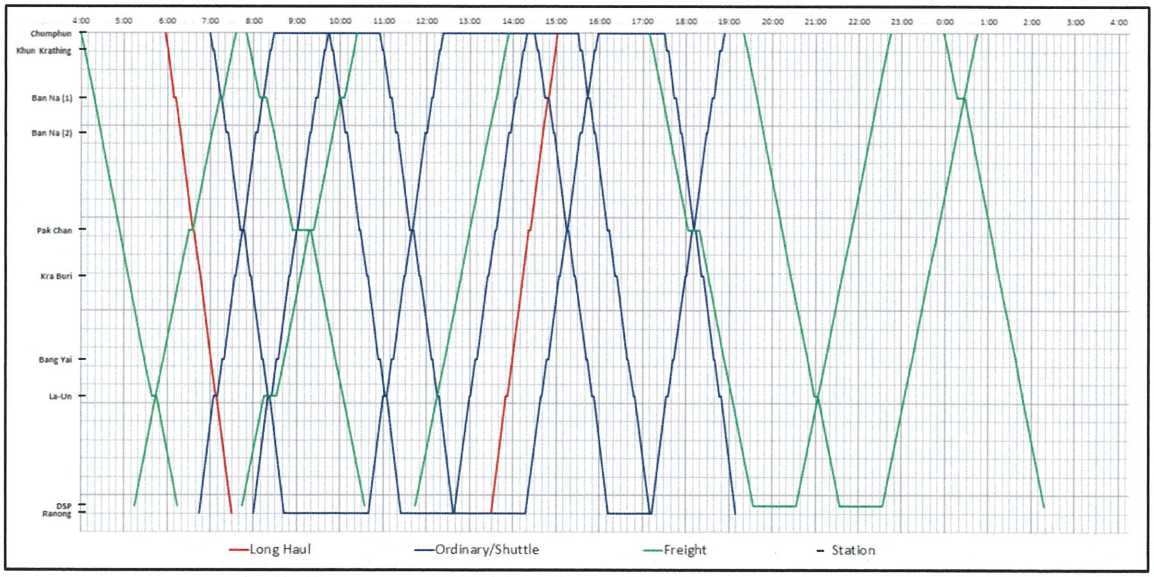
รูปที่ 2.11.3-1 แผนภูมิการเดินรถสำหรับโครงการเส้นทางรถไฟช่วงชุมพร – ระนอง พ.ศ.2568



รูปที่ 2.11.3-2 แผนภูมิการเดินรถสำหรับโครงการเส้นทางรถไฟช่วงชุมพร – ระนอง พ.ศ.2577



รูปที่ 2.11.3-3 แผนภูมิการเดินรถสำหรับโครงการเส้นทางรถไฟช่วงชุมพร – ระนอง พ.ศ.2587



รูปที่ 2.11.3-4 แผนภูมิการเดินรถสำหรับโครงการเส้นทางรถไฟช่วงชุมพร – ระนอง พ.ศ.2597

ตารางที่ 2.11.3-1 จำนวนล้อเลื่อน

ชนิดล้อเลื่อน	2568	2577	2587	2597
ดีเซลราง (คัน)	12	12	15	18
รถจักร (สำหรับรถโดยสาร)	1	1	1	1
รถจักร (สำหรับรถสินค้า)	3	4	5	6
แคร่สินค้า	150	194	250	338
รถโดยสารด่วนพิเศษ (คัน)	10	12	15	16

ตารางที่ 2.11.3-2 จำนวนที่ต้องจัดหาเพิ่มให้สอดคล้องกับความต้องการ ในการใช้งานที่เพิ่มขึ้นแต่ละปี

ชนิดล้อเลื่อน	2568	2577	2587	2597
ดีเซลราง (คัน)	-	-	3	3
รถจักร (สำหรับรถโดยสาร)	-	-	-	-
รถจักร (สำหรับรถสินค้า)	-	1	1	1
แคร่สินค้า	-	44	56	88
รถโดยสารด่วนพิเศษ (คัน)	-	2	3	1

ภาคผนวก

ภาคผนวก ก

แบบเบื้องต้น (Preliminary Design Drawings)

สนข

สำนักงานนโยบายและแผนการขนส่งและจราจร
(สนข.)

งานศึกษาความเหมาะสมทางด้านเศรษฐกิจ วิศวกรรม และสิ่งแวดล้อม
เส้นทางรถไฟชุมพร - ท่าเรือน้ำลึกระนอง

แบบเบื้องต้น
Preliminary Design Drawings

- General Drawings
- Track Works
- Signaling And Telecom
- Alignment
- Civil And Road Works
- Structure Works
- Architect Works
- Electrical And Mechanical Works
- Information

จัดทำโดย : AEC IPC

- บริษัท เอเชี่ยน เอ็นจิเนียริ่ง คอนซัลแต้นส์ จำกัด
- บริษัท อินฟรา พลัส คอนซัลติ้ง จำกัด
- บริษัท เอ็นริช คอนซัลแตนท์ จำกัด

กุมภาพันธ์ 2561

GENERAL DRAWINGS

LIST OF DRAWINGS

SHEET NO.	ITEM	DWG.NO.
	GENERAL DRAWINGS	
1	LIST OF DRAWINGS – 1	SCR–G–001
2	LIST OF DRAWINGS – 2	SCR–G–002
3	LIST OF DRAWINGS – 3	SCR–G–003
4	LIST OF DRAWINGS – 4	SCR–G–004
5	LIST OF DRAWINGS – 5	SCR–G–005
6	LOCATION MAP	SCR–G–006
7	LEGEND AND ABBREVIATION	SCR–G–007
8	SURVEY CONTROL PLAN	SCR–G–008
	TRACK WORKS	
9	OVERALL TRACK SCHEMATIC DIAGRAM	SCR–TW–1001
10	TRACK SCHEMATICS FOR CONNECTION TO MAINLINE	SCR–TW–1002
11	TRACK SCHEMATICS FOR KHUN KRATHING STATION	SCR–TW–1003
12	TRACK SCHEMATICS FOR BAN NA (1) STATION	SCR–TW–1004
13	TRACK SCHEMATICS FOR BAN NA (2) STATION	SCR–TW–1005
14	TRACK SCHEMATICS FOR PAK CHAN STATION	SCR–TW–1006
15	TRACK SCHEMATICS FOR KRABURI STATION	SCR–TW–1007
16	TRACK SCHEMATICS FOR BANG YAI STATION	SCR–TW–1008
17	TRACK SCHEMATICS FOR LA UN STATION	SCR–TW–1009
18	TRACK SCHEMATICS FOR RANONG JUNCTION	SCR–TW–1010
19	TRACK SCHEMATICS FOR RANONG CONTAINER YARD	SCR–TW–1011
20	TRACK SCHEMATICS FOR RANONG TOWN STATION	SCR–TW–1012
21	RAIL PROFILE 54E1	SCR–TW–1013
22	NON–BALLASTED TRACK IN TUNNEL CROSS SECTION AT GENERAL	SCR–TW–1014
	(FOR REFERENCE ONLY)	
23	STRUCTURAL GUAGE	SCR–TW–1015
24	BALLASTED TRACK – SINGLE LINE : CROSS SECTION	SCR–TW–1016
25	NON–BALLASTED TRACK ON VIADUCT, CROSS SECTION AT GENERAL	SCR–TW–1017
	SIGNALING AND TELECOM	
26	LIST OF SYMBOL	SCR–SIG–0001
27	SIGNALING DRAWING FOR SECTION 1	SCR–SIG–1001
28	SIGNALING DRAWING FOR SECTION 2	SCR–SIG–1002
29	SIGNALING DRAWING FOR SECTION 3	SCR–SIG–1003
30	SIGNALING DRAWING FOR SECTION 4	SCR–SIG–1004
31	SIGNALING DRAWING FOR SECTION 5	SCR–SIG–1005
32	SIGNALING DRAWING FOR SECTION 6	SCR–SIG–1006
	ALIGNMENT	
33	LEGEND FOR ALIGNMENT DRAWINGS	SCR–AL–001
34	TYPICAL CROSS SECTION – 1	SCR–AL–002
35	TYPICAL CROSS SECTION – 2	SCR–AL–003
36	TYPICAL CROSS SECTION – 3	SCR–AL–004
37	TYPICAL CROSS SECTION AT KHUN KRATHING STATION	SCR–AL–005
38	TYPICAL CROSS SECTION AT BAN NA (1) STATION	SCR–AL–006
39	TYPICAL CROSS SECTION AT BAN NA (2) STATION	SCR–AL–007
40	TYPICAL CROSS SECTION AT PAK CHAN STATION	SCR–AL–008
41	TYPICAL CROSS SECTION AT KRA BURI STATION	SCR–AL–009
42	TYPICAL CROSS SECTION AT BANG YAI STATION	SCR–AL–010
43	TYPICAL CROSS SECTION AT LA–UN STATION	SCR–AL–011
44	TYPICAL CROSS SECTION AT RANONG STATION	SCR–AL–012
45	STRUCTURAL AND LOADING GAUGES	SCR–AL–013
46	TYPICAL SINGLE TRACK TUNNEL SPACE PROOFING	SCR–AL–014
47	TYPICAL TUNNEL PORTAL OPEN CUT CROSS SECTION	SCR–AL–015
48	TYPICAL TUNNEL PORTAL SUPPORT CROSS SECTION	SCR–AL–016
49	TYPICAL TUNNEL SUPPORT	SCR–AL–017
50	TYPICAL TUNNEL SECTION WITH CROSS PASSAGE	SCR–AL–018

SHEET NO.	ITEM	DWG.NO.
	MAIN LINE	
51	PLAN AND PROFILE KM. 0+000.000 – 2+500.000	SCR–AL–019
52	PLAN AND PROFILE KM. 2+500.000 – 6+000.000	SCR–AL–020
53	PLAN AND PROFILE KM. 6+000.000 – 9+500.000	SCR–AL–021
54	PLAN AND PROFILE KM. 9+500.000 – 13+000.000	SCR–AL–022
55	PLAN AND PROFILE KM. 13+000.000 – 16+500.000	SCR–AL–023
56	PLAN AND PROFILE KM. 16+500.000 – 20+000.000	SCR–AL–024
57	PLAN AND PROFILE KM. 20+000.000 – 23+500.000	SCR–AL–025
58	PLAN AND PROFILE KM. 23+500.000 – 27+000.000	SCR–AL–026
59	PLAN AND PROFILE KM. 27+000.000 – 30+500.000	SCR–AL–027
60	PLAN AND PROFILE KM. 30+500.000 – 34+000.000	SCR–AL–028
61	PLAN AND PROFILE KM. 34+000.000 – 37+500.000	SCR–AL–029
62	PLAN AND PROFILE KM. 37+500.000 – 41+000.000	SCR–AL–030
63	PLAN AND PROFILE KM. 41+000.000 – 44+500.000	SCR–AL–031
64	PLAN AND PROFILE KM. 44+500.000 – 48+000.000	SCR–AL–032
65	PLAN AND PROFILE KM. 48+000.000 – 51+500.000	SCR–AL–033
66	PLAN AND PROFILE KM. 51+500.000 – 55+000.000	SCR–AL–034
67	PLAN AND PROFILE KM. 55+000.000 – 58+500.000	SCR–AL–035
68	PLAN AND PROFILE KM. 58+500.000 – 62+000.000	SCR–AL–036
69	PLAN AND PROFILE KM. 62+000.000 – 65+500.000	SCR–AL–037
70	PLAN AND PROFILE KM. 65+500.000 – 69+000.000	SCR–AL–038
71	PLAN AND PROFILE KM. 69+000.000 – 72+500.000	SCR–AL–039
72	PLAN AND PROFILE KM. 72+500.000 – 76+000.000	SCR–AL–040
73	PLAN AND PROFILE KM. 76+000.000 – 79+500.000	SCR–AL–041
74	PLAN AND PROFILE KM. 79+500.000 – 83+000.000	SCR–AL–042
75	PLAN AND PROFILE KM. 83+000.000 – 86+500.000	SCR–AL–043
76	PLAN AND PROFILE KM. 86+500.000 – 90+000.000	SCR–AL–044
77	PLAN AND PROFILE KM. 90+000.000 – 93+500.000	SCR–AL–045
78	PLAN AND PROFILE KM. 93+500.000 – 97+000.000	SCR–AL–046
79	PLAN AND PROFILE KM. 97+000.000 – 100+500.000	SCR–AL–047
80	PLAN AND PROFILE KM. 100+500.000 – 102+797.580	SCR–AL–048
	SPUR LINE	
81	PLAN AND PROFILE KM. 0+000.000 – 3+000.000	SCR–AL–049
82	PLAN AND PROFILE KM. 3+000.000 – 5+082.176	SCR–AL–050
	CHORD LINE	
83	PLAN AND PROFILE KM. 0+000.000 – 1+129.964	SCR–AL–051
	FENCE	
84	TYPICAL GAVANIZE WIRE MESH FENCE	SCR–AL–052
85	TYPICAL GAVANIZE WIRE MESH GATE	SCR–AL–053
86	INSTALLATION GAVANIZE WIRE MESH FENCE FOR STEEP SLOPE	SCR–AL–054
	CIVIL AND ROAD WORK	
	OVERPASS AT KM. 1+159.000	
87	PLAN	SCR–C–001
88	PROFILE	SCR–C–002
89	SECTION – 1	SCR–C–003
90	SECTION – 2	SCR–C–004
	OVERPASS AT KM. 4+032.000	
91	PLAN	SCR–C–005
92	PROFILE	SCR–C–006
93	SECTION – 1	SCR–C–007
94	SECTION – 2	SCR–C–008

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KINGDOM OF THAILAND
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FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LIST OF DRAWINGS – 1

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR–G–001
SHEET NO.: 1

LIST OF DRAWINGS

SHEET NO.	ITEM	DWG.NO.
	CIVIL AND ROAD WORK	
	OVERPASS AT KM. 14+945.000	
95	PLAN	SCR-C-009
96	PROFILE	SCR-C-010
97	SECTION - 1	SCR-C-011
98	SECTION - 2	SCR-C-012
	OVERPASS AT KM. KM. 42+387.000	
99	PLAN	SCR-C-013
100	PROFILE	SCR-C-014
101	SECTION - 1	SCR-C-015
102	SECTION - 2	SCR-C-016
	OVERPASS AT KM. KM. 53+377.000	
103	PLAN	SCR-C-017
104	PROFILE	SCR-C-018
105	SECTION - 1	SCR-C-019
106	SECTION - 2	SCR-C-020
	DRAINAGE FOR STRUCTURES	
	MISCELLANEOUS	
107	DETAIL OF R.C. DITCH , EARTH DITCH	SCR-DR-001
108	R.C. PIPE CULVERT	SCR-DR-002
109	END STRUCTURE FOR R.C.P. & PIPE CONNECTION DETAILS	SCR-DR-003
110	MANHOLE DETAILS	SCR-DR-004
111	BOX CULVERT ; PLAN AND ELEVATION	SCR-DR-005
112	BOX CULVERT ; DIMENTION & REINFORCEMENT DETAILS	SCR-DR-006
113	BOX CULVERT ; HEADWALL REINFORCEMENT DETAILS	SCR-DR-007
114	BOX CULVERT ; APPROACH SLAB	SCR-DR-008
115	TYPICAL LONGITUDINAL DECK DRAIN	SCR-DR-009
116	SCUPPER AND GRATING DETAILSOF DECK DRAIN	SCR-DR-010
117	SUPPORT AND R.C. TROUGH DETAILS	SCR-DR-011
118	LIST OF LOCATION FOR BOX CULVERT	SCR-DR-012
119	DRAINAGE FOR STRUCTURE : TYPICAL SECTION (1/2)	SCR-DR-013
120	DRAINAGE FOR STRUCTURE : TYPICAL SECTION (2/2)	SCR-DR-014

SHEET NO.	ITEM	DWG.NO.
	STRUCTURE WORK	
1	LIST OF DRAWINGS FOR ELEVATED BRIDGES SHEET 1/2	SCR-RB-GN-001
2	LIST OF DRAWINGS FOR ELEVATED BRIDGES SHEET 2/2	SCR-RB-GN-002
3	GENERAL NOTES FOR ELEVATED RAILWAY BRIDGESSHEET 1/3	SCR-RB-GN-003
4	GENERAL NOTES FOR ELEVATED RAILWAY BRIDGESSHEET 2/3	SCR-RB-GN-004
5	GENERAL NOTES FOR ELEVATED RAILWAY BRIDGESSHEET 3/3	SCR-RB-GN-005
	RAILWAY BRIDGES	
6	RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+117 TO 2+327	SCR-RB-LA-001
7	RAILWAY BRIDGE PLAN AND ELEVATION KM. 6+490 TO 7+190 SHEET 1/2	SCR-RB-LA-002/1
8	RAILWAY BRIDGE PLAN AND ELEVATION KM. 6+490 TO 7+190 SHEET 2/2	SCR-RB-LA-002/2
9	RAILWAY BRIDGE PLAN AND ELEVATION KM. 9+135 TO 10+010 SHEET 1/2	SCR-RB-LA-003/1
10	RAILWAY BRIDGE PLAN AND ELEVATION KM. 9+135 TO 10+010 SHEET 2/2	SCR-RB-LA-003/2
11	RAILWAY BRIDGE PLAN AND ELEVATION KM. 11+650 TO 12+280 SHEET 1/2	SCR-RB-LA-004/1
12	RAILWAY BRIDGE PLAN AND ELEVATION KM. 11+650 TO 12+280 SHEET 2/2	SCR-RB-LA-004/2
13	RAILWAY BRIDGE PLAN AND ELEVATION KM. 15+205 TO 15+415	SCR-RB-LA-005
14	RAILWAY BRIDGE PLAN AND ELEVATION KM. 17+430 TO 17+675	SCR-RB-LA-006
15	RAILWAY BRIDGE PLAN AND ELEVATION KM. 19+430 TO 20+060 SHEET 1/2	SCR-RB-LA-007/1
16	RAILWAY BRIDGE PLAN AND ELEVATION KM. 19+430 TO 20+060 SHEET 2/2	SCR-RB-LA-007/2
17	RAILWAY BRIDGE PLAN AND ELEVATION KM. 20+910 TO 21+190	SCR-RB-LA-008
18	RAILWAY BRIDGE PLAN AND ELEVATION KM. 21+540 TO 21+645	SCR-RB-LA-009
19	RAILWAY BRIDGE PLAN AND ELEVATION KM. 24+830 TO 25+390	SCR-RB-LA-010
20	RAILWAY BRIDGE PLAN AND ELEVATION KM. 25+685 TO 25+860	SCR-RB-LA-011
21	RAILWAY BRIDGE PLAN AND ELEVATION KM. 27+145 TO 27+250	SCR-RB-LA-012
22	RAILWAY BRIDGE PLAN AND ELEVATION KM. 27+650 TO 28+105	SCR-RB-LA-013
23	RAILWAY BRIDGE PLAN AND ELEVATION KM. 28+770 TO 28+910	SCR-RB-LA-014
24	RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 1/3	SCR-RB-LA-015/1
25	RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 2/3	SCR-RB-LA-015/2
26	RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 3/3	SCR-RB-LA-015/3
27	RAILWAY BRIDGE PLAN AND ELEVATION KM. 34+020 TO 34+545	SCR-RB-LA-016
28	RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+210 TO 35+455	SCR-RB-LA-017
29	RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 1/3	SCR-RB-LA-018/1
30	RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 2/3	SCR-RB-LA-018/2
31	RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 3/3	SCR-RB-LA-018/3
32	RAILWAY BRIDGE PLAN AND ELEVATION KM. 38+145 TO 38+320	SCR-RB-LA-019
33	RAILWAY BRIDGE PLAN AND ELEVATION KM. 39+722 TO 39+897	SCR-RB-LA-020
34	RAILWAY BRIDGE PLAN AND ELEVATION KM. 41+850 TO 42+200	SCR-RB-LA-021
35	RAILWAY BRIDGE PLAN AND ELEVATION KM. 44+030 TO 44+345	SCR-RB-LA-022
36	RAILWAY BRIDGE PLAN AND ELEVATION KM. 45+190 TO 45+505	SCR-RB-LA-023
37	RAILWAY BRIDGE PLAN AND ELEVATION KM. 45+735 TO 45+875	SCR-RB-LA-024
38	RAILWAY BRIDGE PLAN AND ELEVATION KM. 46+625 TO 46+905	SCR-RB-LA-025
39	RAILWAY BRIDGE PLAN AND ELEVATION KM. 47+765 TO 48+430 SHEET 1/2	SCR-RB-LA-026/1
40	RAILWAY BRIDGE PLAN AND ELEVATION KM. 47+765 TO 48+430 SHEET 2/2	SCR-RB-LA-026/2
41	RAILWAY BRIDGE PLAN AND ELEVATION KM. 49+050 TO 49+330	SCR-RB-LA-027
42	RAILWAY BRIDGE PLAN AND ELEVATION KM. 50+485 TO 50+695	SCR-RB-LA-028
43	RAILWAY BRIDGE PLAN AND ELEVATION KM. 51+400 TO 51+540	SCR-RB-LA-029
44	RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 1/3	SCR-RB-LA-030/1
45	RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 2/3	SCR-RB-LA-030/2
46	RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 3/3	SCR-RB-LA-030/3
47	RAILWAY BRIDGE PLAN AND ELEVATION KM. 55+540 TO 55+785	SCR-RB-LA-031
48	RAILWAY BRIDGE PLAN AND ELEVATION KM. 56+730 TO 56+940	SCR-RB-LA-032
49	RAILWAY BRIDGE PLAN AND ELEVATION KM. 58+520 TO 58+765	SCR-RB-LA-033
50	RAILWAY BRIDGE PLAN AND ELEVATION KM. 60+855 TO 60+675	SCR-RB-LA-034
51	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 1/8	SCR-RB-LA-035/1
52	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 2/8	SCR-RB-LA-035/2

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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
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FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LIST OF DRAWINGS - 2

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-G-002
SHEET NO.: 2

LIST OF DRAWINGS

SHEET NO.	ITEM	DWG.NO.
	STRUCTURE WORK	
	RAILWAY BRIDGES	
53	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 3/8	SCR-RB-LA-035/3
54	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 4/8	SCR-RB-LA-035/4
55	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 5/8	SCR-RB-LA-035/5
56	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 6/8	SCR-RB-LA-035/6
57	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 7/8	SCR-RB-LA-035/7
58	RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+185 TO 65+600 SHEET 8/8	SCR-RB-LA-035/8
59	RAILWAY BRIDGE PLAN AND ELEVATION KM. 66+145 TO 66+705	SCR-RB-LA-036
60	RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+125 TO 67+755 SHEET 1/2	SCR-RB-LA-037/1
61	RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+125 TO 67+755 SHEET 2/2	SCR-RB-LA-037/2
62	RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 1/3	SCR-RB-LA-038/1
63	RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 2/3	SCR-RB-LA-038/2
64	RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 3/3	SCR-RB-LA-038/3
65	RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 1/4	SCR-RB-LA-039/1
66	RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 2/4	SCR-RB-LA-039/2
67	RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 3/4	SCR-RB-LA-039/3
68	RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 4/4	SCR-RB-LA-039/4
69	RAILWAY BRIDGE PLAN AND ELEVATION KM. 74+590 TO 75+430 SHEET 1/2	SCR-RB-LA-040/1
70	RAILWAY BRIDGE PLAN AND ELEVATION KM. 74+590 TO 75+430 SHEET 2/2	SCR-RB-LA-040/2
71	RAILWAY BRIDGE PLAN AND ELEVATION KM. 75+715 TO 75+925	SCR-RB-LA-041
72	RAILWAY BRIDGE PLAN AND ELEVATION KM. 77+645 TO 78+590 SHEET 1/2	SCR-RB-LA-042/1
73	RAILWAY BRIDGE PLAN AND ELEVATION KM. 77+645 TO 78+590 SHEET 2/2	SCR-RB-LA-042/2
74	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 1/8	SCR-RB-LA-043/1
75	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 2/8	SCR-RB-LA-043/2
76	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 3/8	SCR-RB-LA-043/3
77	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 4/8	SCR-RB-LA-043/4
78	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 5/8	SCR-RB-LA-043/5
79	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 6/8	SCR-RB-LA-043/6
80	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 7/8	SCR-RB-LA-043/7
81	RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 8/8	SCR-RB-LA-043/8
82	RAILWAY BRIDGE PLAN AND ELEVATION KM. 85+985 TO 86+265	SCR-RB-LA-044
83	RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 1/3	SCR-RB-LA-045/1
84	RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 2/3	SCR-RB-LA-045/2
85	RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 3/3	SCR-RB-LA-045/3
86	RAILWAY BRIDGE PLAN AND ELEVATION KM. 89+700 TO 90+330 SHEET 1/2	SCR-RB-LA-046/1
87	RAILWAY BRIDGE PLAN AND ELEVATION KM. 89+700 TO 90+330 SHEET 2/2	SCR-RB-LA-046/2
88	RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 1/3	SCR-RB-LA-047/1
89	RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 2/3	SCR-RB-LA-047/2
90	RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 3/3	SCR-RB-LA-047/3
91	RAILWAY BRIDGE PLAN AND ELEVATION KM. 95+770 TO 96+435 SHEET 1/2	SCR-RB-LA-048/1
92	RAILWAY BRIDGE PLAN AND ELEVATION KM. 95+770 TO 96+435 SHEET 2/2	SCR-RB-LA-048/2
93	RAILWAY BRIDGE PLAN AND ELEVATION KM. 97+405 TO 97+790	SCR-RB-LA-049
94	RAILWAY BRIDGE PLAN AND ELEVATION KM. 98+380 TO 98+695	SCR-RB-LA-050
95	RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+500 TO 3+270 SHEET 1/2	SCR-RB-LA-051/1
96	RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+500 TO 3+270 SHEET 2/2	SCR-RB-LA-051/2
97	RAILWAY BRIDGE PLAN AND ELEVATION KM. 3+720 TO 4+280 SHEET 1/2	SCR-RB-LA-052/1
98	RAILWAY BRIDGE PLAN AND ELEVATION KM. 3+720 TO 4+280 SHEET 2/2	SCR-RB-LA-052/2
	SUPERSTRUCRES AND SUB-STRUCTURES	
99	SPAN ASSEMBLY	SCR-RB-ST-401
100	TYPICAL DETAILS OF SEGMENTAL BOX GIRDER	SCR-RB-ST-501
101	TYPICAL DETAILS OF PIER TYPE "VD3"	SCR-RB-ST-601
102	TYPICAL DETAILS OF PIER TYPE "VD3E"	SCR-RB-ST-602
103	TYPICAL DETAILS OF ABUTMENT TYPE "BG01"	SCR-RB-ST-701

SHEET NO.	ITEM	DWG.NO.
	STRUCTURE WORK	
	MISCELLANEOUS	
104	TYPICAL DETAILS OF DRAIN PIPES AND GRATINGS	SCR-RB-MI-011
105	TYPICAL DETAILS OF HANDRAIL	SCR-RB-MI-012
106	TYPICAL DETAILS OF PARAPET AT NOISE BARRIER	SCR-RB-MI-013
107	TYPICAL DETAILS OF CABLE TROUGH AND OCS BASE	SCR-RB-MI-014

	STRUCTURE WORK	
108	LIST OF DRAWINGS FOR RAILWAY CROSSINGS	SCR-RC-GN-001
109	GENERAL NOTES FOR RAILWAY CROSSINGS SHEET 1	SCR-RC-GN-002
110	GENERAL NOTES FOR RAILWAY CROSSINGS SHEET 2	SCR-RC-GN-003
111	GENERAL NOTES FOR RAILWAY CROSSINGS SHEET 3	SCR-RC-GN-004
	RAILWAY CROSSING (OVERPASSES / FLYOVERS AND CROSS BRIDGES)	
112	OVERPASS BRIDGE PLAN AND ELEVATION KM.1+159	SCR-RC-OP-LA-001
113	OVERPASS BRIDGE PLAN AND ELEVATION KM.4+032	SCR-RC-OP-LA-002
114	OVERPASS BRIDGE PLAN AND ELEVATION KM.14+945	SCR-RC-OP-LA-003
115	OVERPASS BRIDGE PLAN AND ELEVATION KM.42+587	SCR-RC-OP-LA-004
116	OVERPASS BRIDGE PLAN AND ELEVATION KM.53+377	SCR-RC-OP-LA-005
117	CROSSING BRIDGE PLAN AND ELEVATION KM.23+390	SCR-RC-CB-LA-001
118	CROSSING BRIDGE PLAN AND ELEVATION KM.29+620	SCR-RC-CB-LA-002
119	CROSSING BRIDGE PLAN AND ELEVATION KM.87+354	SCR-RC-CB-LA-003
120	CROSSING BRIDGE PLAN AND ELEVATION KM.102+107	SCR-RC-CB-LA-004
	STANDARD STRUCTURES	
121	TYPICAL DETAILS OF PC. PLANK GIRDER	SCR-RC-ST-001
122	TYPICAL DETAILS OF PC. I-GIRDER FOR SPAN LENGTH 30.00 M.	SCR-RC-ST-011
123	TYPICAL DETAILS OF SLAB AND DIAPHRAGM FOR PC. I-GIRDER	SCR-RC-ST-012
124	TYPICAL DETAILS OF EXPANSION JOINTS AND LINKED SLAB	SCR-RC-ST-013
125	TYPICAL DETAILS OF PIER TYPE "A1" HEIGHT ≤ 10.00 M. AND EXPANSION JOINT	SCR-RC-ST-101
126	TYPICAL DETAILS OF PIER TYPE "A2" 10.00 M. ≤ HEIGHT ≤ 13.00 M.	SCR-RC-ST-102
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127	TYPICAL DETAILS OF PIER TYPE "A3" WIDTH 11.50M. WITH 1-SIDEWALK,	SCR-RC-ST-103
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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
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FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LIST OF DRAWINGS – 3

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-G-003
SHEET NO.: 3

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MINISTRY OF TRANSPORT
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FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
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TITLE: LIST OF DRAWINGS – 4

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-G-004
SHEET NO.: 4

LIST OF DRAWINGS

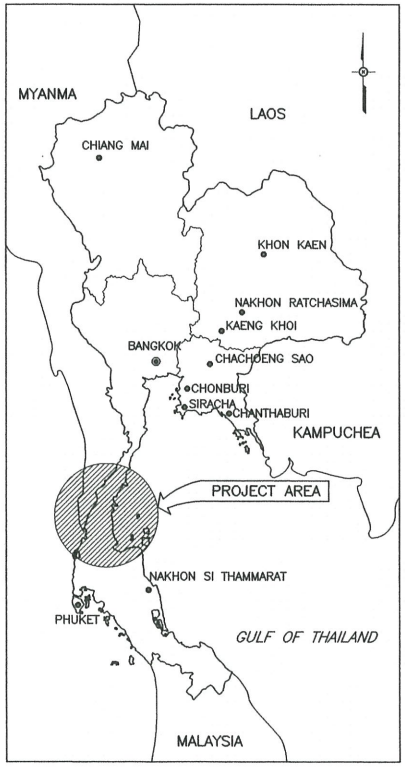
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021	SLOPE PROTECTION TYPE 3	SCR-I-021
022	SLOPE PROTECTION TYPE 4	SCR-I-022
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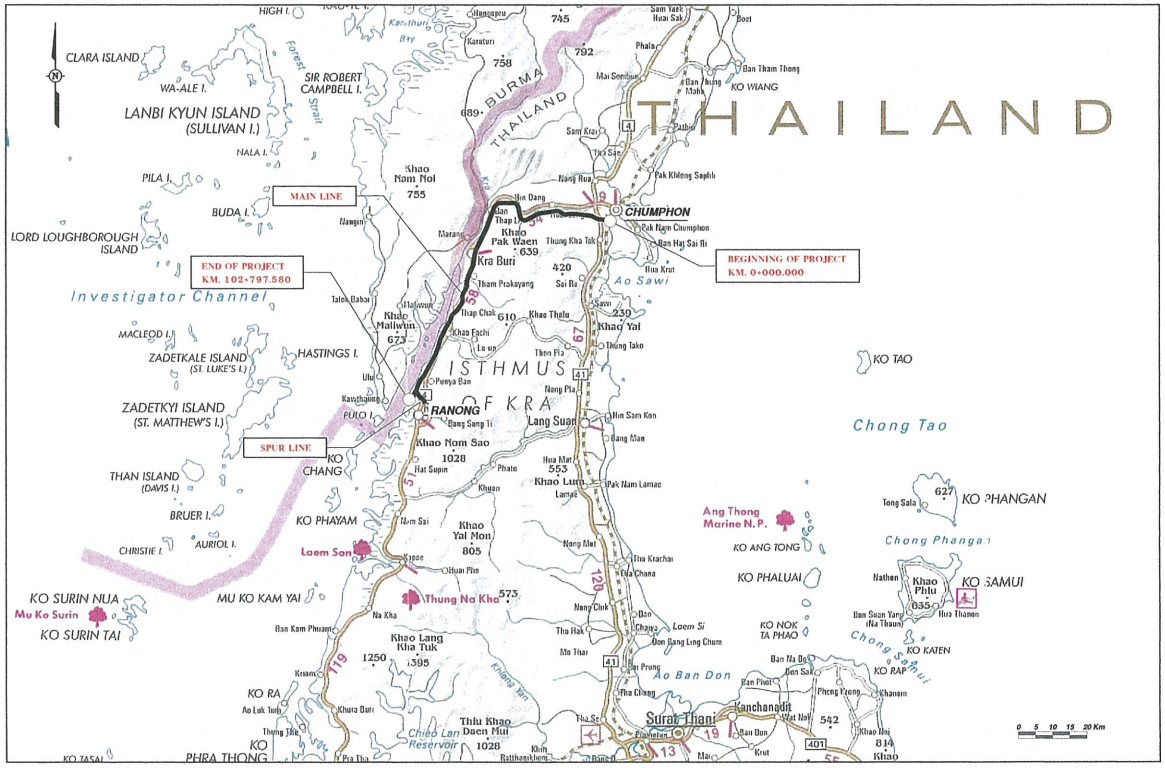
MINISTRY OF TRANSPORT

OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING

CHUMPHON - RANONG RAILWAY PROJECT



KEY MAP



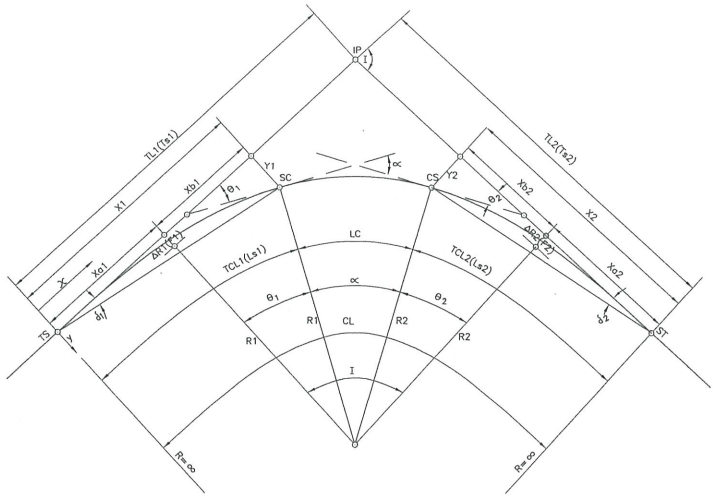
LOCATION MAP

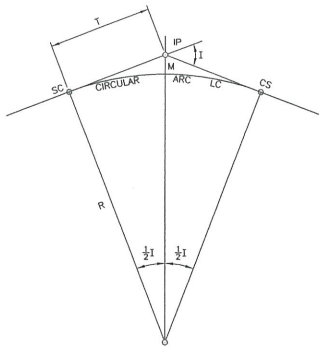
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE LOCATION MAP	DATE: FEBRUARY 2018 DWG. NO.: SCR-G-006	SCALE: AS SHOWN SHEET NO.: 6

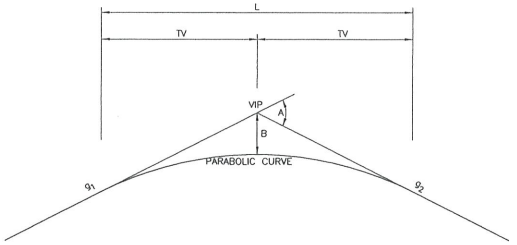
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LEGEND

- POST BOX
- BENCH MARK
- HORIZONTAL CONTROL POINT
- LAMP POLE
- WATER VALVE
- DESTINATION SIGN
- BIG TREE
- TELEPHONE POST
- MANHOLE OF ELECTRICITY
- MANHOLE OF TELEPHONE
- FIRE HYDRANT
- FIBRE OPTIC PIT
- TELEPHONE JUNCTION BOX
- MANHOLE FOR DRAINAGE
- TRAFFIC CONTROL BOX
- SIGNAL/TRAFFIC LIGHT
- INSULATED JOINT
- KILOMETER POST
- R/W — RIGHT OF WAY BOUNDARY
- GAS PIPELINE WITH MARK
- W — WATER PIPE LINE
- E — ELECTRIC LINE
- T — TELEGRAPH OR TELEPHONE LINE
- F-SC — ONE-STOREYED CONCRETE FRAMED BUILDING
- F-SW — ONE-STOREYED WOODEN FRAMED BUILDING







HORIZONTAL CURVES WITH TRANSITIONS

(TRANSITION CURVE = CUBIC EQUATION)

IP	INTERSECTING POINT OF TANGENTS
I	ANGLE OF INTERSECTING TANGENTS
δ_0	ANGLE BETWEEN TANGENT AT TS. AND CHORD OF TRANSITION
θ	ANGLE BETWEEN TANGENT TO SPIRAL ARC
α	CENTRAL ANGLE OF CIRCULAR CURVE = $I-(\theta_1+\theta_2)$
R	RADIUS OF CIRCULAR CURVE
y	PORMULA OF TRANSITION CURVE $y = \frac{x^3}{6RX}$
TS	POINT OF CHANGE FROM TANGENT TO TRANSITION
SC	POINT OF CHANGE FROM TRANSITION TO CIRCLE
CS	POINT OF CHANGE FROM CIRCLE TO TRANSITION
ST	POINT OF CHANGE FROM TRANSITION TO TANGENT
Ts	TOTAL LENGTH OF TANGENT FROM IP TO TS OR ST
x	ABSCISSA FROM TS OR ST
LS	LENGTH OF SPIRAL ARC FROM TS TO SC OR FROM CS TO ST
LC	LENGTH OF CIRCULAR ARC FROM SC TO CS
XM	ABSCISSA REFERRED TO TS OR ST WITH RADIUS (R+AR)
X	ABSCISSA OF SC OR CS REFERRED TO TS OR ST
Y	ORDINATE OF SC OR CS
ΔR	DIFFERENEC IN RADIUS BETWEEN THE CIRCLE WITHOUT TRANSITION (RADIUS R) AND THE CIRCLE WITH TRANSITION (RADIUS R+ΔR)
CL	TOTAL LENGTH OF CIRCULAR CURVE AND TRANSITIONS

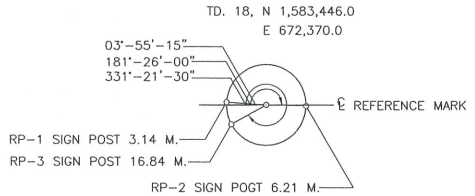


CIRCULAR HORIZONTAL CURVES

IP	INTERSECTING POINT OF TANGENTS
I	ANGLE OF INTERSECTING TANGENTS
R	RADIUS OF CIRCULAR CURVE
SC	POINT OF CURVATURE (BEGINNING OF CURVE,STRAIGHT TO CURVE)
CS	POINT OF TANGENCY (END OF CURVE,CURVE TO STRAIGHT)
T	LENGTH OF TANGENT FROM IP TO SC OR CS
LC	LENGTH OF CIRCULAR ARC FROM SC TO CS
M	OFFSET OF IP FROM CURVE

OTHER ABBREVIATIONS

PC	PIPE CULVERT
BC	BOX CULVERT
BR	BRIDGE
FO	FLY OVER
IE	INVERT ELEVATION OF CULVERT AT CENTER LINE
STR	STRAIGHT



VERTICAL CURVES

VIP = VERTICAL INTERSECTING POINT OF TANGENTS

$A = g_2 - g_1$

= ALGEBRAIC DIFFERENCE IN GRADES (PERMILLAGE) OF THE GRADE TANGENTS

VR = VERTICAL RADIUS IN METERS

$L = \frac{VR.A}{1000}$

= TOTAL LENGTH OF VERTICAL CURVE IN METERS

TV = 0.5L=TANGENT VERTICAL CURVE IN METERS

B = BISECTRIX VERTICAL CURVE IN METERS

$= \frac{AL}{8,000}$

V:\PROJECT\1465-SCR\DRAWINGS\03_PRELIM\01_GENERAL\SCR-G-007.DWG

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LEGEND AND ABBREVIATION

DATE: FEBRUARY 2018
SCALE: NONE
DWG. NO.: SCR-G-007
SHEET NO.: 7

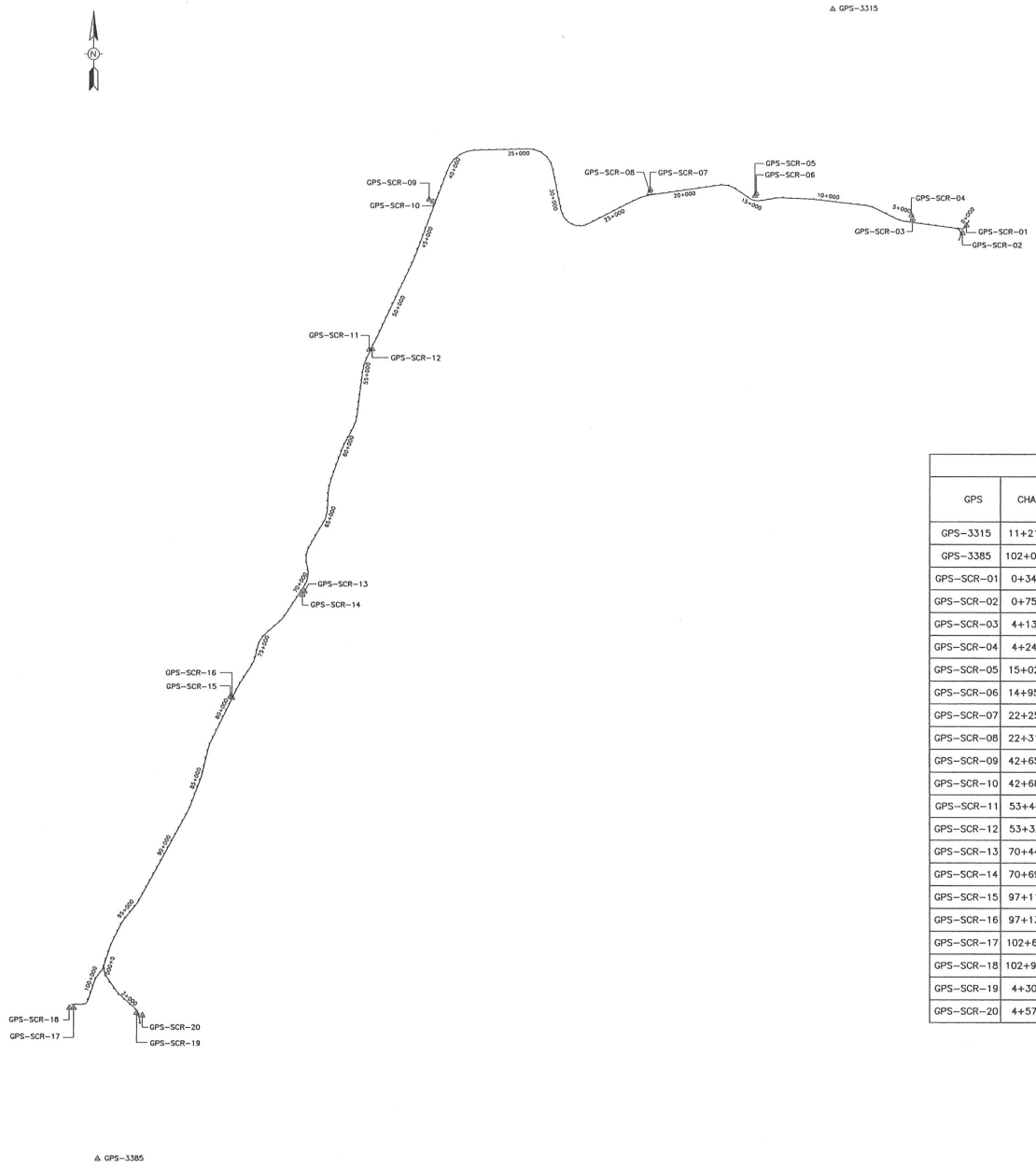


TABLE GPS							
GPS	CHAINAGE	LT/RT	OFFSET (M.)	DRAWING COORDINATE		ELEV.(MSL)	REMARKS
				E	N		
GPS-3315	11+214.062	RT	12795.639	508,270.822	1,172,807.355	25.720	
GPS-3385	102+042.197	LT	10332.237	459,172.264	1,096,060.217	14.139	
GPS-SCR-01	0+342.204	LT	8.392	517,289.119	1,158,348.526	6.398	
GPS-SCR-02	0+752.218	LT	282.963	517,008.923	1,157,834.643	4.985	
GPS-SCR-03	4+136.177	RT	232.965	513,645.193	1,158,781.358	7.191	
GPS-SCR-04	4+245.439	RT	466.363	513,568.050	1,159,027.400	7.135	
GPS-SCR-05	15+026.009	RT	325.090	503,092.397	1,160,317.103	27.460	
GPS-SCR-06	14+958.760	RT	479.917	503,171.007	1,160,456.310	27.473	
GPS-SCR-07	22+255.883	RT	356.599	496,047.400	1,160,724.150	44.688	
GPS-SCR-08	22+313.084	RT	169.403	496,017.131	1,160,530.618	42.338	
GPS-SCR-09	42+652.908	RT	449.280	481,240.349	1,160,030.369	20.333	
GPS-SCR-10	42+688.375	RT	144.548	481,513.198	1,159,890.110	19.961	
GPS-SCR-11	53+445.901	RT	81.114	477,252.606	1,150,033.930	9.804	
GPS-SCR-12	53+326.931	LT	75.038	477,444.838	1,150,073.736	10.351	
GPS-SCR-13	70+442.932	LT	210.940	472,929.855	1,133,841.330	21.381	
GPS-SCR-14	70+697.616	LT	217.888	472,795.703	1,133,624.737	14.168	
GPS-SCR-15	97+112.365	RT	156.289	467,991.066	1,126,839.897	9.381	
GPS-SCR-16	97+136.958	RT	17.813	468,104.069	1,126,756.168	14.488	
GPS-SCR-17	102+645.691	LT	225.423	457,587.366	1,106,122.416	22.814	
GPS-SCR-18	102+937.254	LT	238.031	457,297.312	1,106,111.747	3.177	
GPS-SCR-19	4+307.540	RT	102.173	462,142.540	1,105,615.189	16.897	
GPS-SCR-20	4+570.378	LT	226.253	461,769.700	1,105,797.032	15.875	

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KINGDOM OF THAILAND
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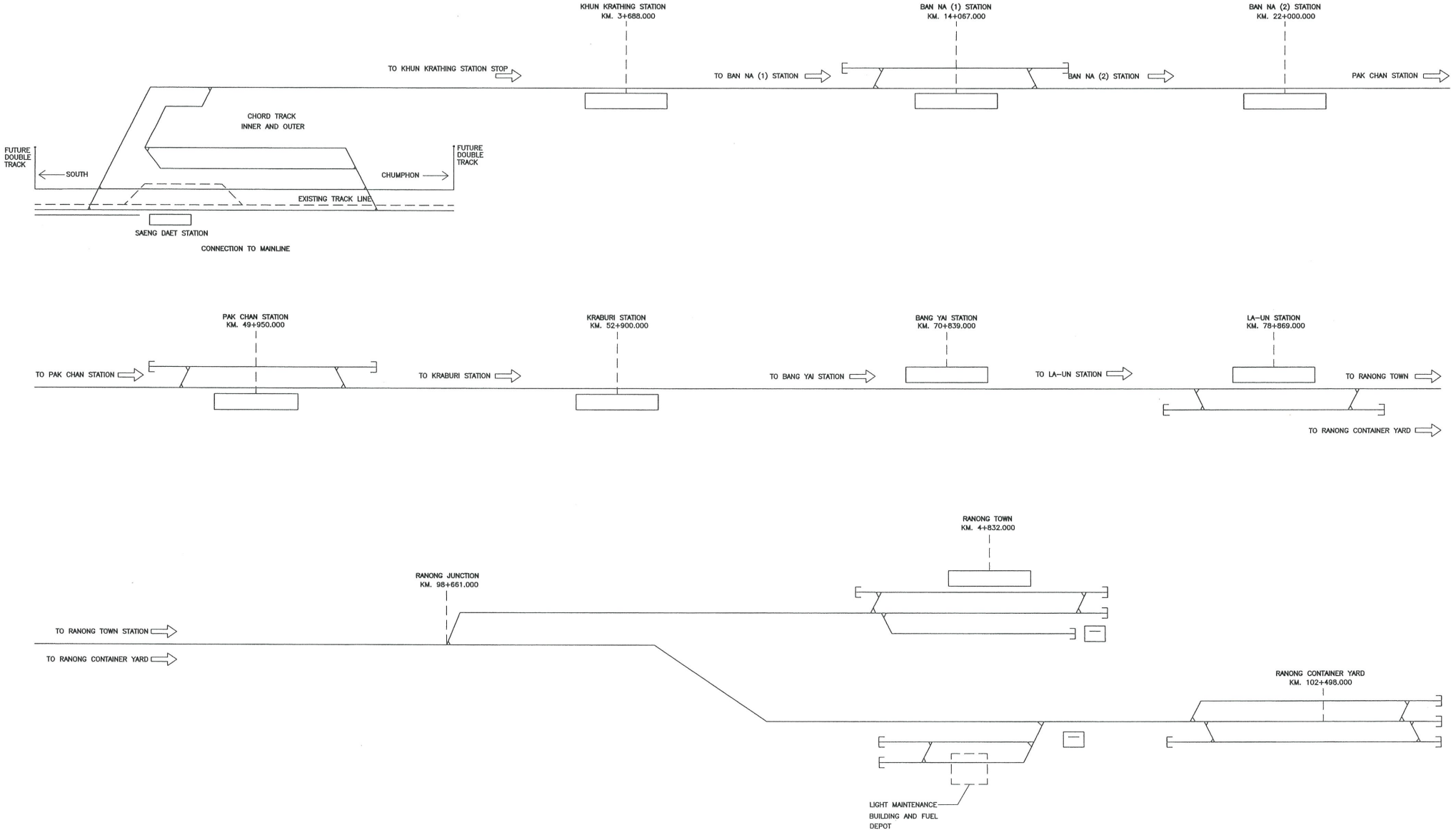
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: SURVEY CONTROL PLAN

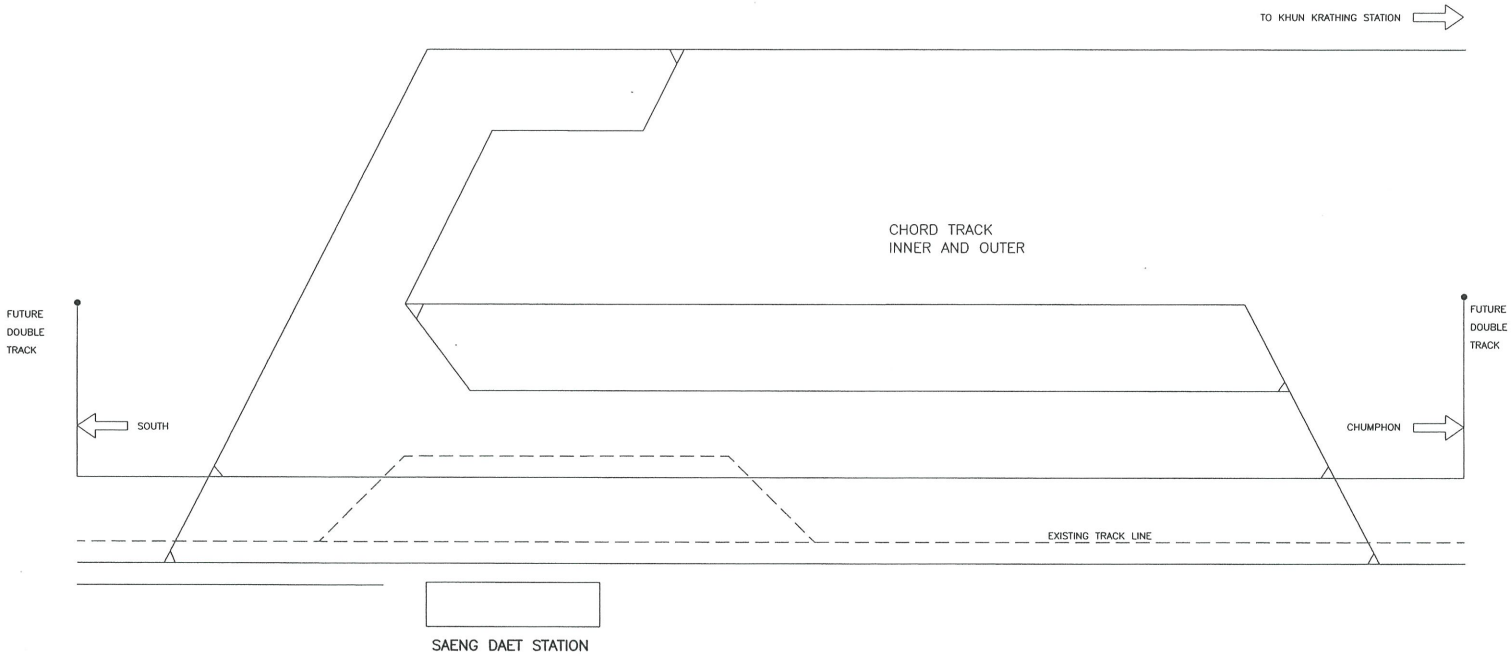
DATE: FEBRUARY 2018
SCALE: NONE
DWG. NO.: SCR-G-008
SHEET NO.: 8

TRACK WORKS



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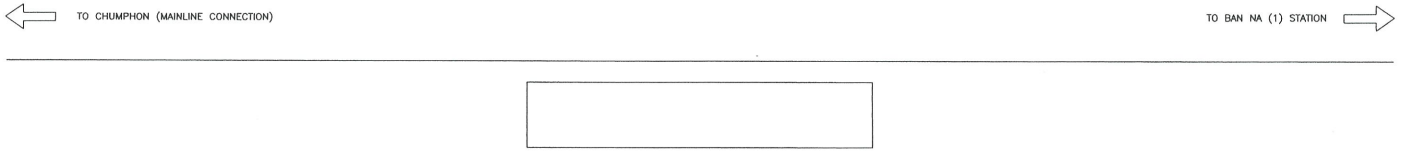
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERALL TRACK SCHEMATICS DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1001	SCALE: AS SHOWN SHEET NO.: 9



TRACK SCHEMATICS FOR CONNECTION TO MAINLINE

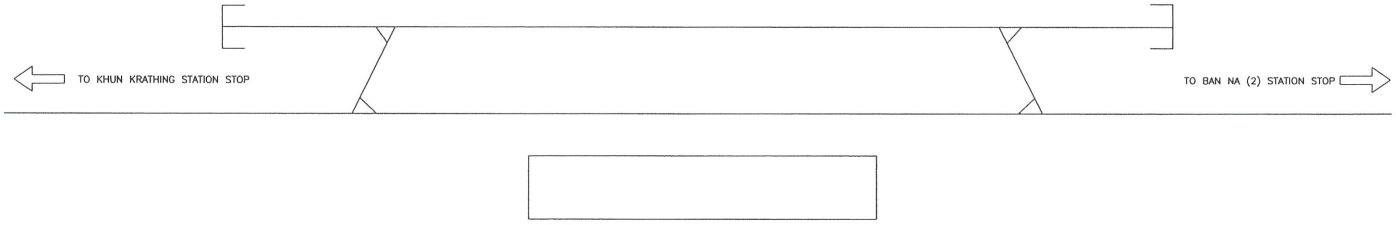
V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1002.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR CONNECTION TO MAINLINE	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1002	SCALE: AS SHOWN SHEET NO.: 10



V:\PROJECT\1485-SCR\DRAWINGS\03_PRELIM\02_TRACK WORK\SCR-TW-1003.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR KHUN KRATHING STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1003	SCALE: AS SHOWN SHEET NO.: 11



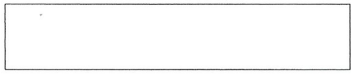
BAN NA (1) STATION

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1004.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR BAN NA (1) STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1004	SCALE: AS SHOWN SHEET NO.: 12

TO BAN NA (1) STATION

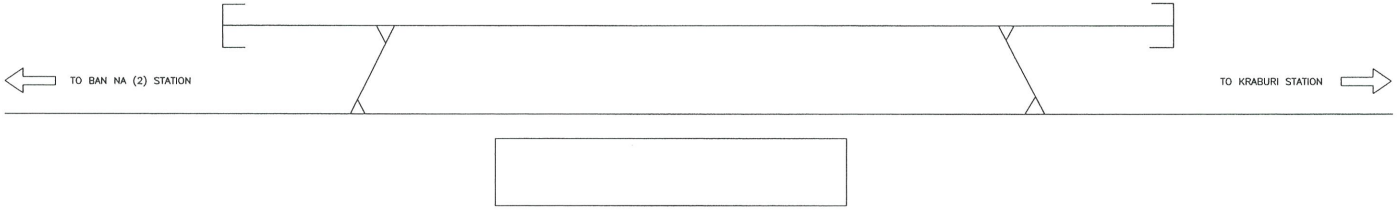
TO PAK CHAN STATION



BAN NA (2) STATION

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1005.DWG

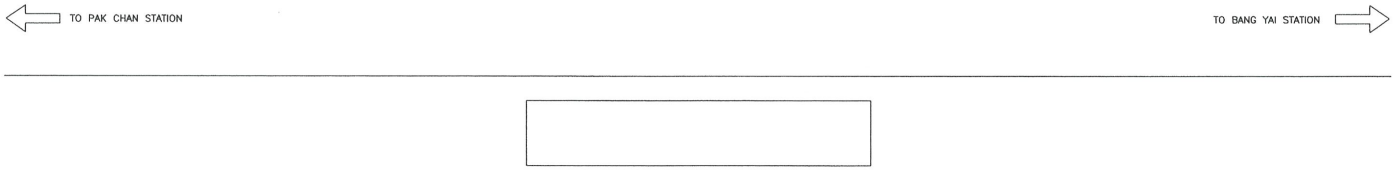
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR BAN NA (2) STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1005	SCALE: AS SHOWN SHEET NO.: 13



PAK CHAN STATION

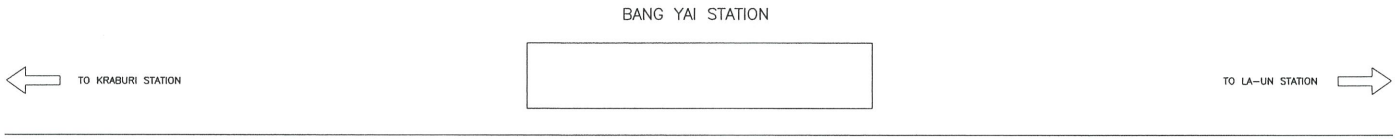
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR PAK CHAN STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1006	SCALE: AS SHOWN SHEET NO.: 14



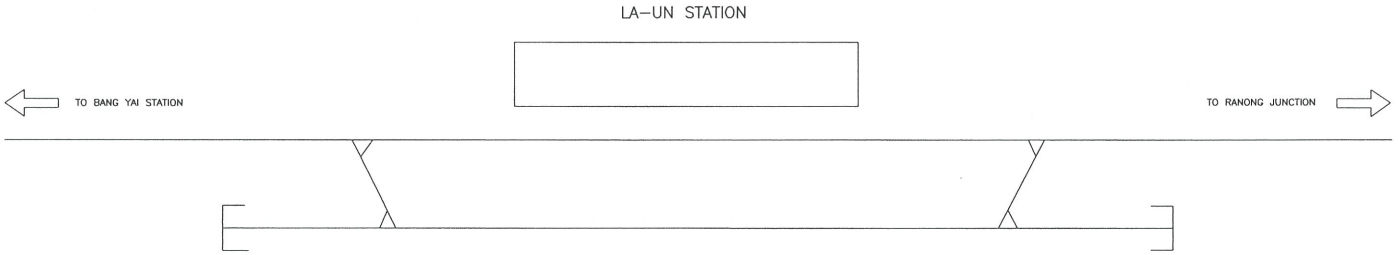
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR KRABURI STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1007	SCALE: AS SHOWN SHEET NO.: 15



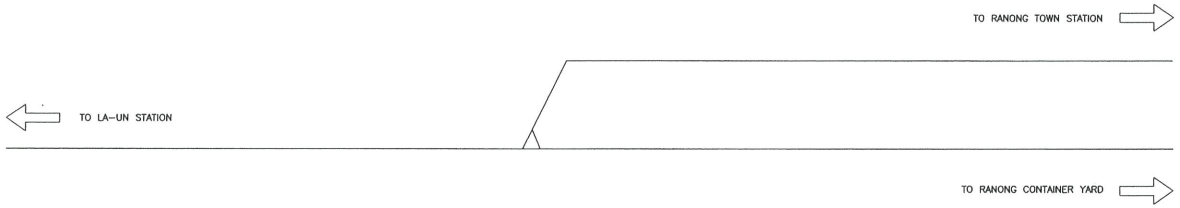
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR BANG YAI STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1008	SCALE: AS SHOWN SHEET NO.: 16

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1008.DWG



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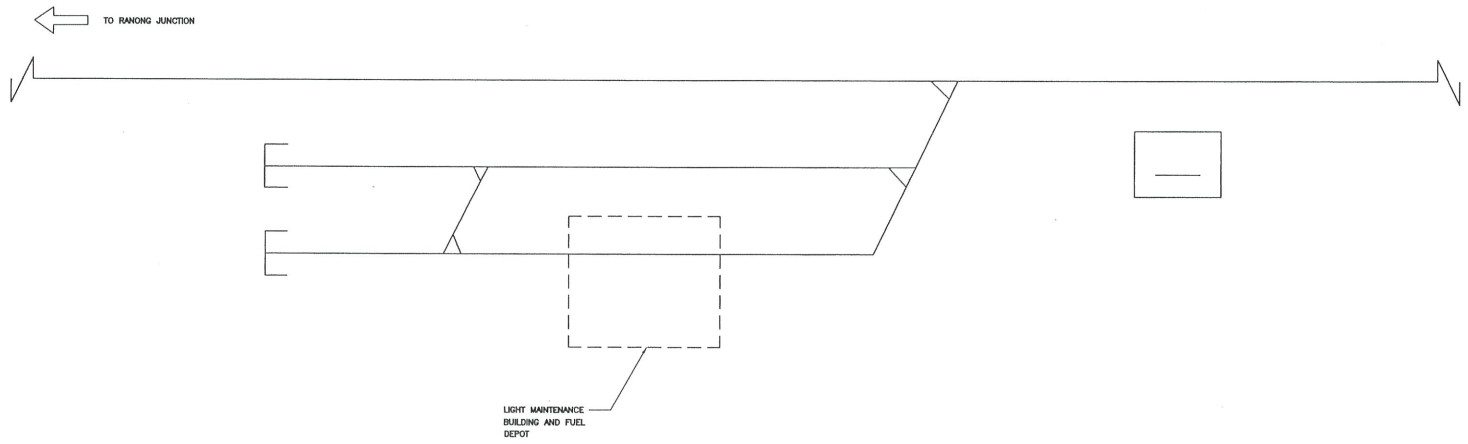
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE TRACK SCHEMATICS FOR LA–UN STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR–TW–1009	SCALE: AS SHOWN SHEET NO.: 17



RANONG JUNCTION

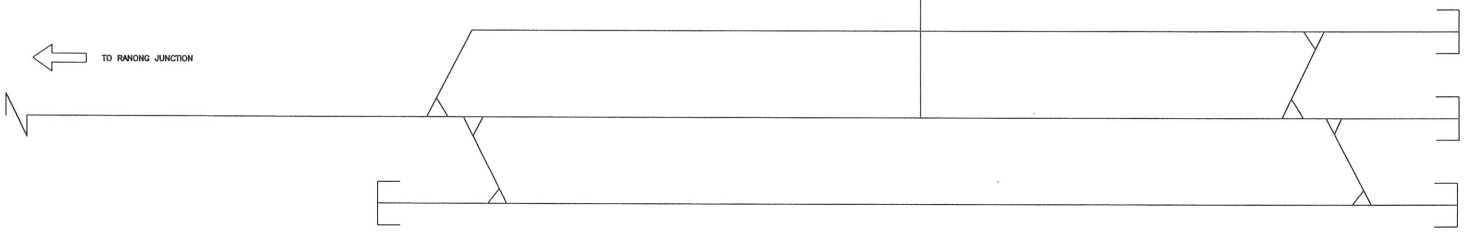
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR RANONG JUNCTION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1010	SCALE: AS SHOWN SHEET NO.: 18



RANONG CONTAINER YARD

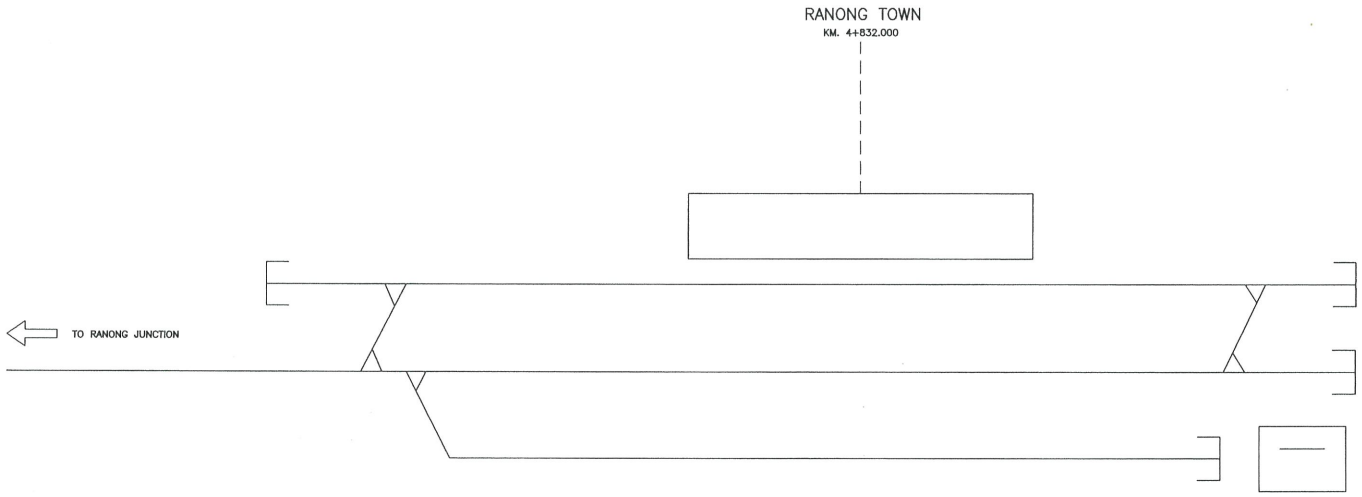
KM. 102+498.000



RANONG CONTAINER YARD

V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1011.DWG

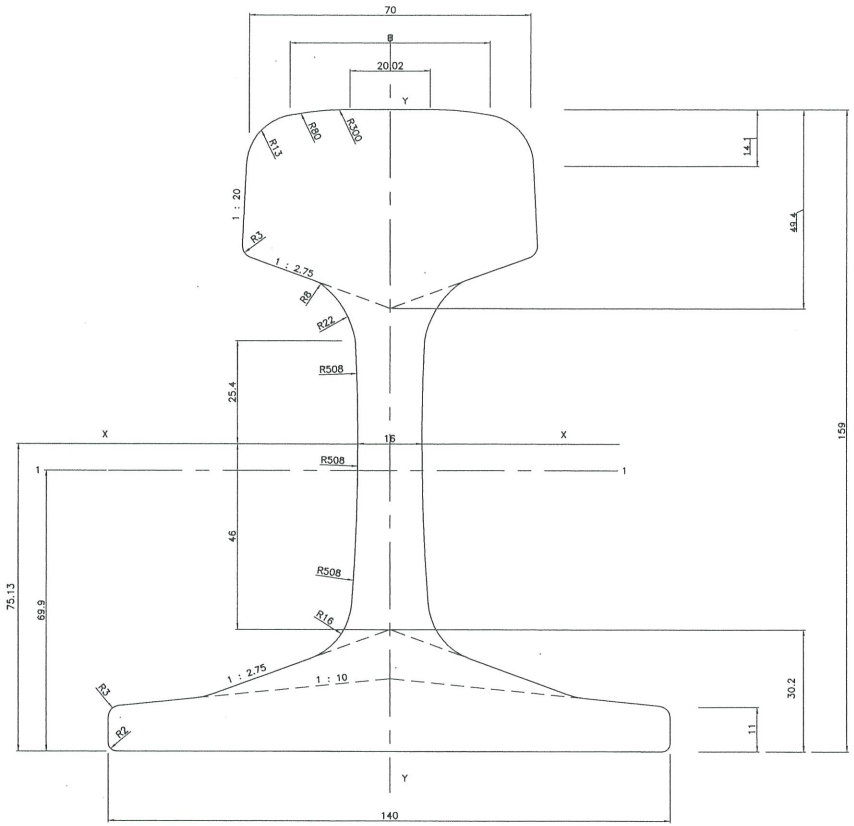
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR RANONG CONTAINER YARD	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1011	SCALE: AS SHOWN SHEET NO.: 19



RANONG TOWN STATION

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1012.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TRACK SCHEMATICS FOR RANONG TOWN STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1012	SCALE: AS SHOWN SHEET NO.: 20



RAIL PROFILE 54E1
NOT TO SCALE

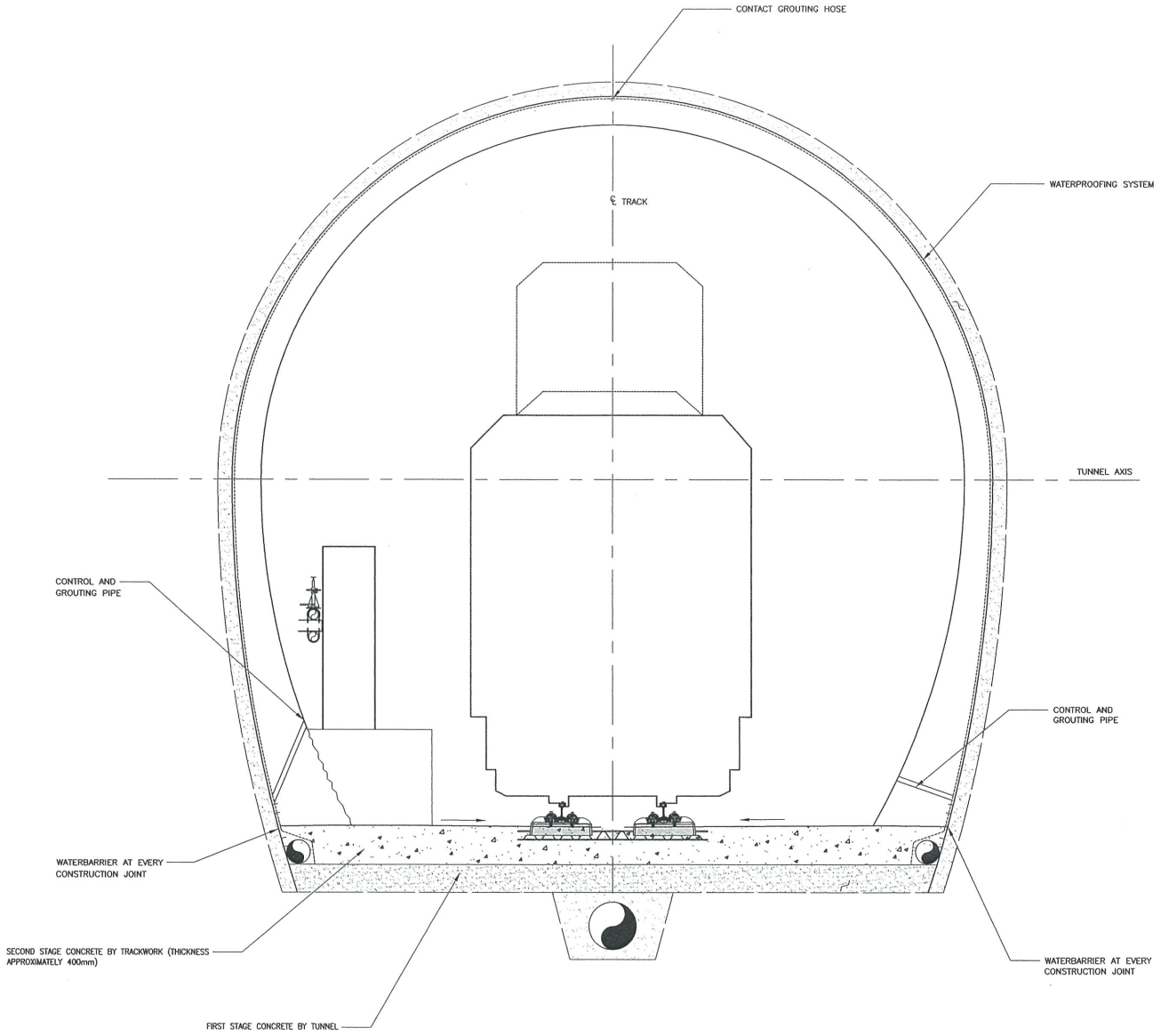
NOTES:

- ALL DIMENSIONS IN MILLIMETRES
- 1 CENTRE LINE OF BRANDING

CROSS SECTIONAL	: 69.77 $mm.^2$
MASS PER METRE	: 54.77 Kg/m.
MOMENT OF INERTIA X–X AXIS	: 2337.9 $cm.^4$
SECTION MODULUS – HEAD	: 278.7 $cm.^3$
SECTION MODULUS – BASE	: 311.2 $cm.^3$
MOMENT OF INERTIA Y–Y AXIS	: 419.2 $cm.^4$
SECTION MODULUS Y–Y AXIS	: 59.9 $cm.^3$
INDICATIVE DIMENSIONS	: A = 20.024 mm. B = 49.727 mm.

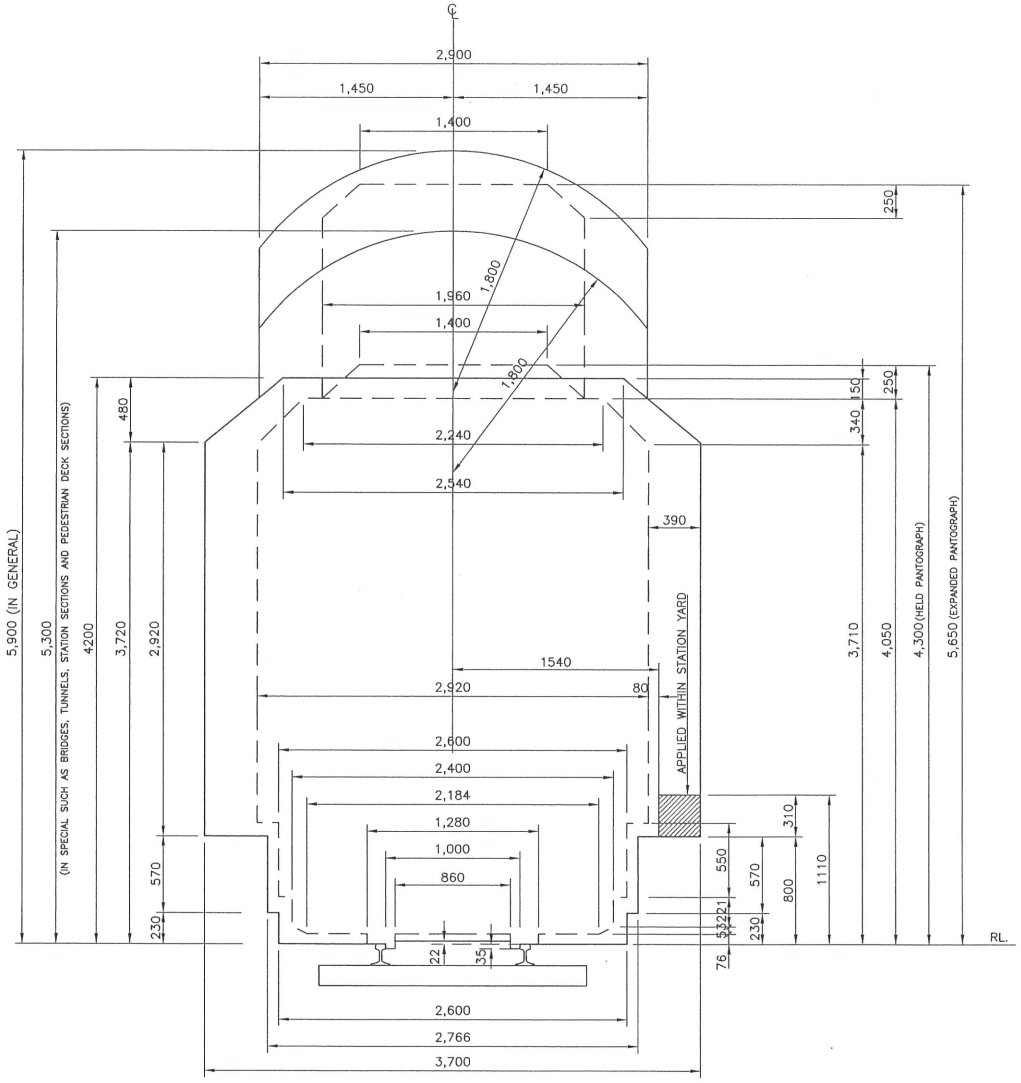
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAIL PROFILE 54E1	DATE: FEBRUARY 2018 SCALE: AS SHOWN DWG. NO.: SCR–TW–1013 SHEET NO.: 21



V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\02_TRACK WORK\SCR-TW-1014.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE NON-BALLASTED TRACK IN TUNNEL CROSS SECTION AT GENERAL (FOR REFERENCE ONLY)	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1014	SCALE: AS SHOWN SHEET NO.: 22

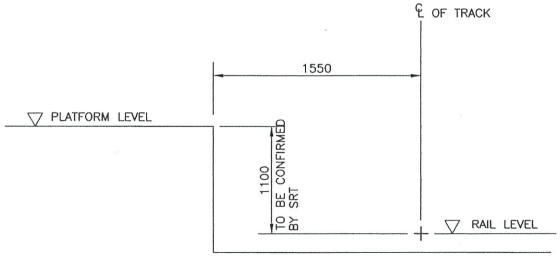


STRUCTURAL AND LOADING PROFILES PROPOSED BY CONSULTANT

NOT TO SCALE

STRUCTURAL PROFILE

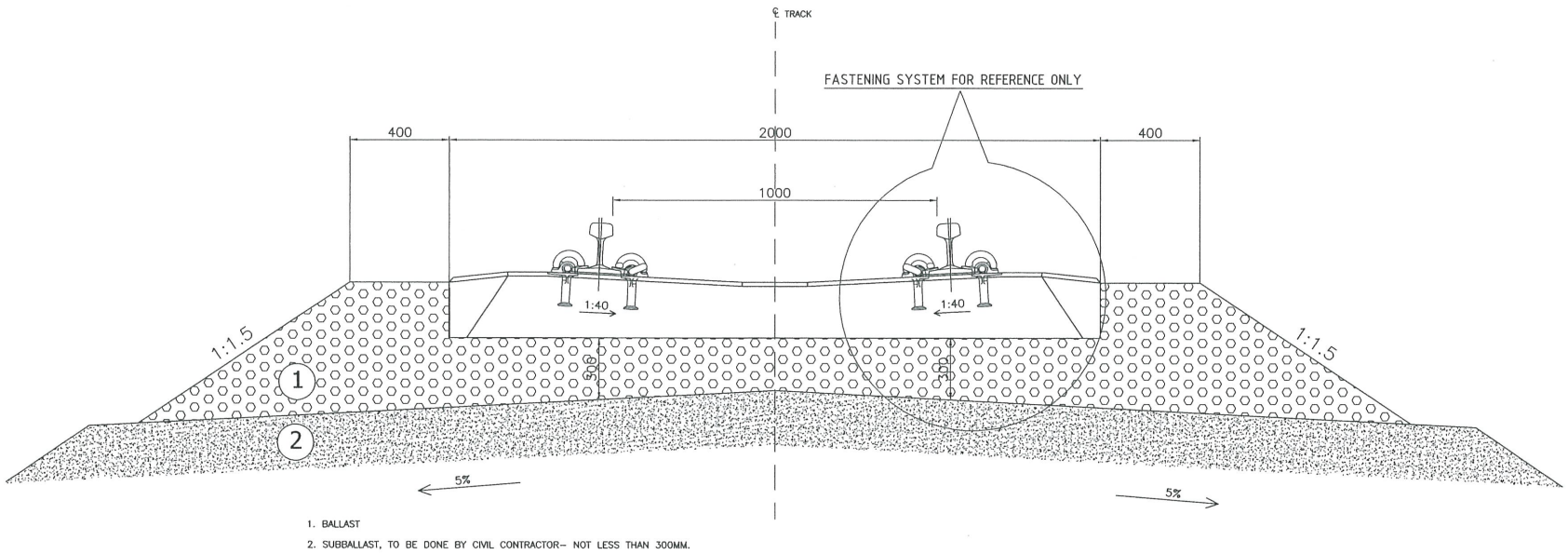
LOADING PROFILE



PLATFORM EDGE DISTANCE

V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIMA\02_TRACK WORK\SCR-TW-1015.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STRUCTURAL GUAGE	DATE: FEBRUARY 2018 DWG. NO.: SCR-TW-1015	SCALE: AS SHOWN SHEET NO.: 23

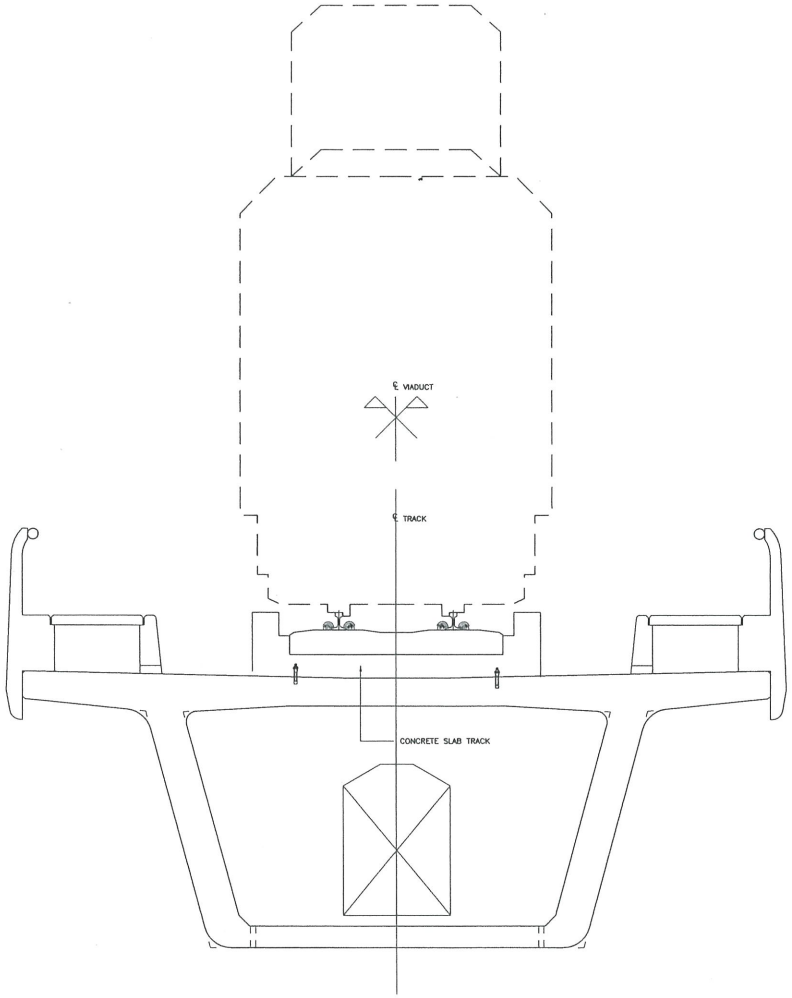


1. BALLAST
2. SUBBALLAST, TO BE DONE BY CIVIL CONTRACTOR– NOT LESS THAN 300MM.

BALLASTED TRACK – SINGLE LINE : CROSS SECTION
NOT TO SCALE

V:\PROJECTS\1485-SCR\DRAWINGS\03_PRELIMINARY\02_TRACK WORK\SCR-TW-1016.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE BALLASTED TRACK – SINGLE LINE : CROSS SECTION	DATE: FEBRUARY 2018 DWG. NO.: SCR–TW–1016	SCALE: AS SHOWN SHEET NO.: 24



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE NON–BALLASTED TRACK ON VIADUCT, CROSS SECTION AT GENERAL	DATE: FEBRUARY 2018 DWG. NO.: SCR–TW–1017	SCALE: A3 NONE SHEET NO.: 25

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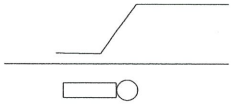
SIGNALING AND TELECOM



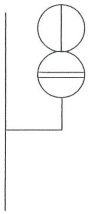
= INSULATED JOINT

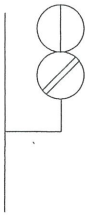


= LIMIT OF SHUNT

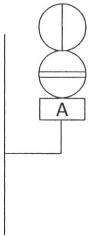


= ELECTRIC POINT MACHINE

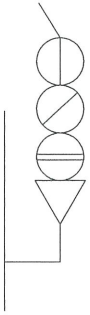




= TWO ASPECT SIGNAL WITH YELLOW AND GREEN



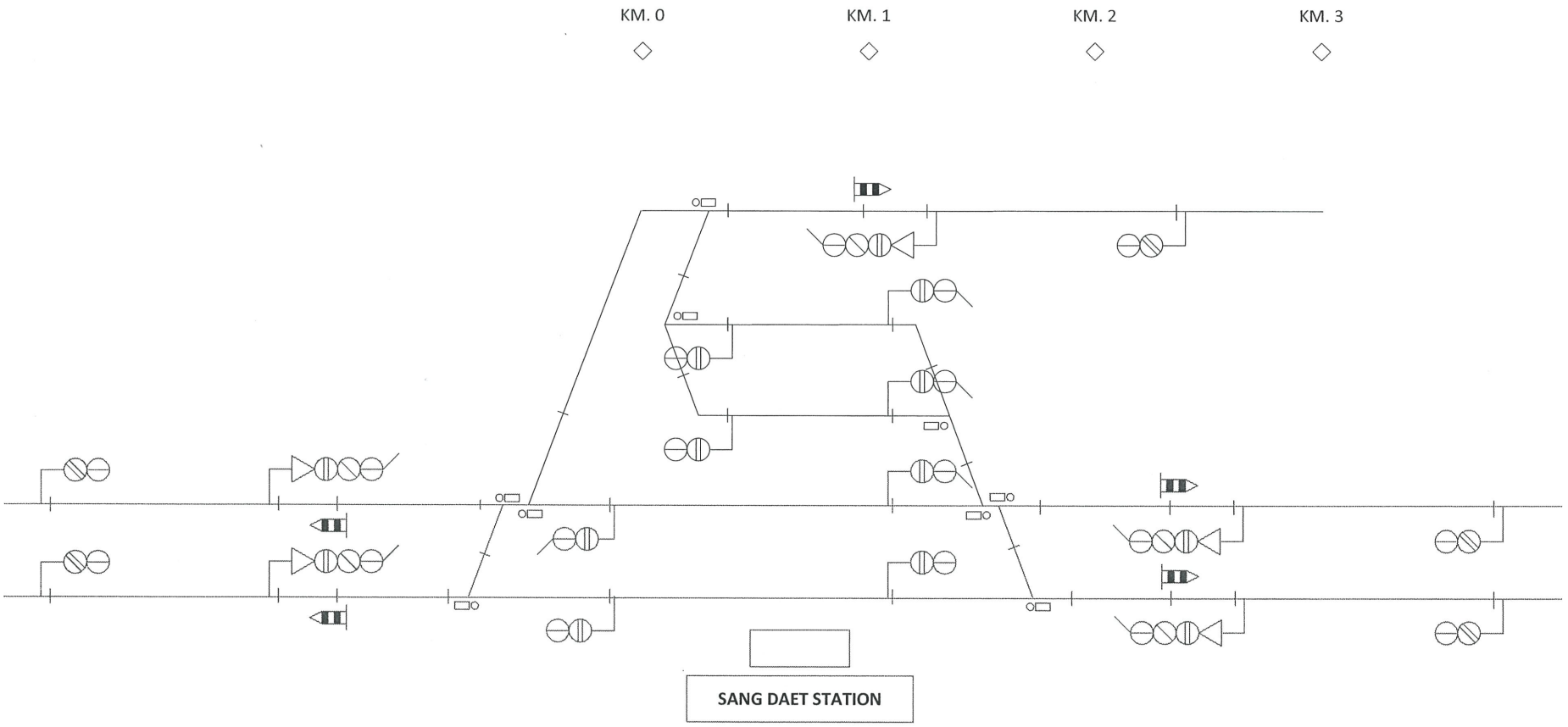
= TWO ASPECT AUTOMATIC SIGNAL



= THREE ASPECT SIGNAL WITH RED. FLASHING RED. YELLOW AND GREEN WITH SHUNT SIGNAL (EXAMPLE SHOW LIFT HAND ROUTE INDICATOR)

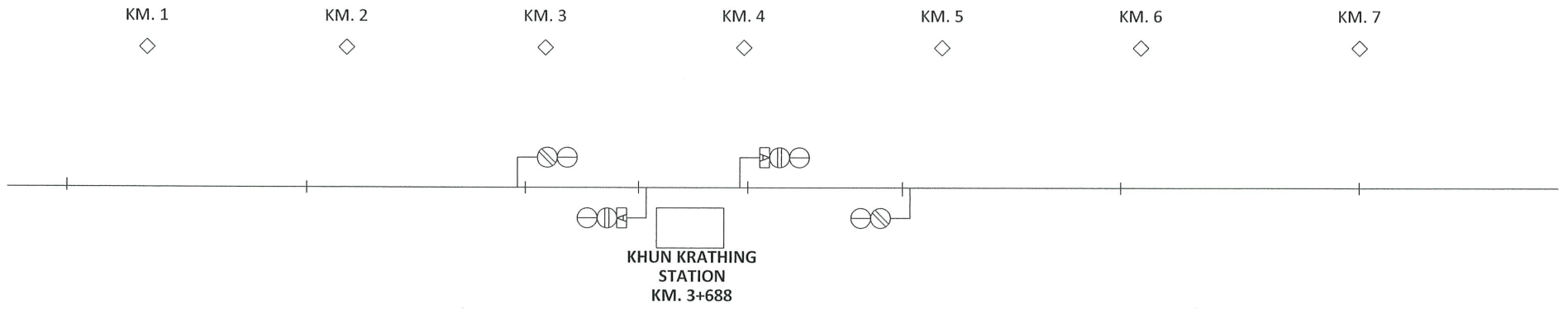
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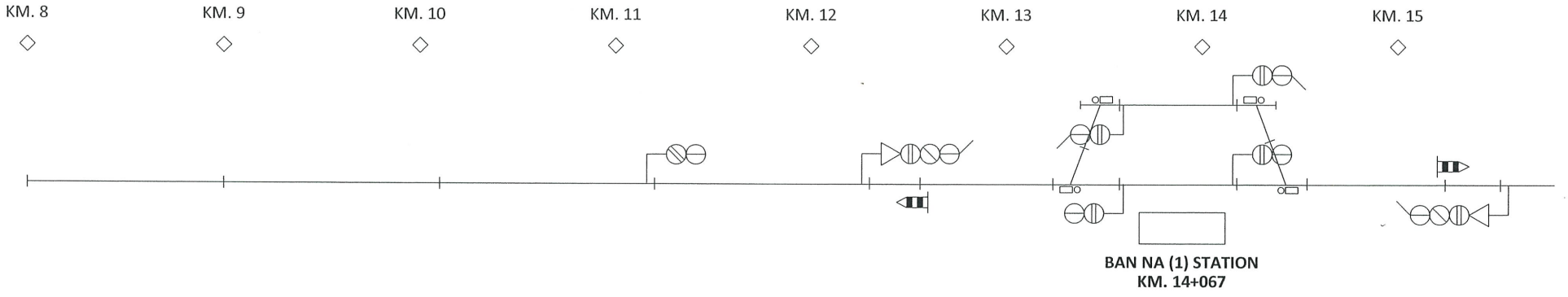
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: LIST OF SYMBOL	DATE: FEBRUARY 2018 DWG. NO.: SCR-SIG-0001	SCALE: N/A SHEET NO.: 26

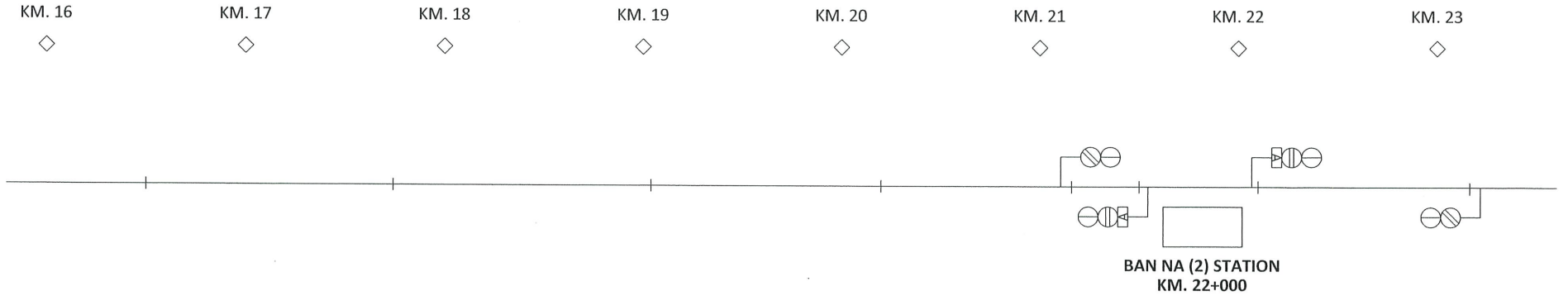


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SINGNALING DRAWING FOR SECTION 1	DATE: FEBRUARY 2018 DWG. NO.: SCR-SIG-1001	SCALE: N/A SHEET NO.: 27

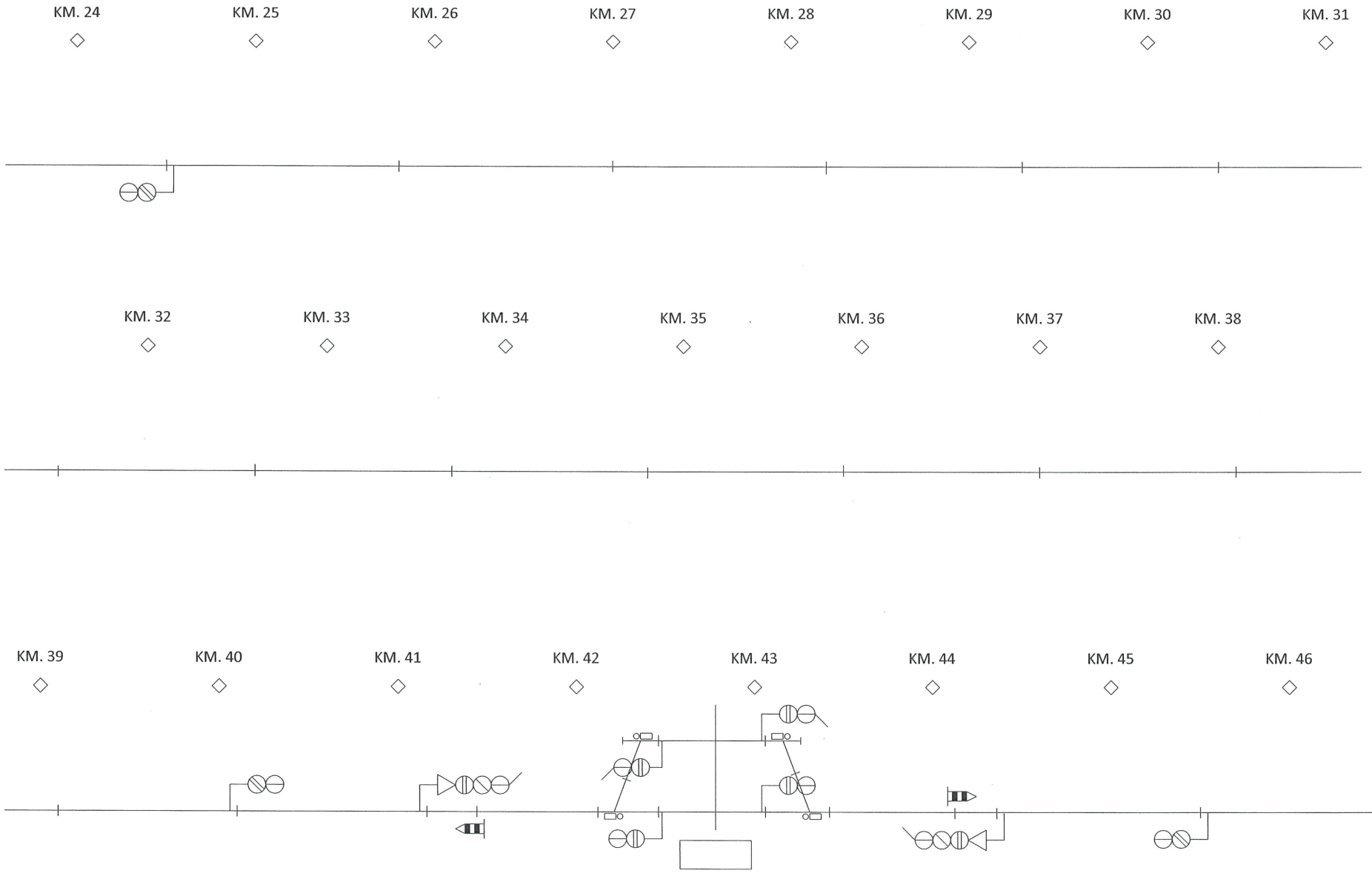






KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultant Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE Signaling Drawing for Section 2	DATE FEBRUARY 2018 DWG NO SCR–SIG–1002	SCALE N/A SHEET NO 28

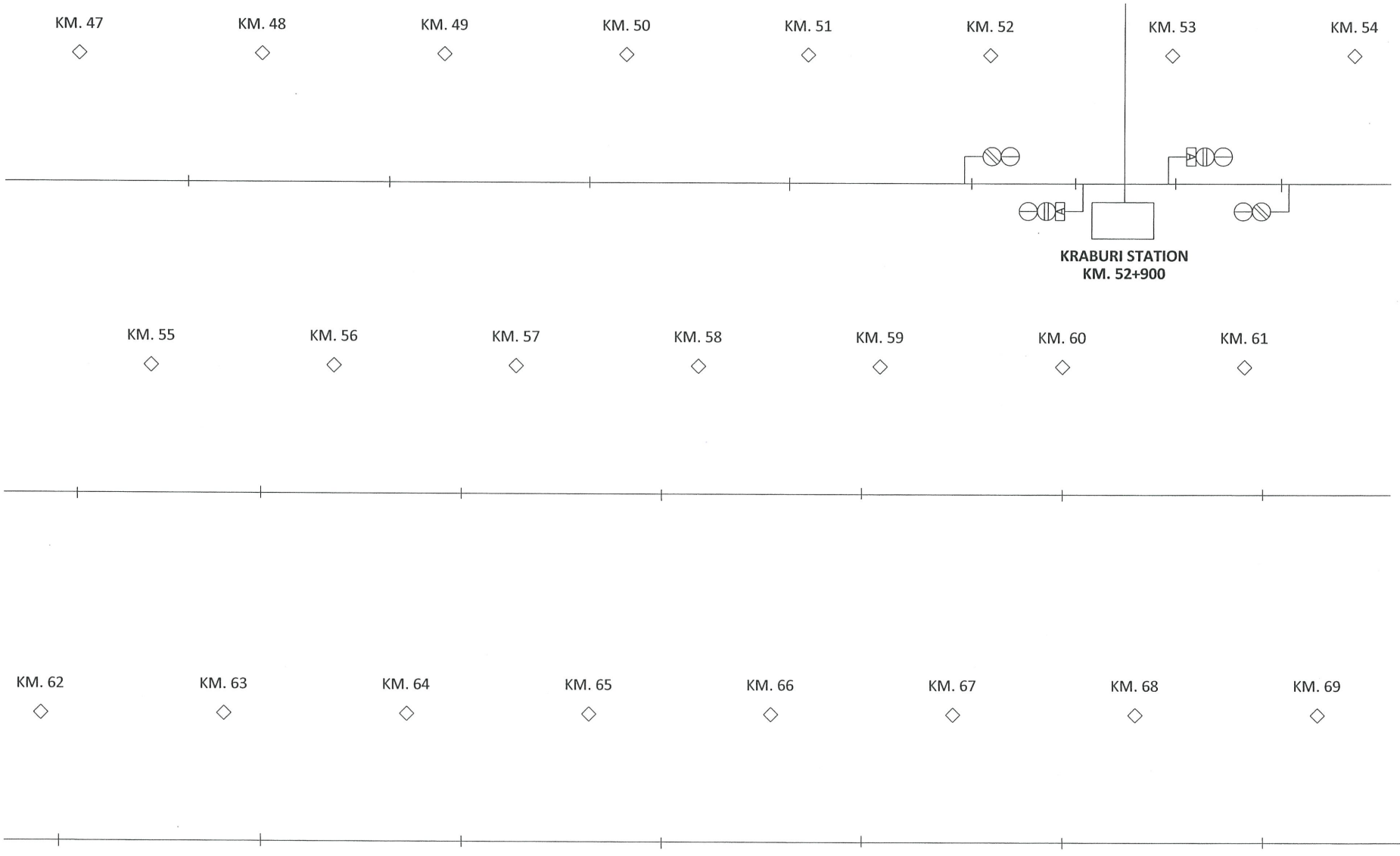
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PAK CHAN STATION
KM. 42+950

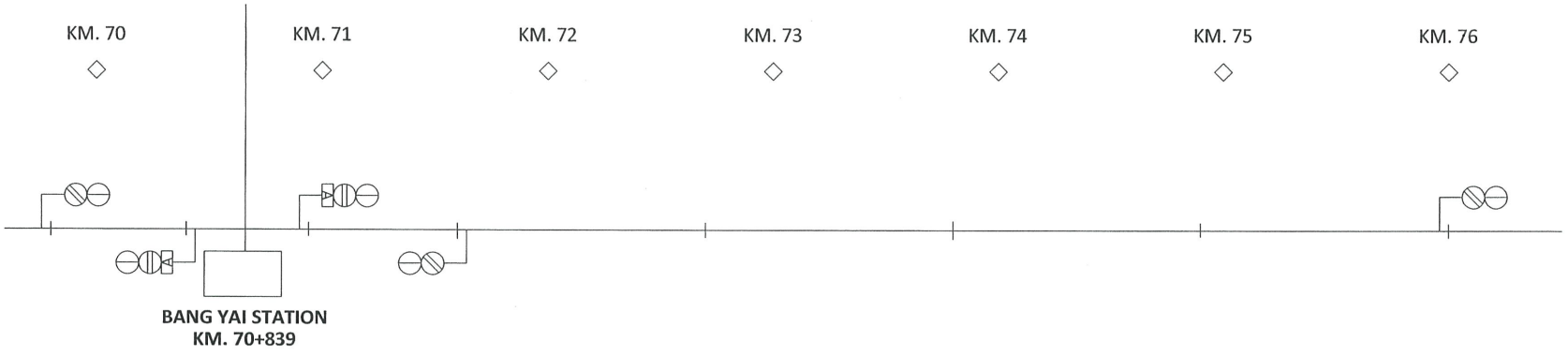
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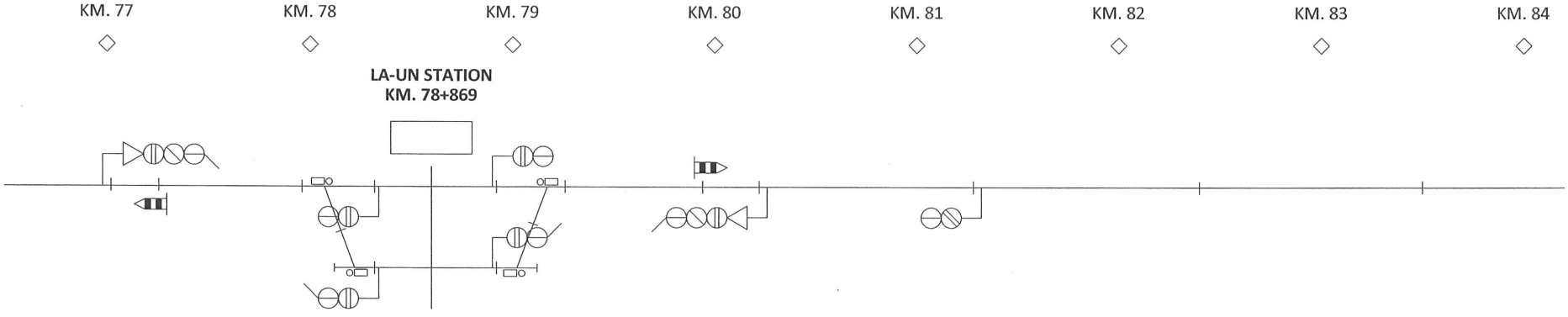
KINGDOM OF THAILAND MINISTRY OF TRANSPORT otp OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SIGNALING DRAWING FOR SECTION 3	DATE: FEBRUARY 2018 DWG. NO.: SCR-SIG-1003	SCALE: N/A SHEET NO.: 29

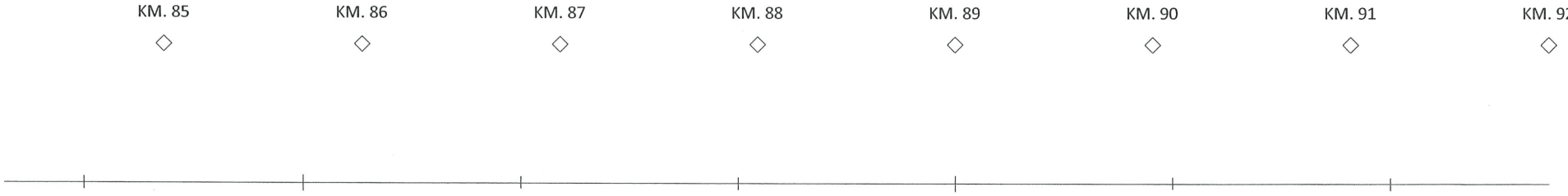


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SIGNALING DRAWING FOR SECTION 4	DATE : FEBRUARY 2018 DWG. NO. : SCR-SIG-1004	SCALE : N/A SHEET NO. : 30

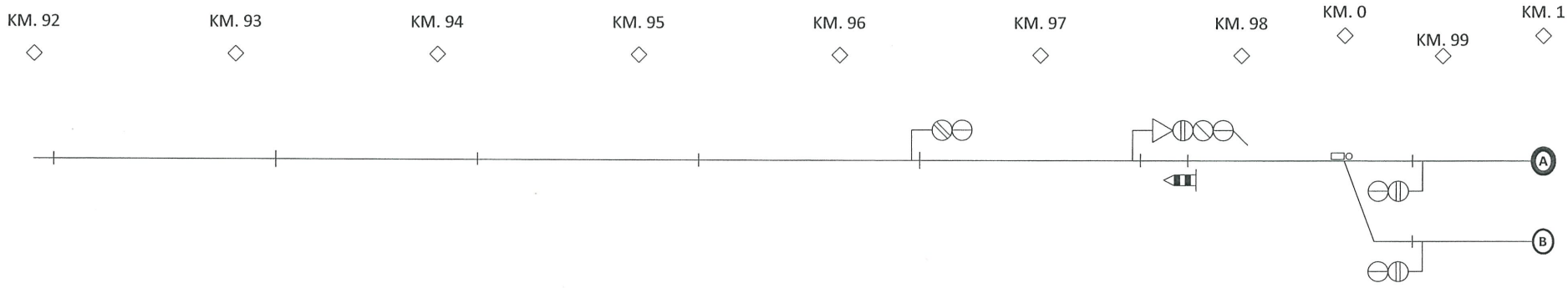


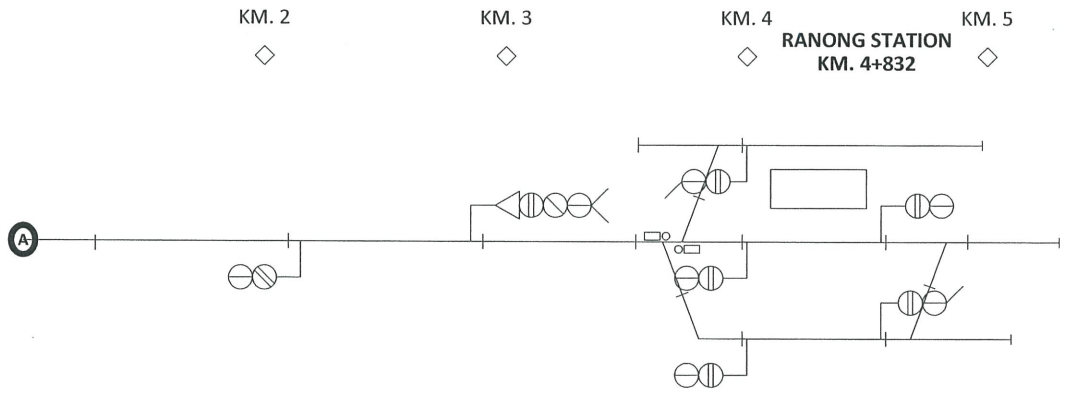


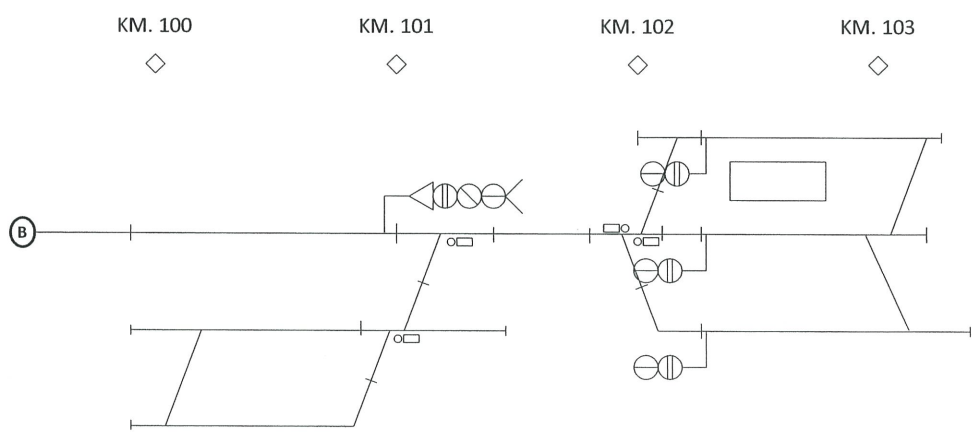


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SIGNALING DRAWING FOR SECTION 5	DATE: FEBRUARY 2018 DWG. NO.: SCR-SIG-1005	SCALE: N/A SHEET NO.: 31





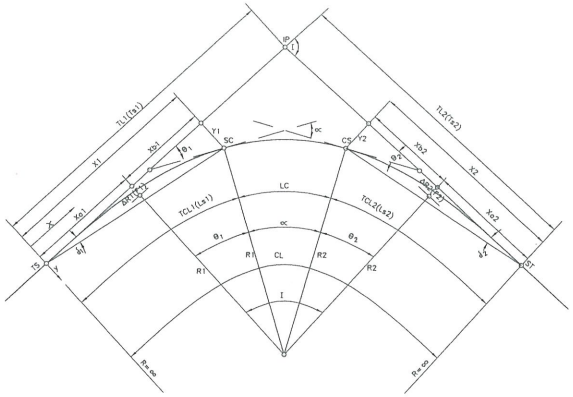


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SIGNALING DRAWING FOR SECTION 6	DATE: FEBRUARY 2018 DWG. NO.: SCR-SIG-1006	SCALE: N/A SHEET NO.: 32

ALIGNMENT

- POST BOX
- BENCH MARK
- HORIZONTAL CONTROL POINT
- LAMP POLE
- WATER VALVE
- DESTINATION SIGN
- BIG TREE
- TELEPHONE POST
- MANHOLE OF ELECTRICITY
- MANHOLE OF TELEPHONE
- FIRE HYDRANT
- FIBRE OPTIC PIT
- TELEPHONE JUNCTION BOX
- MANHOLE FOR DRAINAGE
- TRAFFIC CONTROL BOX
- SIGNAL/TRAFFIC LIGHT
- INSULATED JOINT
- KILOMETER POST
- R/W — RIGHT OF WAY BOUNDARY
- GAS PIPELINE WITH MARK
- W — WATER PIPE LINE
- E — ELECTRIC LINE
- T — TELEGRAPH OR TELEPHONE LINE
- F-SC — ONE-STOREYED CONCRETE FRAMED BUILDING
- F-SW — ONE-STOREYED WOODEN FRAMED BUILDING

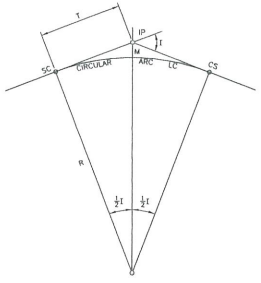


HORIZONTAL CURVES WITH TRANSITIONS

(TRANSITION CURVE = CUBIC EQUATION)

IP	INTERSECTING POINT OF TANGENTS
I	ANGLE OF INTERSECTING TANGENTS
$\frac{1}{3}\theta$	ANGLE BETWEEN TANGENT AT TS. AND CHORD OF TRANSITION
θ	ANGLE BETWEEN TANGENT TO SPIRAL ARC
$\propto$	CENTRAL ANGLE OF CIRCULAR CURVE = $I-(\theta_1+\theta_2)$
R	RADIUS OF CIRCULAR CURVE
y	PORMULA OF TRANSITION CURVE $y = \frac{x^3}{6RX}$
TS	POINT OF CHANGE FROM TANGENT TO TRANSITION
SC	POINT OF CHANGE FROM TRANSITION TO CIRCLE
CS	POINT OF CHANGE FROM CIRCLE TO TRANSITION
ST	POINT OF CHANGE FROM TRANSITION TO TANGENT
Ts	TOTAL LENGTH OF TANGENT FROM IP TO TS OR ST
χ	ABSCISSA FROM TS OR ST
LS	LENGTH OF SPIRAL ARC FROM TS TO SC OR FROM CS TO ST
LC	LENGTH OF CIRCULAR ARC FROM SC TO CS
XM	ABSCISSA REFERRED TO TS OR ST WITH RADIUS (R+AR)
X	ABSCISSA OF SC OR CS REFERRED TO TS OR ST
Y	ORDINATE OF SC OR CS
ΔR	DIFFERENEC IN RADIUS BETWEEN THE CIRCLE WITHOUT TRANSITION (RADIUS R) AND THE CIRCLE WITH TRANSITION (RADIUS R+ΔR)
CL	TOTAL LENGTH OF CIRCULAR CURVE AND TRANSITIONS



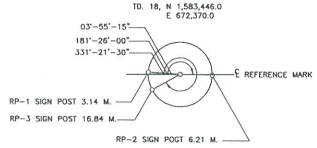


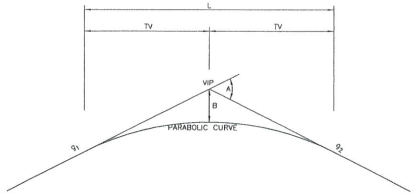
CIRCULAR HORIZONTAL CURVES

IP	INTERSECTING POINT OF TANGENTS
I	ANGLE OF INTERSECTING TANGENTS
R	RADIUS OF CIRCULAR CURVE
SC	POINT OF CURVATURE (BEGINNING OF CURVE,STRAIGHT TO CURVE)
CS	POINT OF TANGENCY (END OF CURVE,CURVE TO STRAIGHT)
T	LENGTH OF TANGENT FROM IP TO SC OR CS
LC	LENGTH OF CIRCULAR ARC FROM SC TO CS
M	OFFSET OF IP FROM CURVE

OTHER ABBREVIATIONS

PC	PIPE CULVERT
BC	BOX CULVERT
BR	BRIDGE
FO	FLY OVER
IE	INVERT ELEVATION OF CULVERT AT CENTER LINE
STR	STRAIGHT





VERTICAL CURVES

VIP = VERTICAL INTERSECTING POINT OF TANGENTS

A = $g_2 - g_1$
= ALGEBRAIC DIFFERENCE IN GRADES (PERMILLAGE)
OF THE GRADE TANGENTS

VR = VERTICAL RADIUS IN METERS

L = $\frac{VR\,A}{1000}$
= TOTAL LENGTH OF VERTICAL CURVE IN METERS

TV = 0.5L=TANGENT VERTICAL CURVE IN METERS

B = BISECTRIX VERTICAL CURVE IN METERS
= $\frac{AL}{8,000}$

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIMIN04_ALIGNMENT\01_TYPICAL\SCR-AL-001_LEGEND FOR ALIGNMENT DRAWINGS.DWG

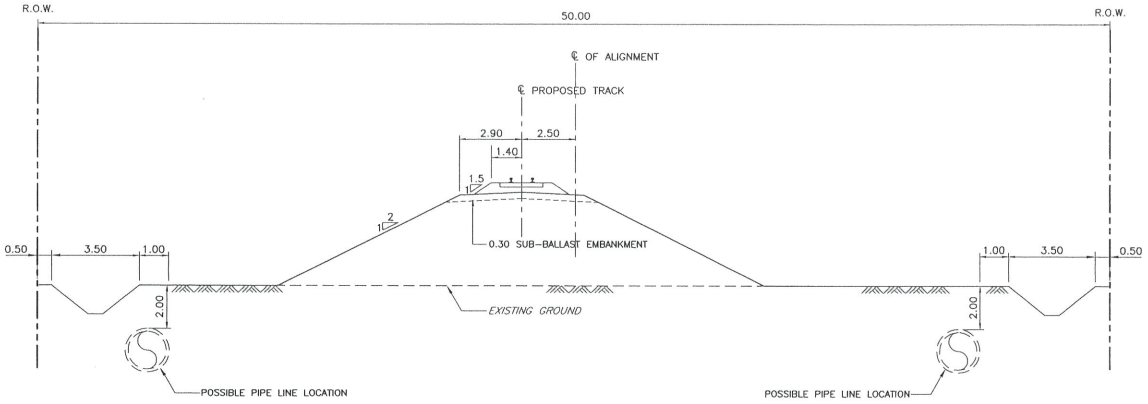
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

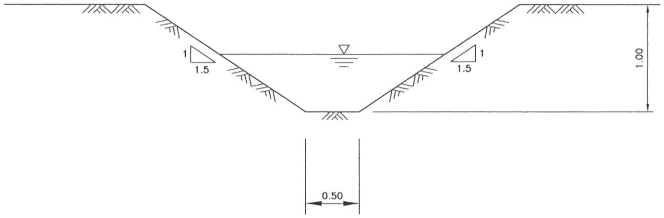
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LEGEND FOR ALIGNMENT DRAWINGS

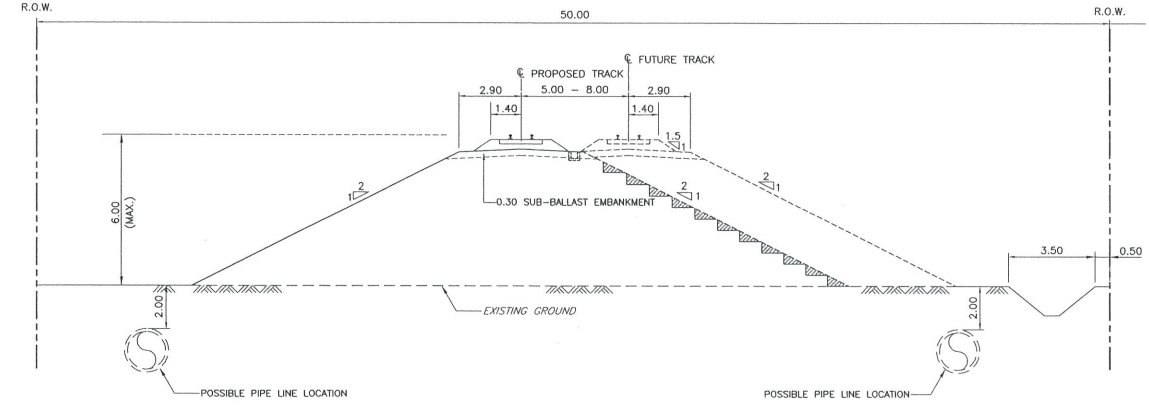
DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-AL-001
SHEET NO.: 33



TYPICAL CROSS SECTION OF FILL SECTION



DETAIL OF V-DRAIN



TYPICAL CROSS SECTION OF FILL SECTION WITH FUTURE TRACK

V:\PROJECT\465-SCR\DRAWINGS\03 PRELIMINARY DESIGN\04_ALIGNMENT\01_TYPICAL\SCR-AL-002_TYPICAL CROSS SECTION - 1.DWG

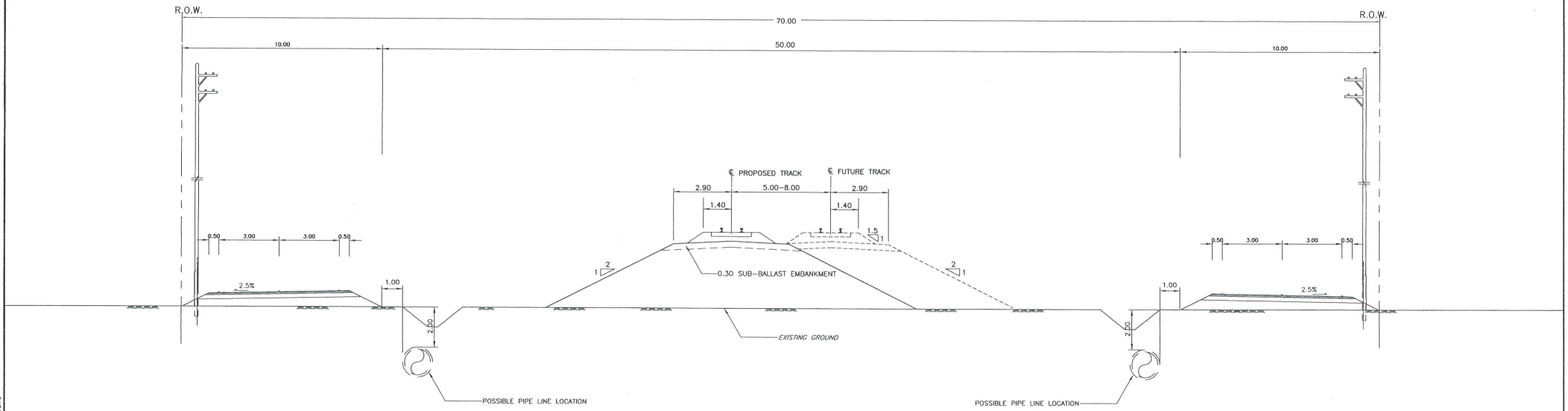
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL CROSS SECTION – 1

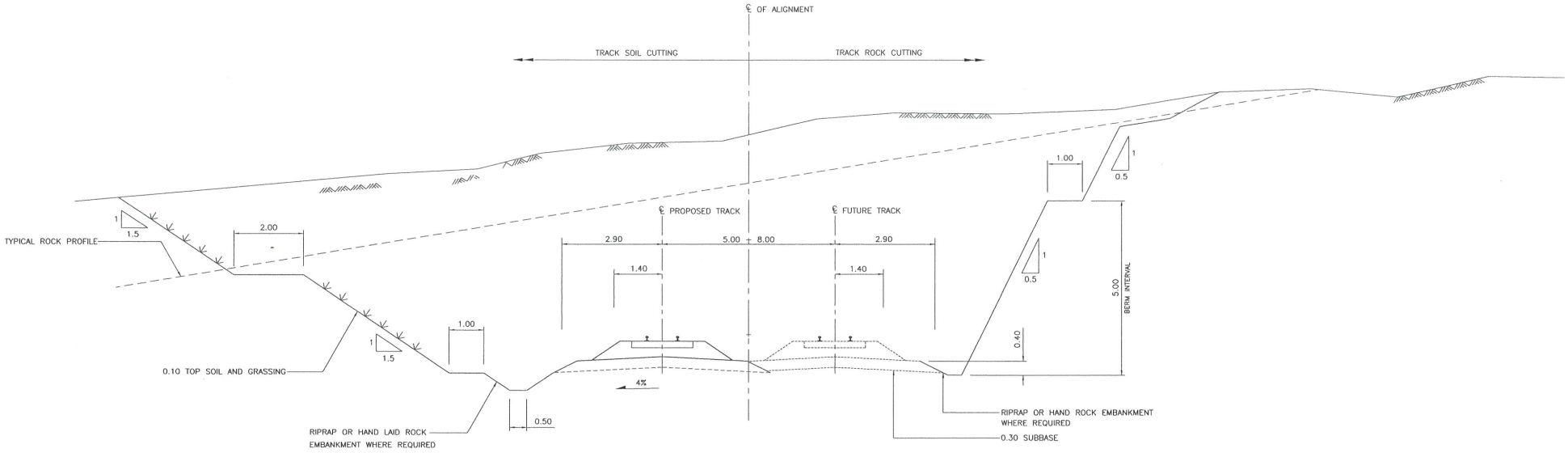
DATE: FEBRUARY 2018
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DWG. NO.: SCR-AL-002
SHEET NO.: 34



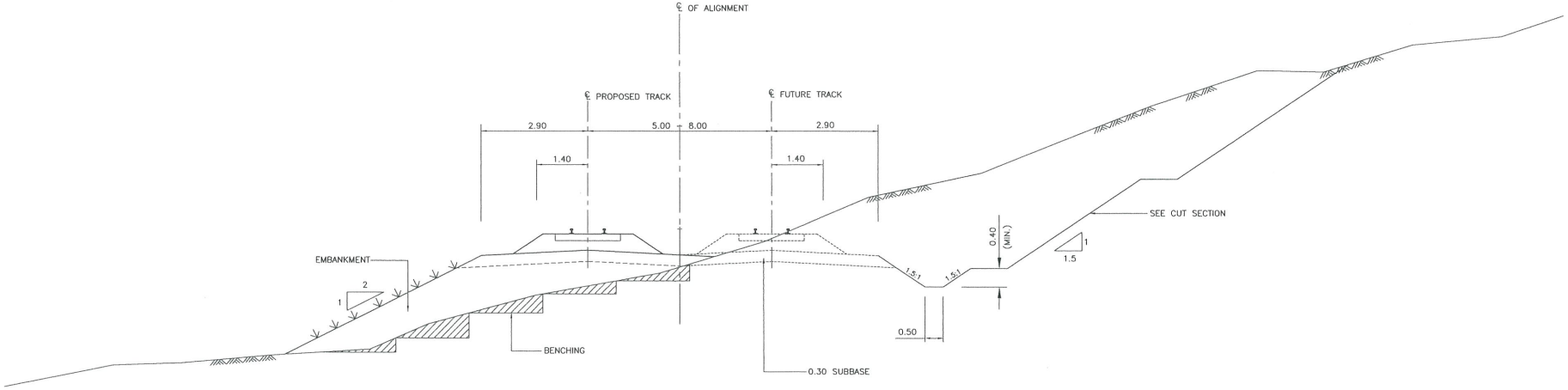
TYPICAL EMBANKMENT AND SERVICE ROAD

V:\PROJECT\1455-SCR\DRAWINGS\03 PRELIM\04_ALIGNMENT\01_TYPICAL\SCR-AL-003_TYPICAL CROSS SECTION - 2.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE TYPICAL CROSS SECTION – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–AL–003	SCALE: A3 NONE SHEET NO.: 35



TYPICAL CROSS SECTION FOR CUT



TYPICAL CROSS SECTION FOR SIDELONG GROUND

C:\PROJECT\1465-SCR\DRAWINGS\03 PRELIMINARY DESIGN\01_TYPICAL\SCR-AL-004_TYPICAL CROSS SECTION - 3.DWG

otp

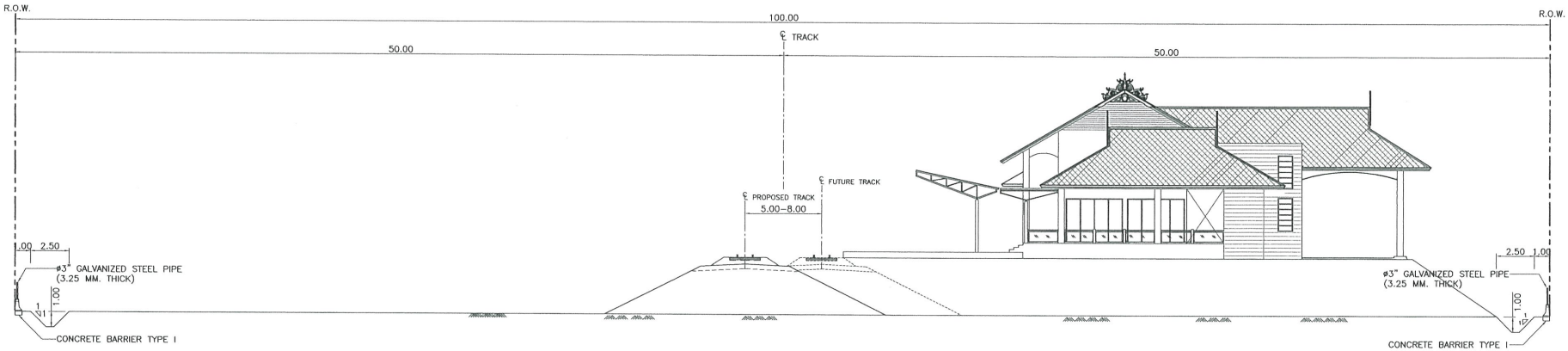
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL CROSS SECTION – 3

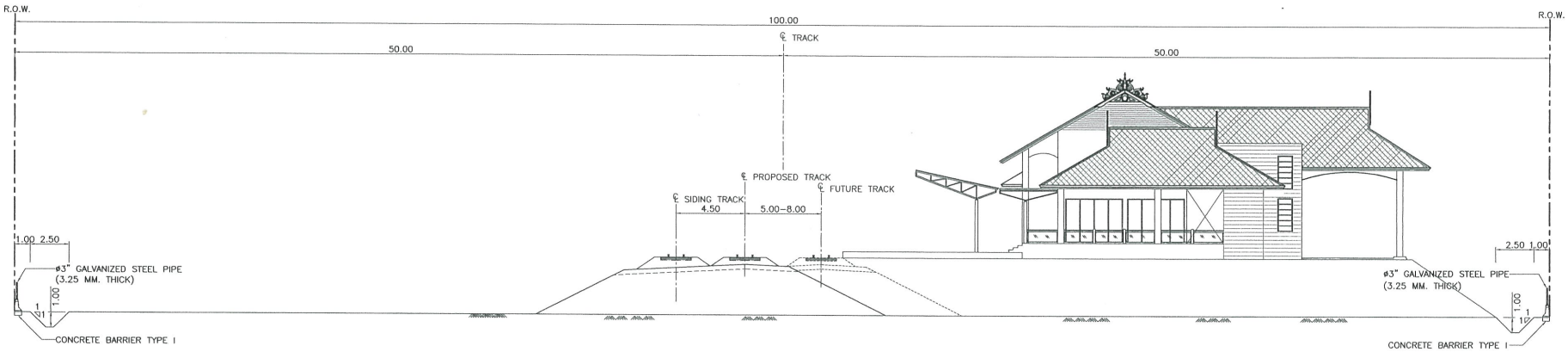
DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-AL-004
SHEET NO.: 36



TYPICAL CROSS SECTION AT KHUN KRATHING STATION

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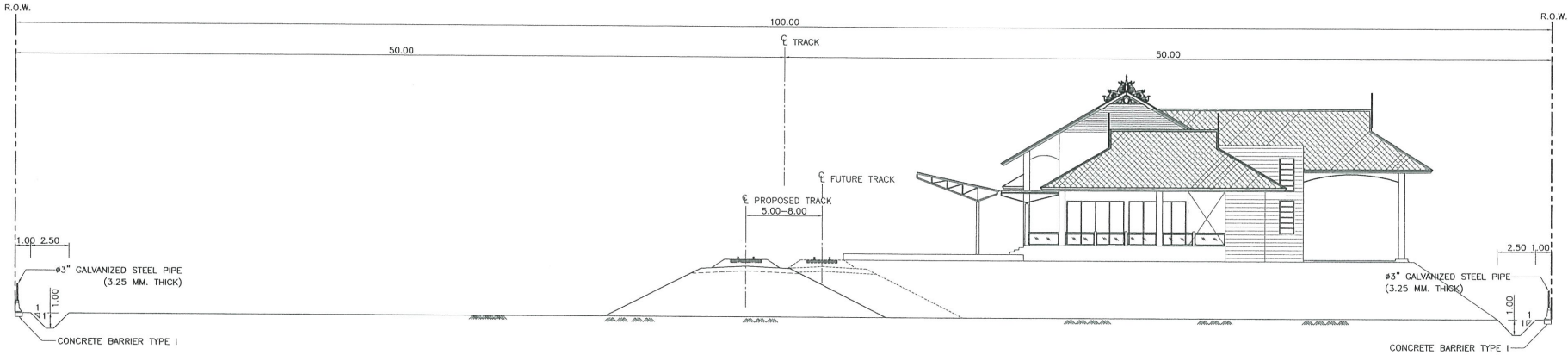
otp **KINGDOM OF THAILAND** MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC *Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE TYPICAL CROSS SECTION AT KHUN KRATHING STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-005	SCALE: A3 NONE SHEET NO.: 37



TYPICAL CROSS SECTION AT BAN NA (1) STATION

V:\PROJECT\1485-SCR\DRAWINGS\03_PRELIM\04_AL\COMENT\01_TYPICAL\SCR-AL-006_TYPICAL CROSS SECTION AT BAN NA (1) STATION.DWG

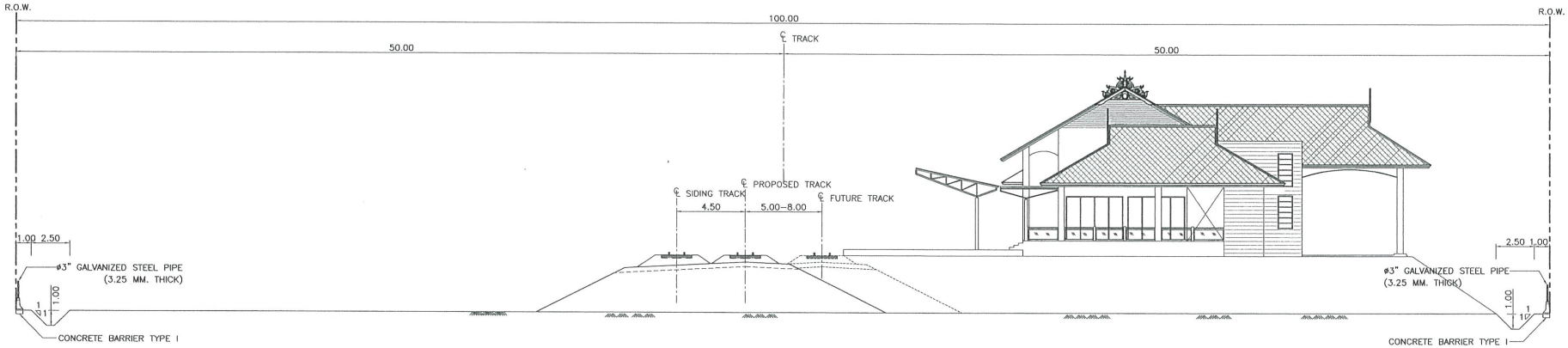
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: TYPICAL CROSS SECTION AT BAN NA (1) STATION	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-006	SCALE: A3 NONE SHEET NO.: 38



TYPICAL CROSS SECTION AT BAN NA (2) STATION

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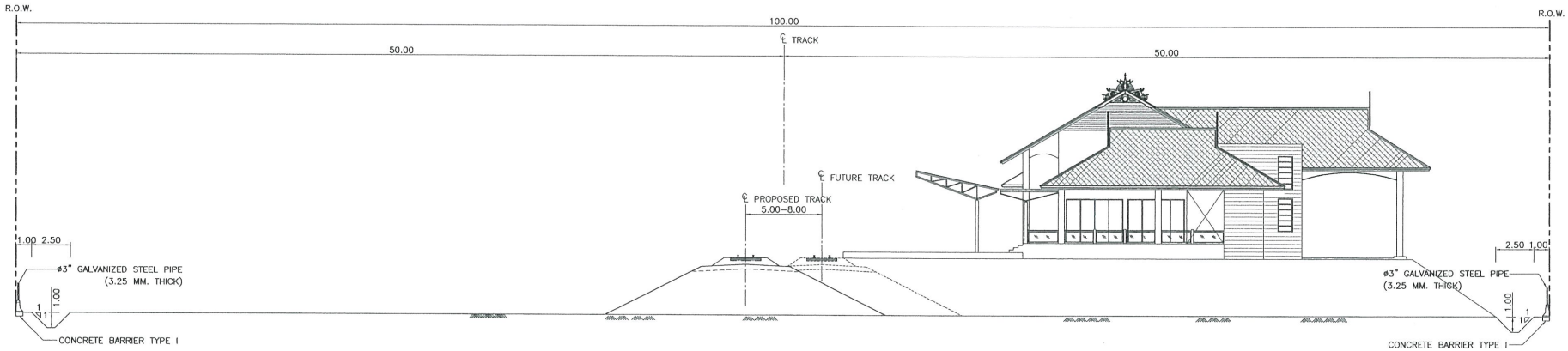
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL CROSS SECTION AT BAN NA (2) STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-007	SCALE: A3 NONE SHEET NO.: 39



TYPICAL CROSS SECTION AT PAK CHAN STATION

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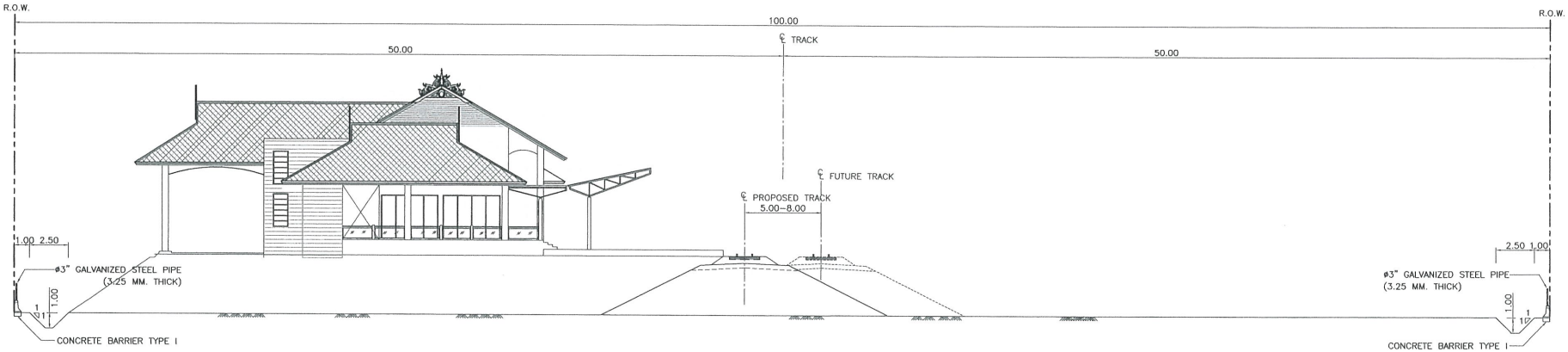
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL CROSS SECTION AT PAK CHAN STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-008	SCALE: A3 NONE SHEET NO.: 40



TYPICAL CROSS SECTION AT KRA BURI STATION

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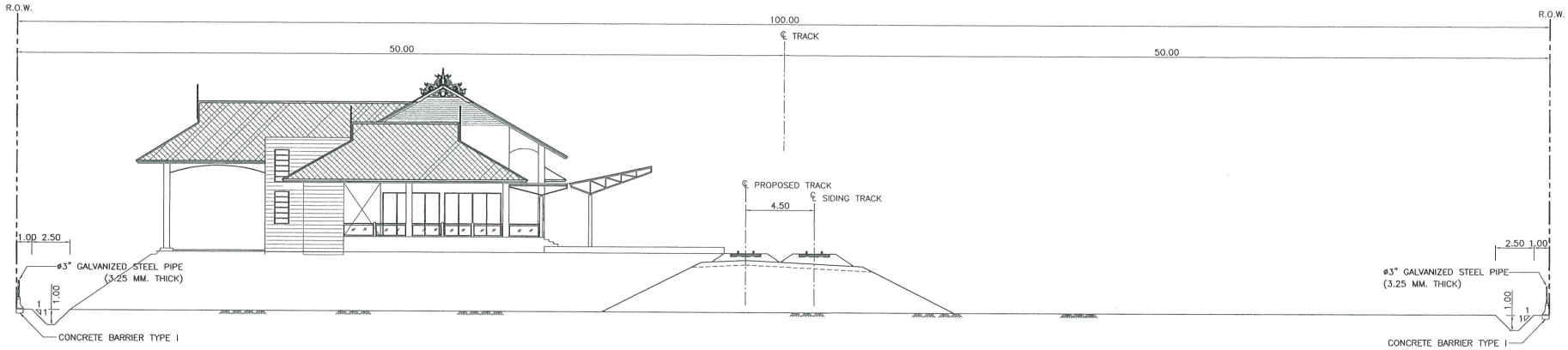
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL CROSS SECTION AT KRA BURI STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-009	SCALE: A3 NONE SHEET NO.: 4.1



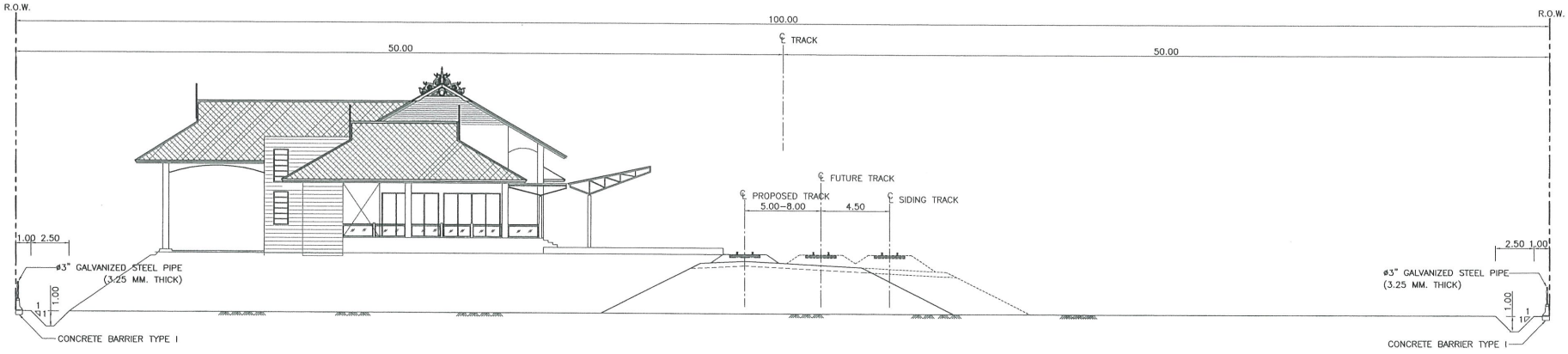
TYPICAL CROSS SECTION AT BANG YAI STATION

V:\PROJECT\1465-SCR\DRAWINGS\03 PREL_IN\04_ALIGNMENT\01_TYPICAL\SCR-AL-010_TYPICAL CROSS SECTION AT BANG YAI STATION.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: TYPICAL CROSS SECTION AT BANG YAI STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-010	SCALE: A3 NONE SHEET NO.: 42



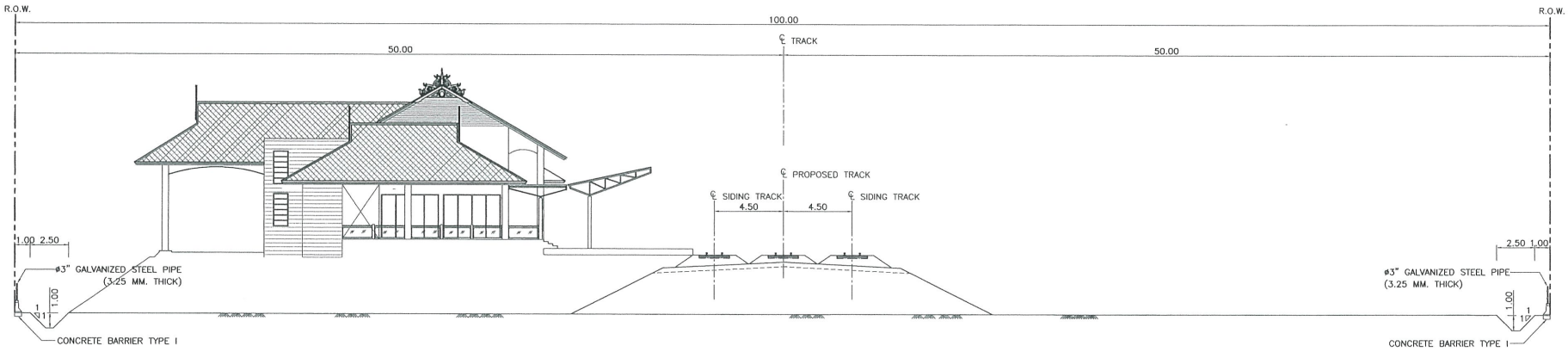
TYPICAL CROSS SECTION AT LA UN STATION (SINGLE TRACK)



TYPICAL CROSS SECTION AT LA UN STATION (DOUBLE TRACK)

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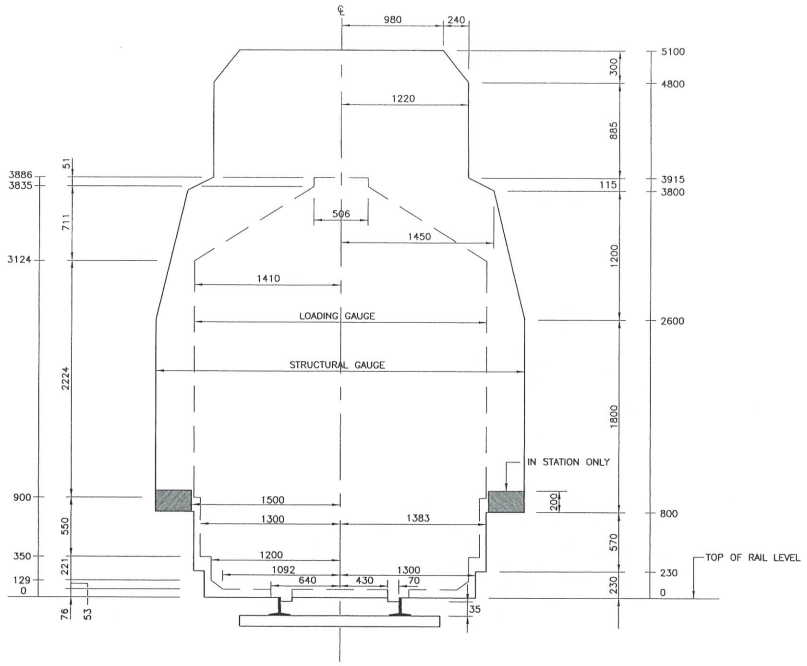
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL CROSS SECTION AT LA-UN STATION	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-011	SCALE: A3 NONE SHEET NO.: 43



TYPICAL CROSS SECTION AT RANONG STATION

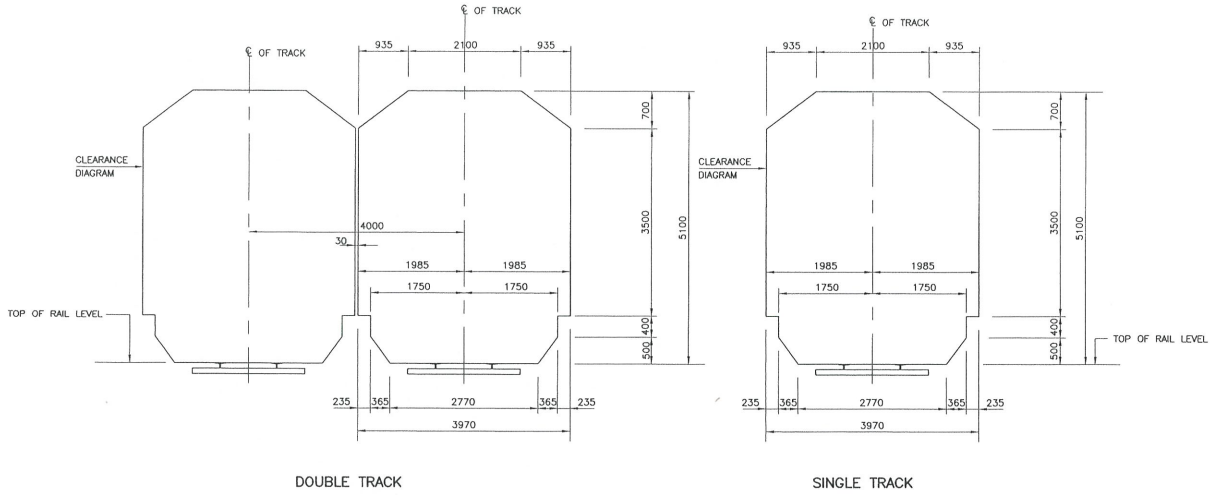
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL CROSS SECTION AT RANONG STATION	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-012	SCALE: A3 NONE SHEET NO.: 44



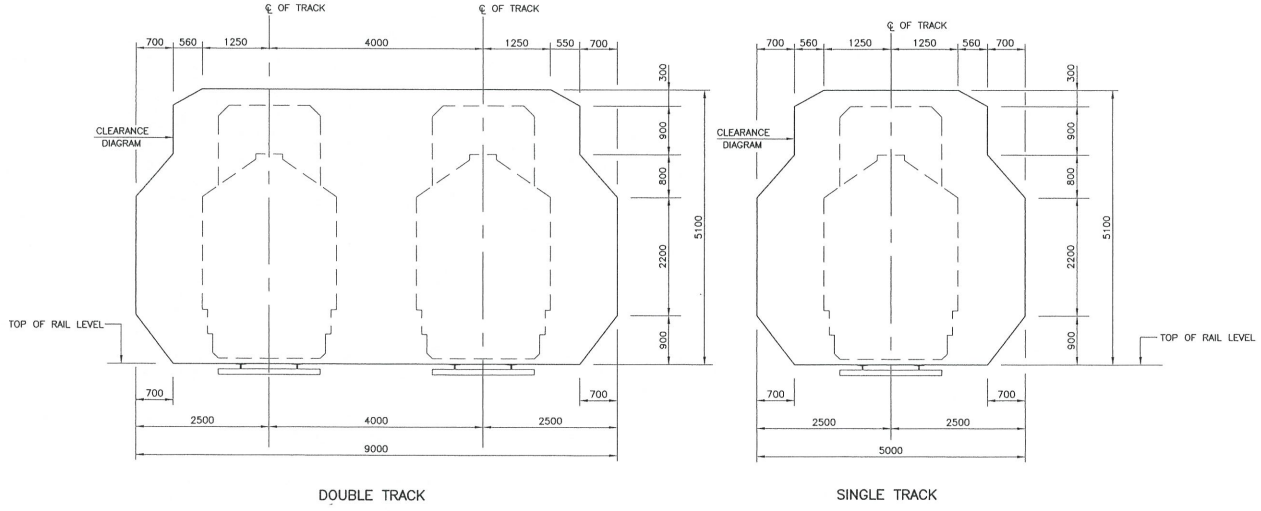
STRUCTURAL AND LOADING GAUGES

SCALE 1:50



CLEARANCE DIAGRAM FOR RAILWAY BRIDGE

SCALE 1:100

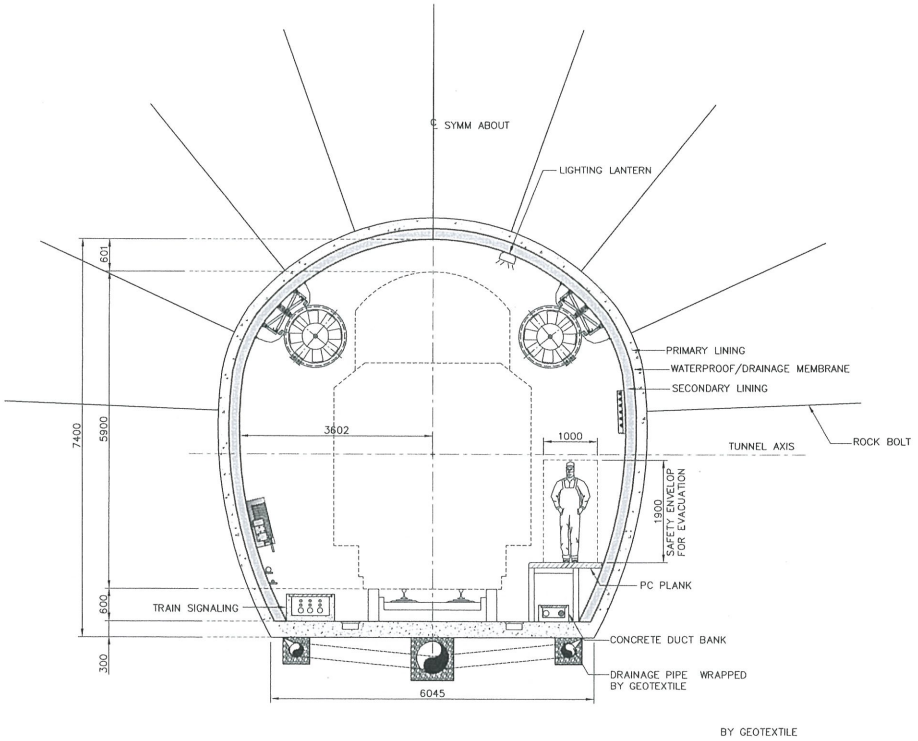


CLEARANCE DIAGRAM FOR OVERHEAD ROAD BRIDGE CROSSING

SCALE 1:100

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\04_ALIGNMENT\01_TYPICAL\SCR-AL-013_STRUCTURAL AND LOADING GUAGES.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: STRUCTURAL AND LOADING GUAGES	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-013	SCALE: A3 NONE SHEET NO.: 45

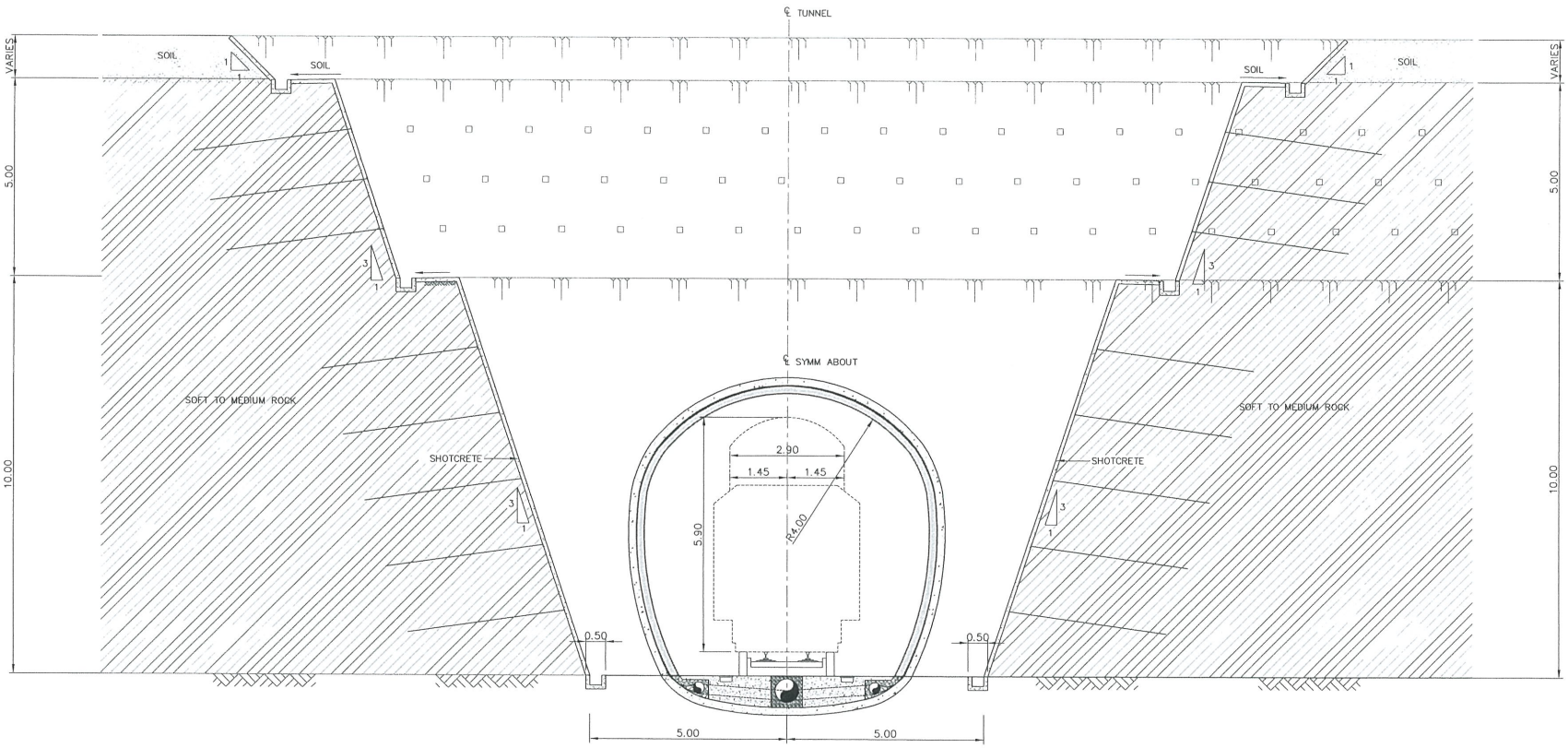


TYPICAL SINGLE TRACK TUNNEL SPACE PROOFING

SCALE 1:50

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL SINGLE TRACK TUNNEL SPACE PROOFING	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-014	SCALE: AS SHOWN SHEET NO.: 46



NOTES :

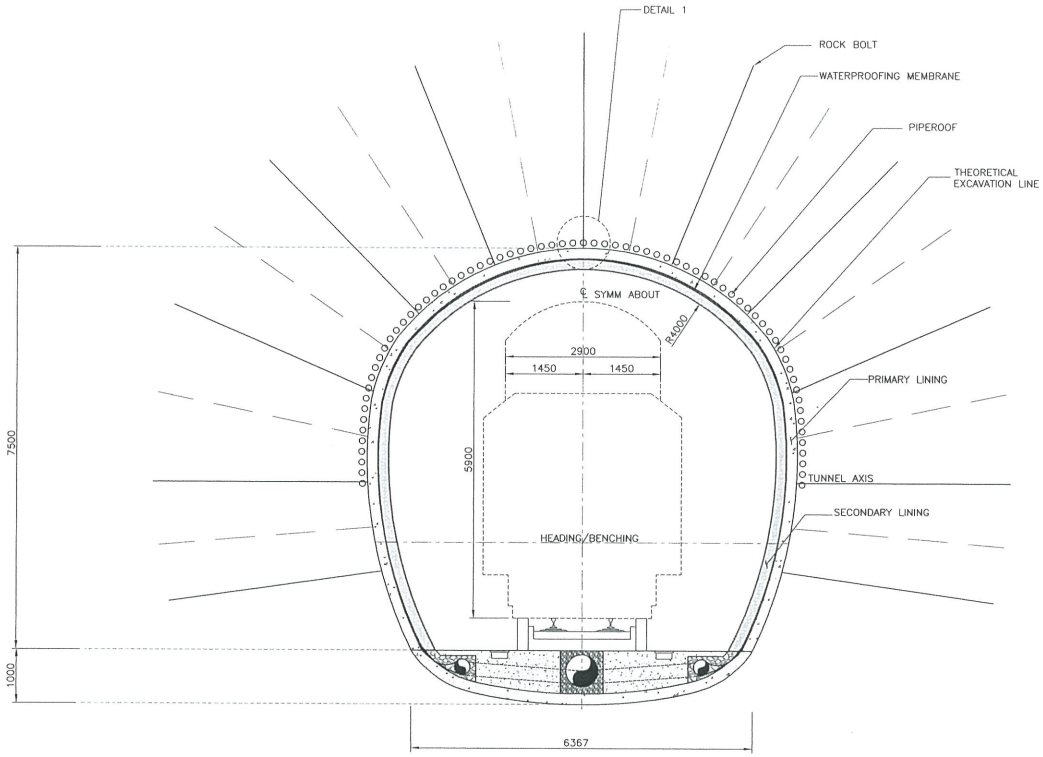
1. SOIL NAIL SHALL BE INSTALLED WHERE SAND IS APPEARED.
2. IF HARD ROCK IS APPEARED, SLOPE RATIO SHALL BE ADJUSTED TO BE 1H:5V

TYPICAL TUNNEL PORTAL OPEN CUT CROSS SECTION

SCALE 1:125

V:\PROJECT\1465-SCR\DRAWINGS\03_PRELIM\04_AL(SAMENT)\01_TYPICAL\SCR-AL-015_TYPICAL TUNNEL PORTAL OPEN CUT CROSS SECTION.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL TUNNEL PORTAL OPEN CUT CROSS SECTION	DATE: FEBRUARY 2018 DWG.NO.: SCR-AL-015	SCALE: A3 NONE SHEET NO.: 47



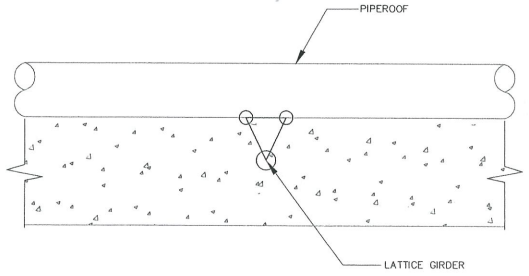
TYPICAL TUNNEL PORTAL SUPPORT CROSS SECTION

SCALE 1:50



NOTES :

1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. HEADING AND BENCHING EXCAVATIONS
3. LATTICE GIRDER SHALL BE INSTALLED.
4. ROCK BOLTS SHALL BE INSTALLED

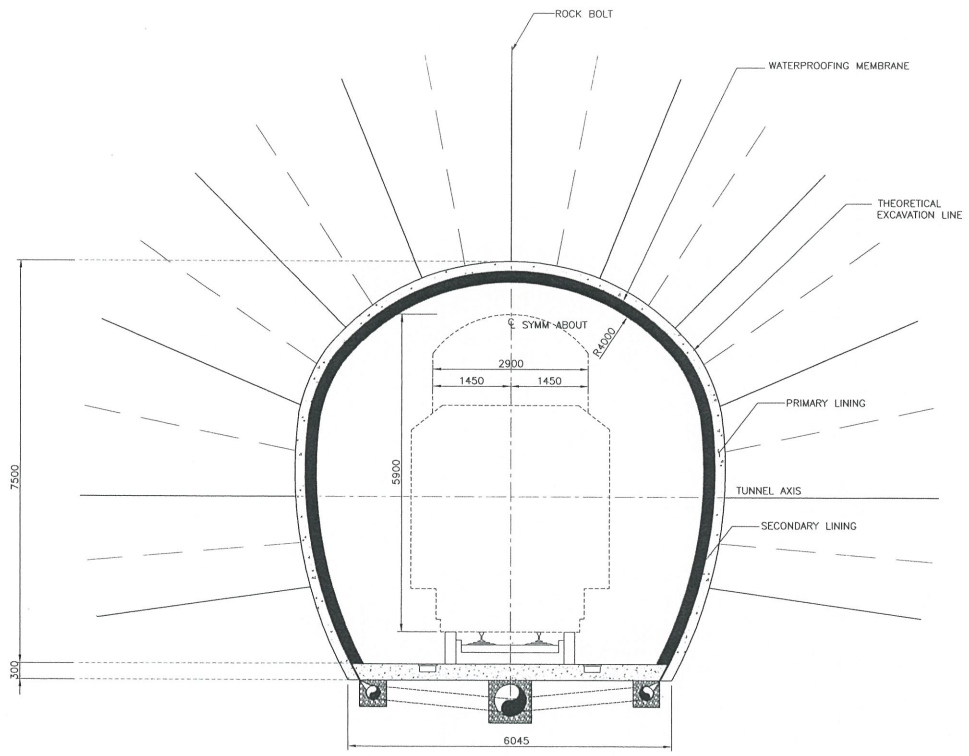


DETAIL 1

SCALE 1:10

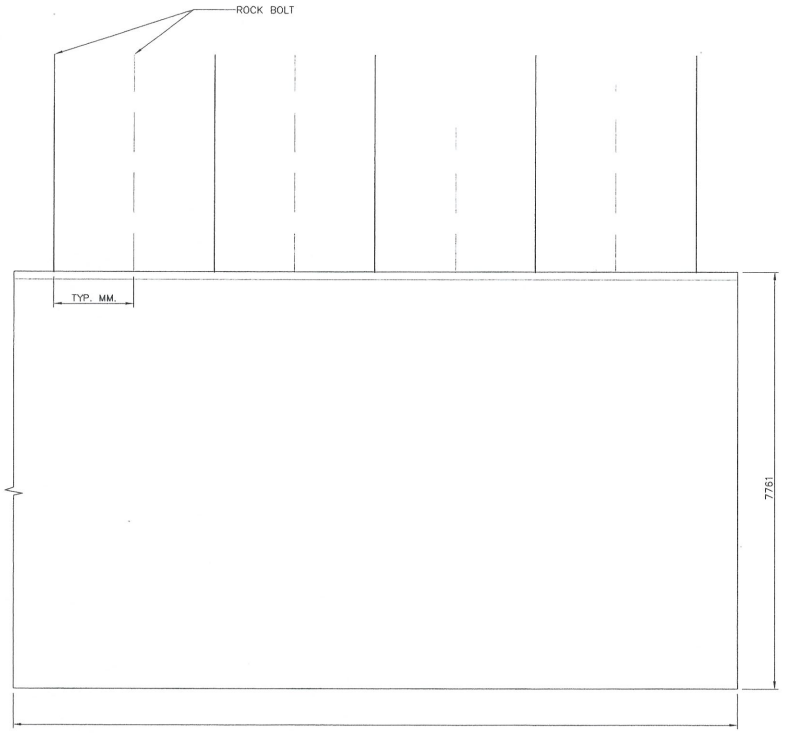
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL TUNNEL PORTAL SUPPORT CROSS STATION	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-016	SCALE: AS SHOWN SHEET NO. 48



TYPICAL TUNNEL SUPPORT

SCALE 1:50



FULL FACE EXCAVATION

NOTES :

1. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ROCK BOLT PATTERN SHALL BE ADJUSTED SUITABLY FOR ROCK CONDITIONS.
3. ROCK SURFACE SHALL BE SMOOTHEN PRIOR TO INSTALLATION OF WATERPROOFING SYSTEM.
4. EXCAVATION LENGTH AND SEQUENCES MIGHT BE CHANGED DEPENDING ON THE DECISION OF THE ENGINEER.

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otp

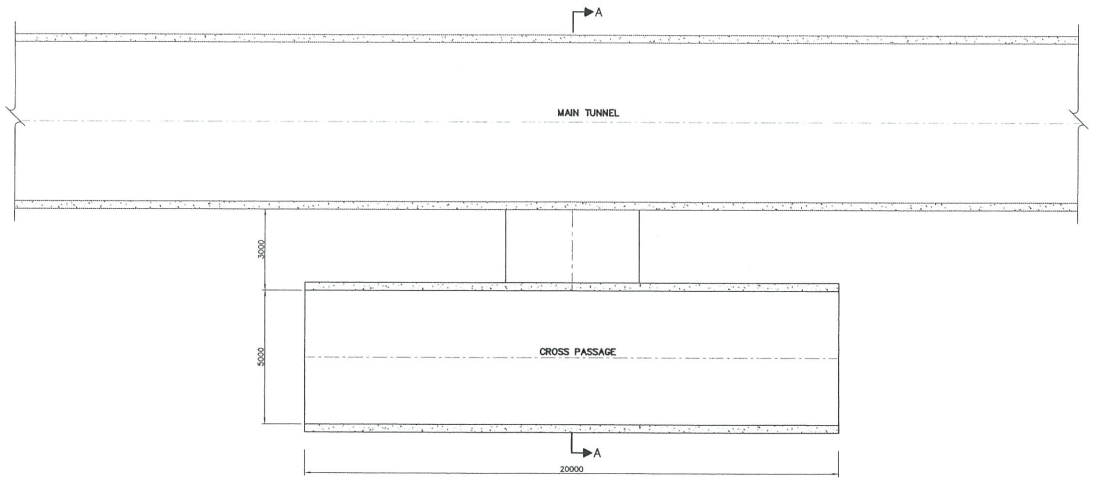
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

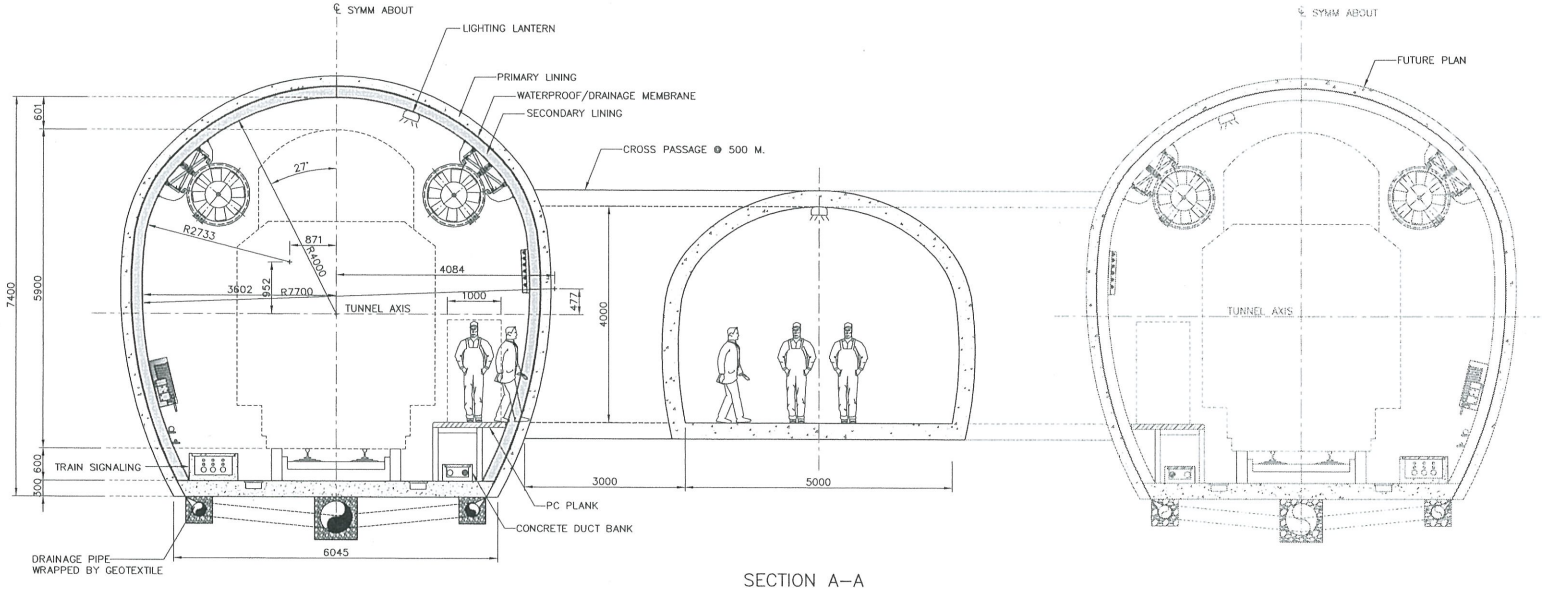
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL TUNNEL SUPPORT

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-AL-017
SHEET NO.: 49



TYPICAL TUNNEL CROSS PASSAGE PLAN
SCALE 1:50

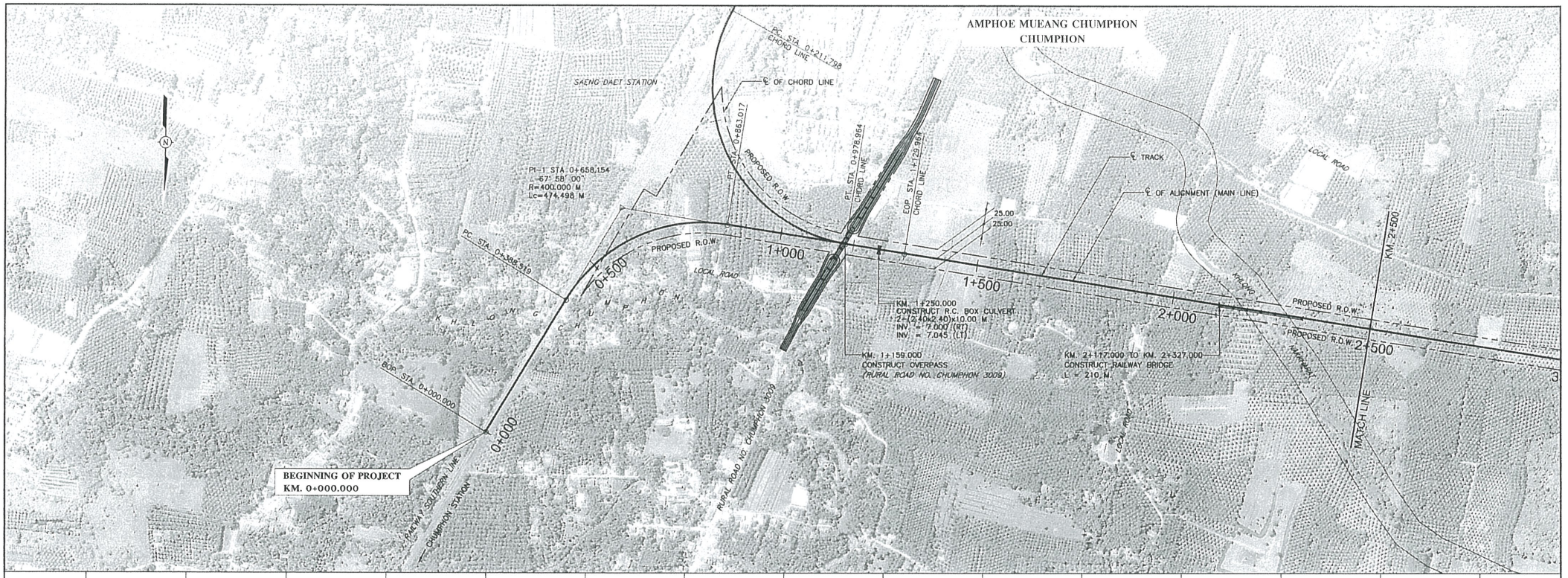


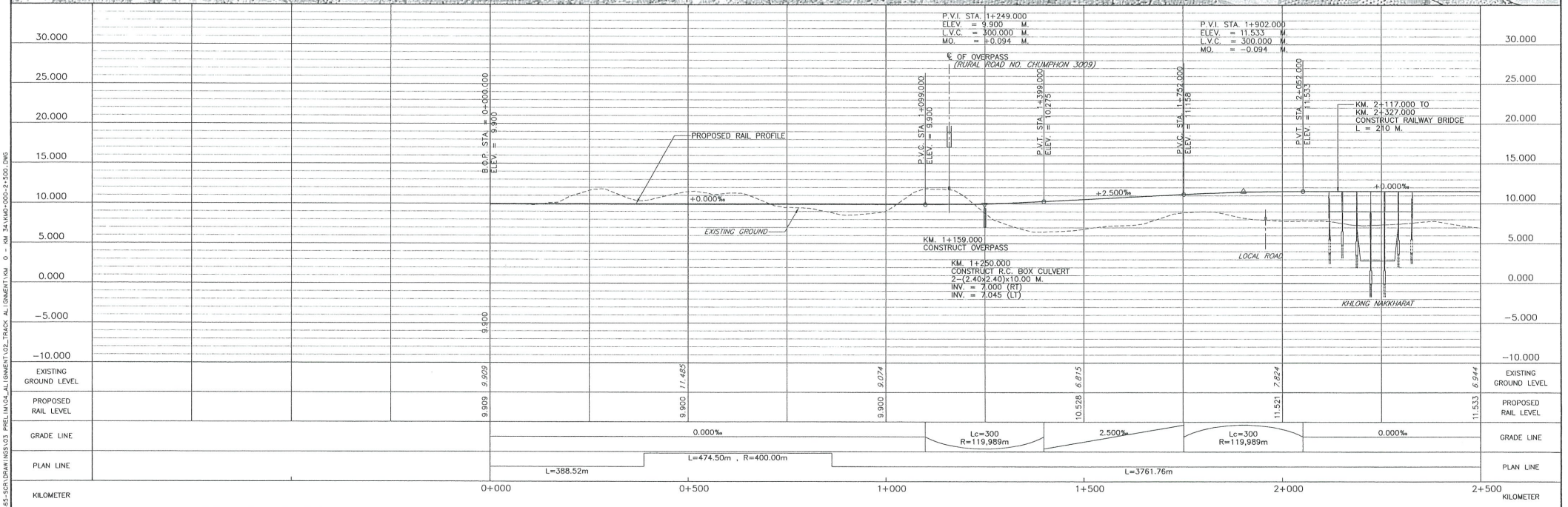
SECTION A–A

TYPICAL TUNNEL SECTION WITH CROSS PASSAGE
SCALE 1:50

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE TYPICAL TUNNEL SECTION WITH CROSS PASSAGE	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-018	SCALE: AS SHOWN SHEET NO. 50

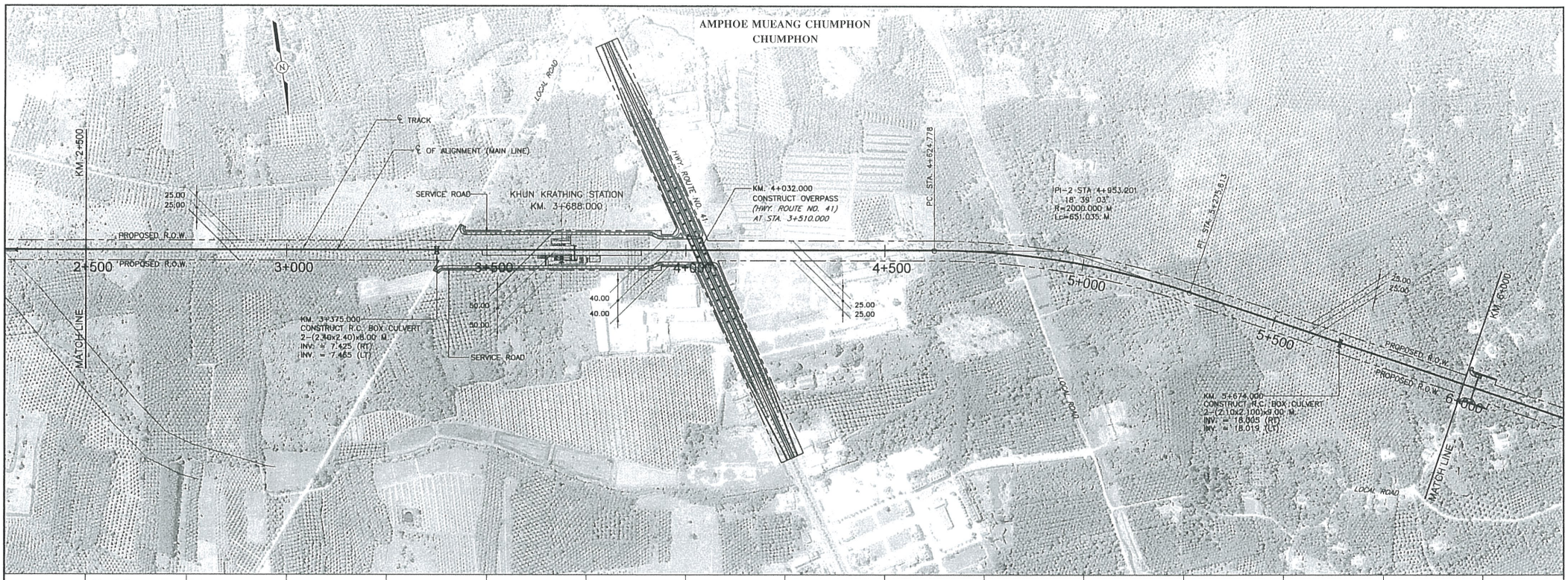


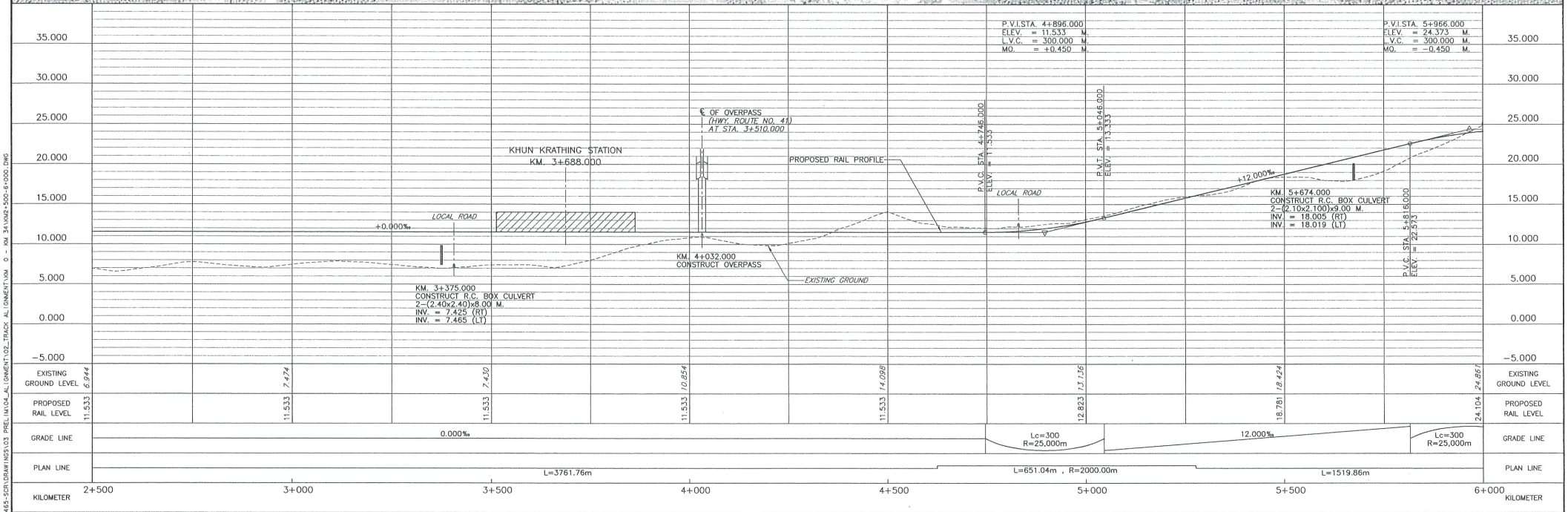


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM.0+000.000 TO KM. 2+500.000

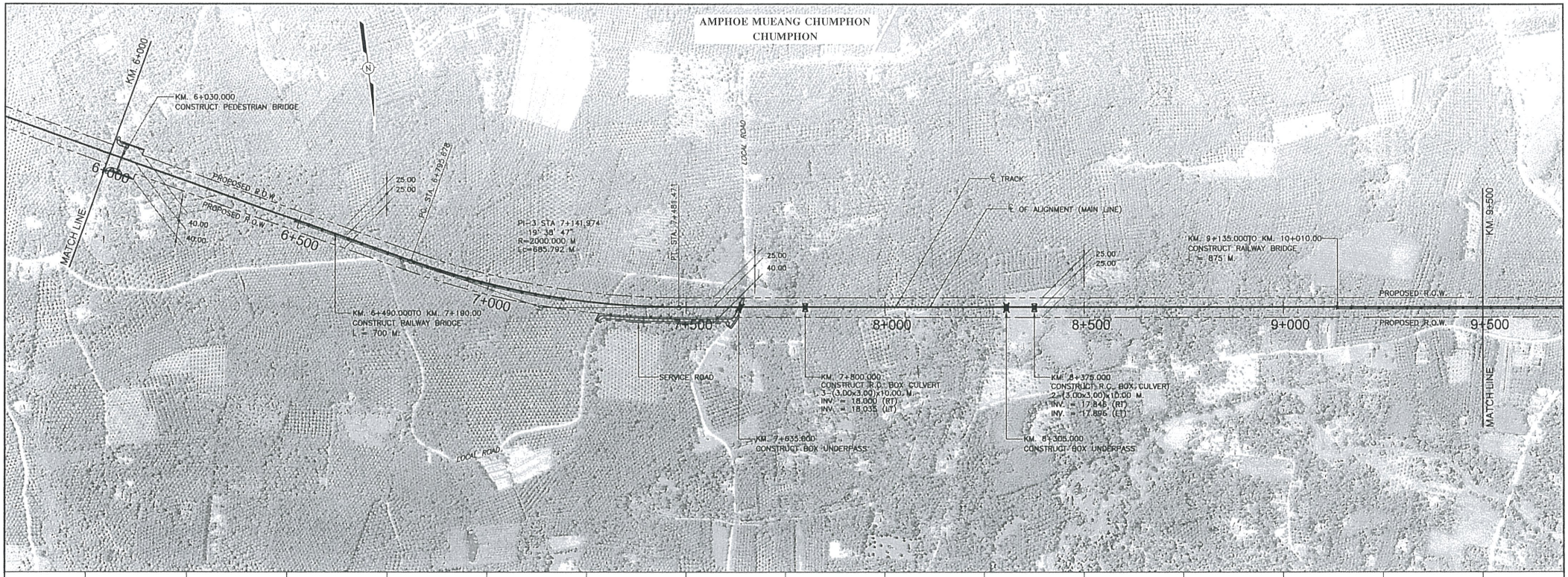
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SHEET NO.	51

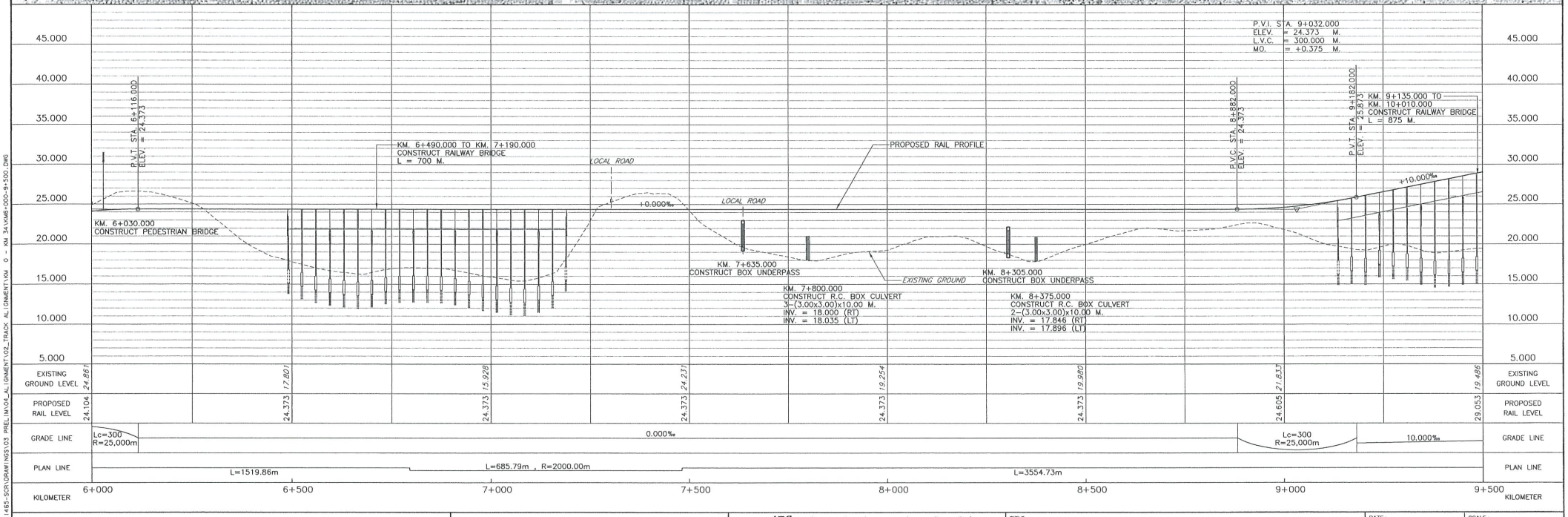




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE MAIN LINE PLAN AND PROFILE KM. 2+500.000 TO KM. 6+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-020	SCALE: A3 H=1:10,000 V=1:500 SHEET NO. 52





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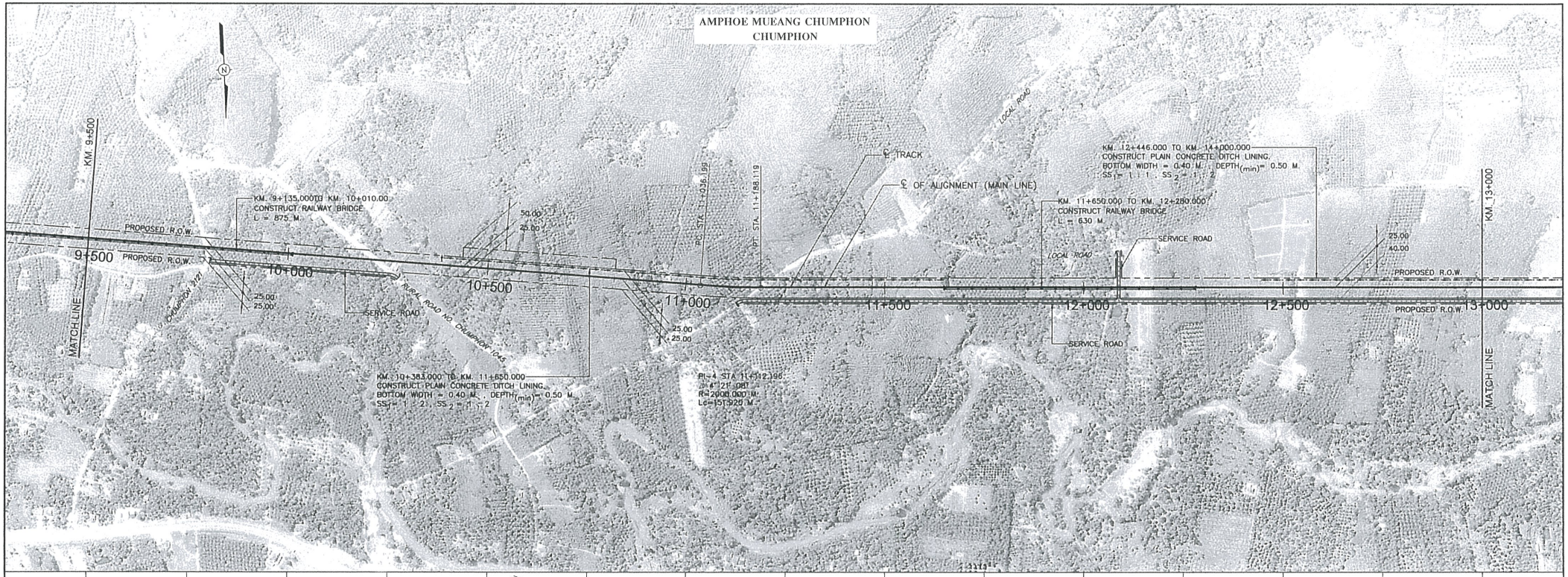
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

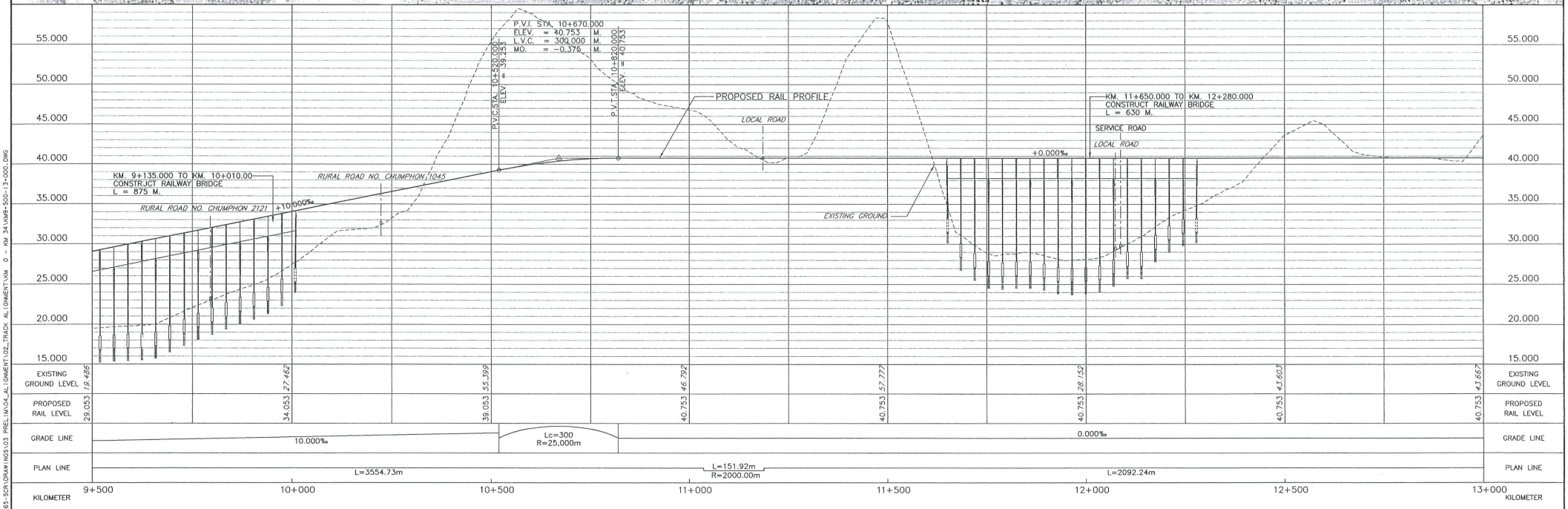
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 6+000.000 TO KM. 9+500.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG NO.: SCR-AL-021
SHEET NO.: 53





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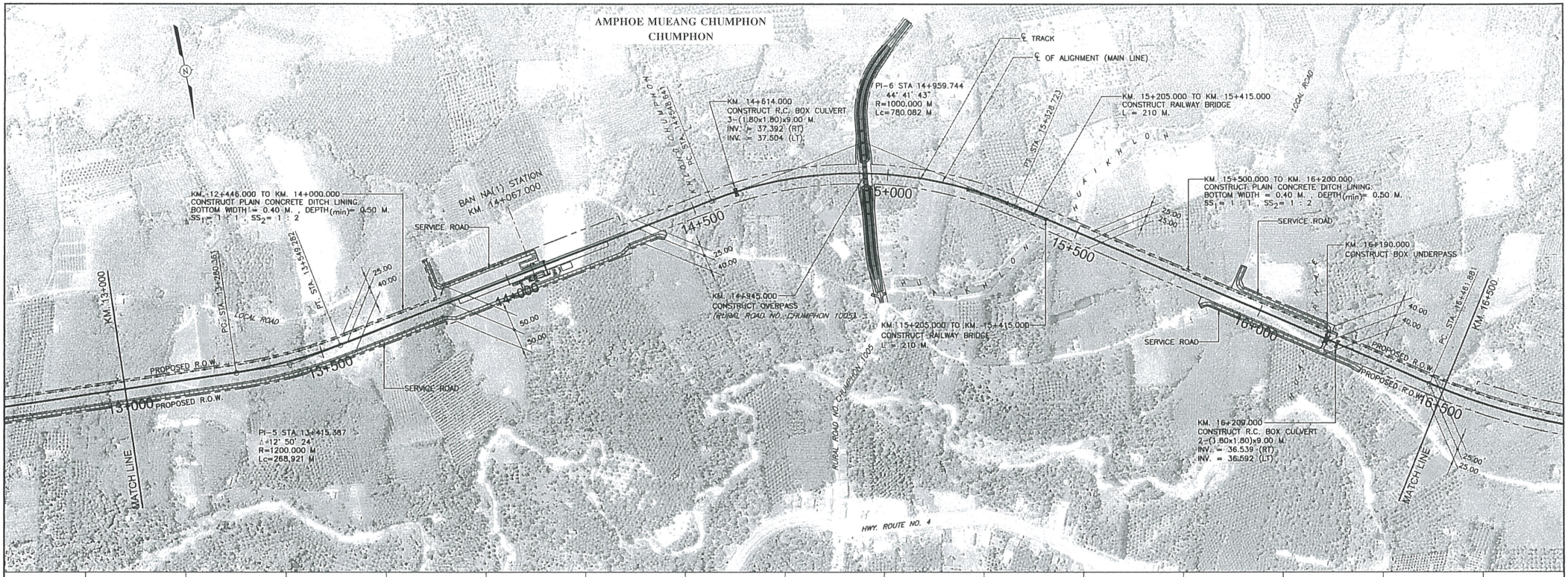
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

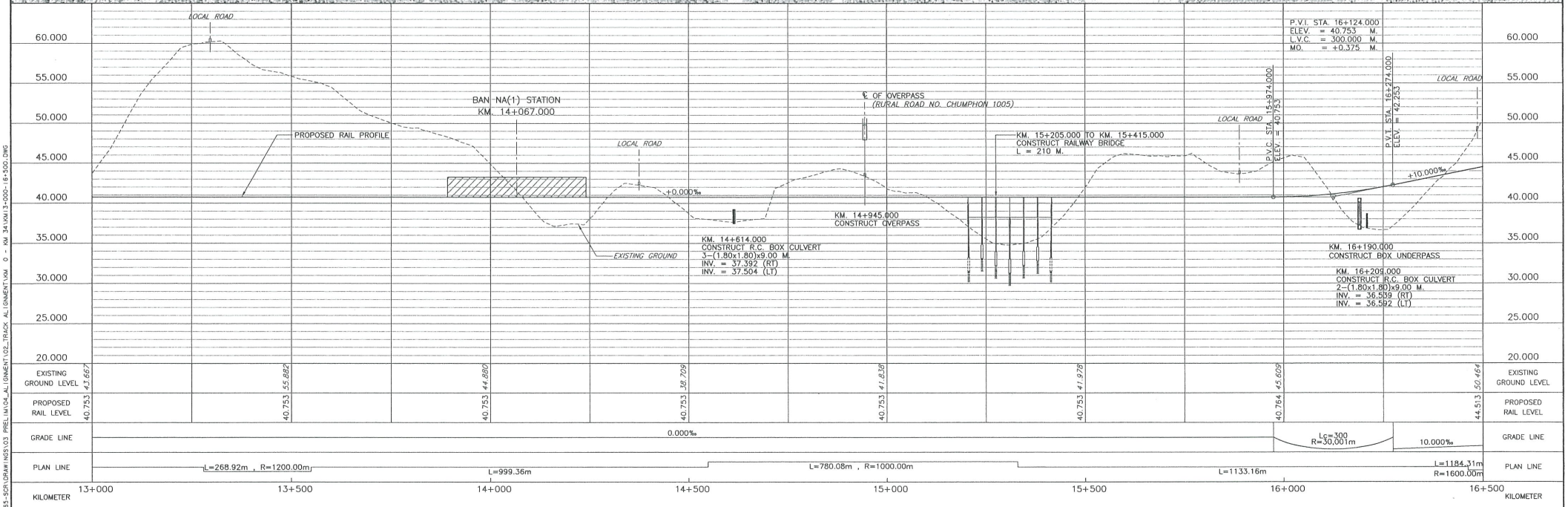
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 9+500.000 TO KM. 13+000.000

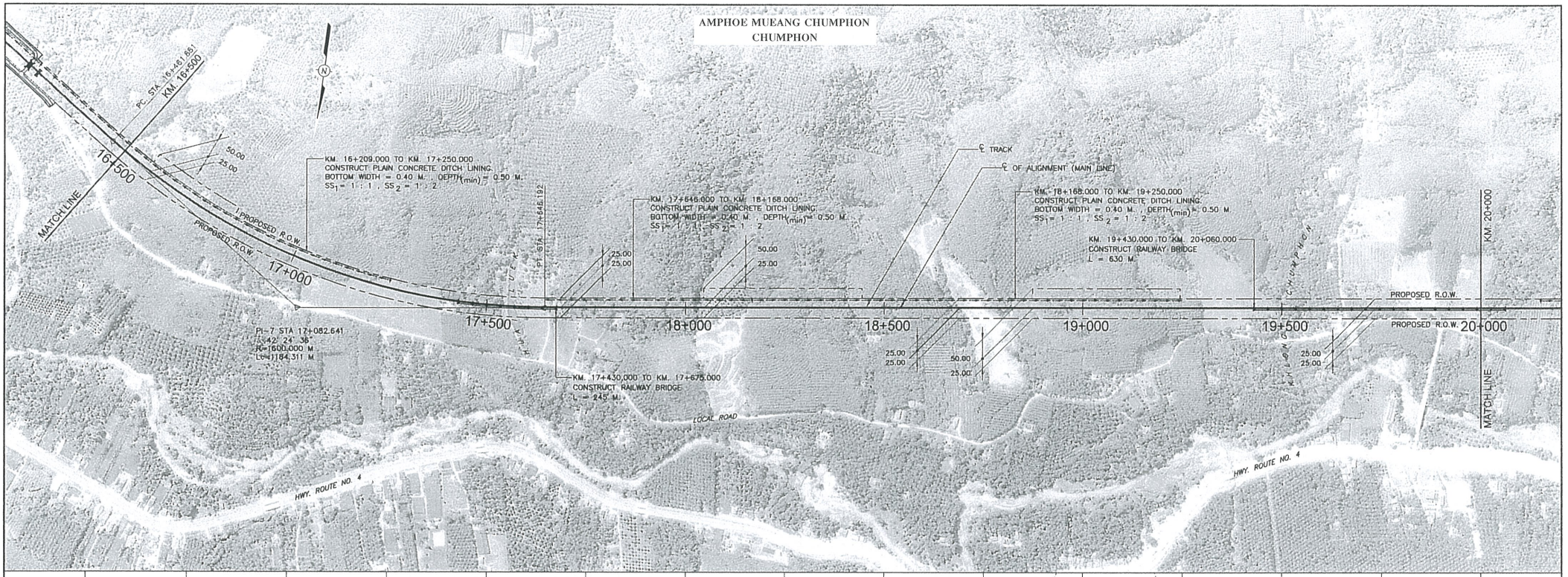
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DWG. NO. SCR-AL-022
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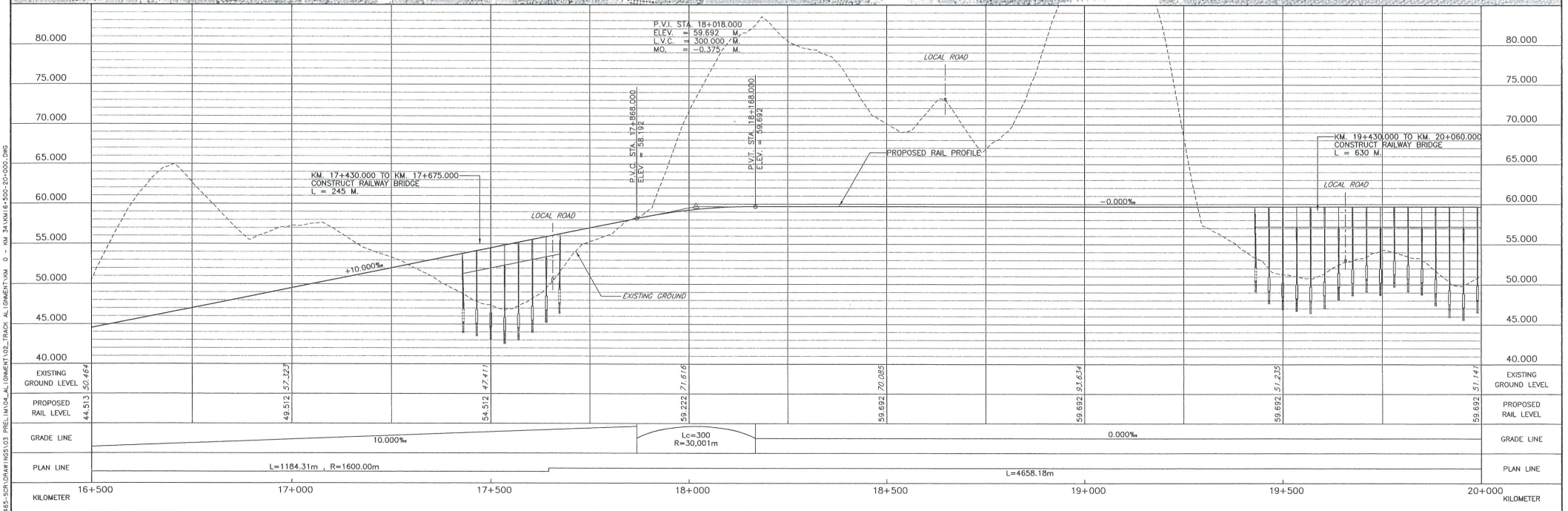




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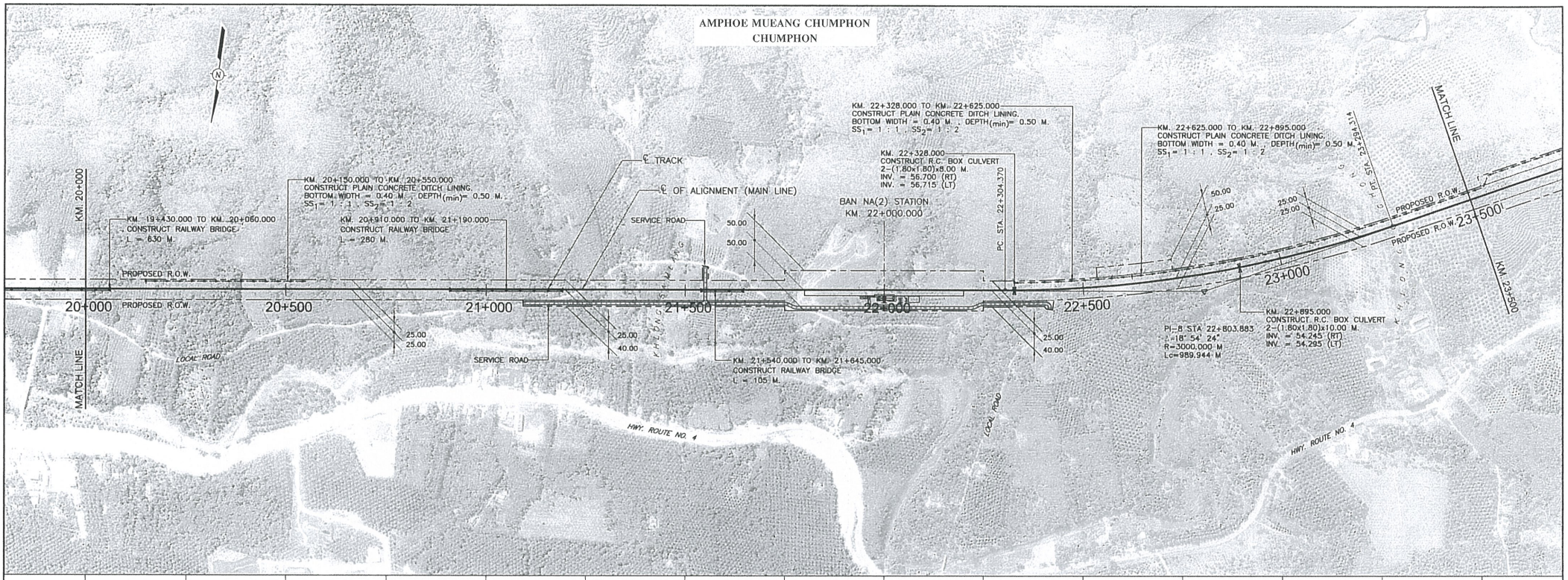
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 13+000.000 TO KM. 16+500.000	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-023	SCALE: A3 H=1:10,000 V=1:500 SHEET NO. 55

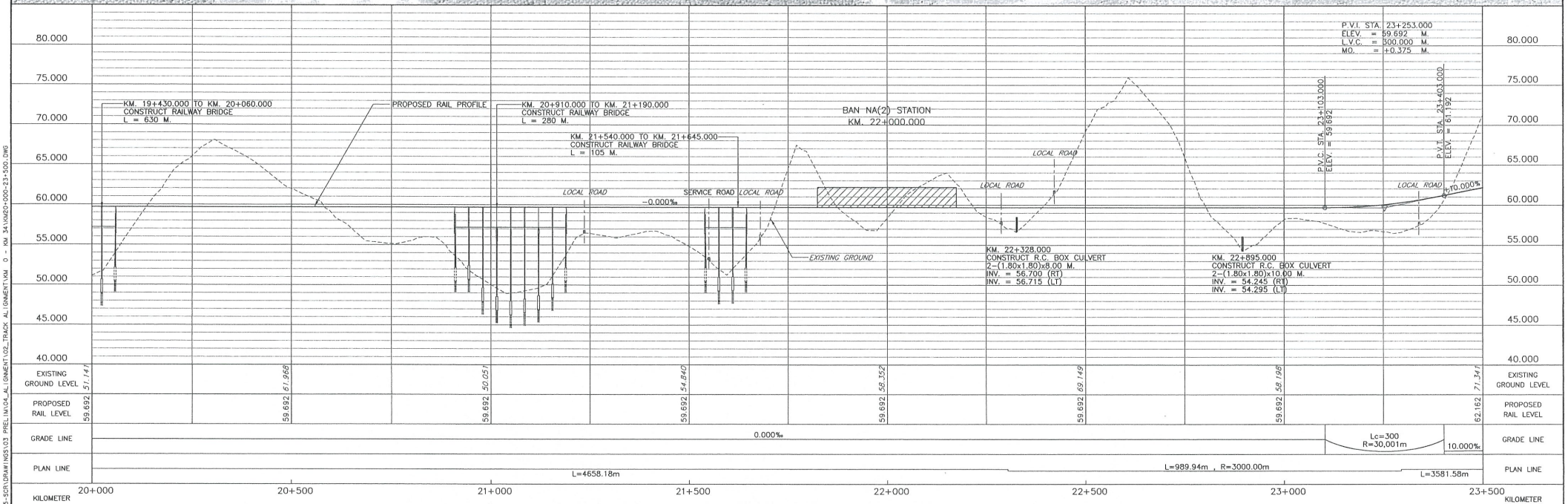




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: MAIN LINE PLAN AND PROFILE KM. 16+500.000 TO KM. 20+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR−AL−024	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 56





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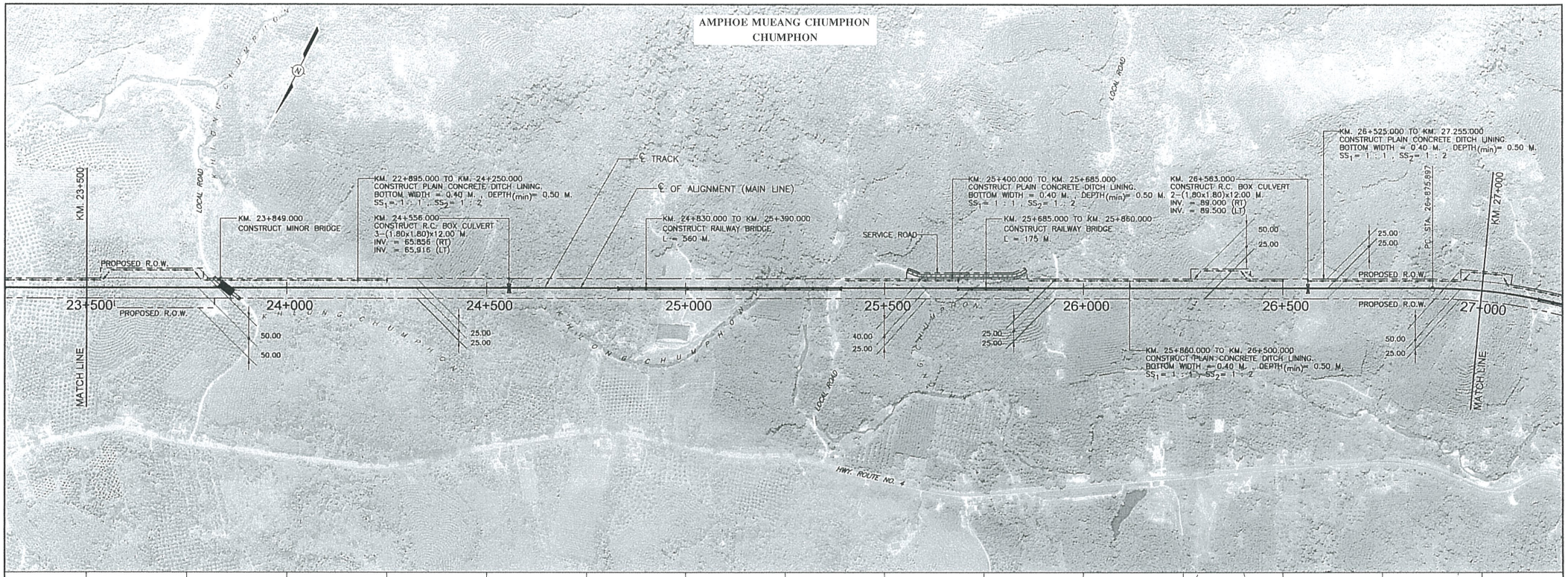
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

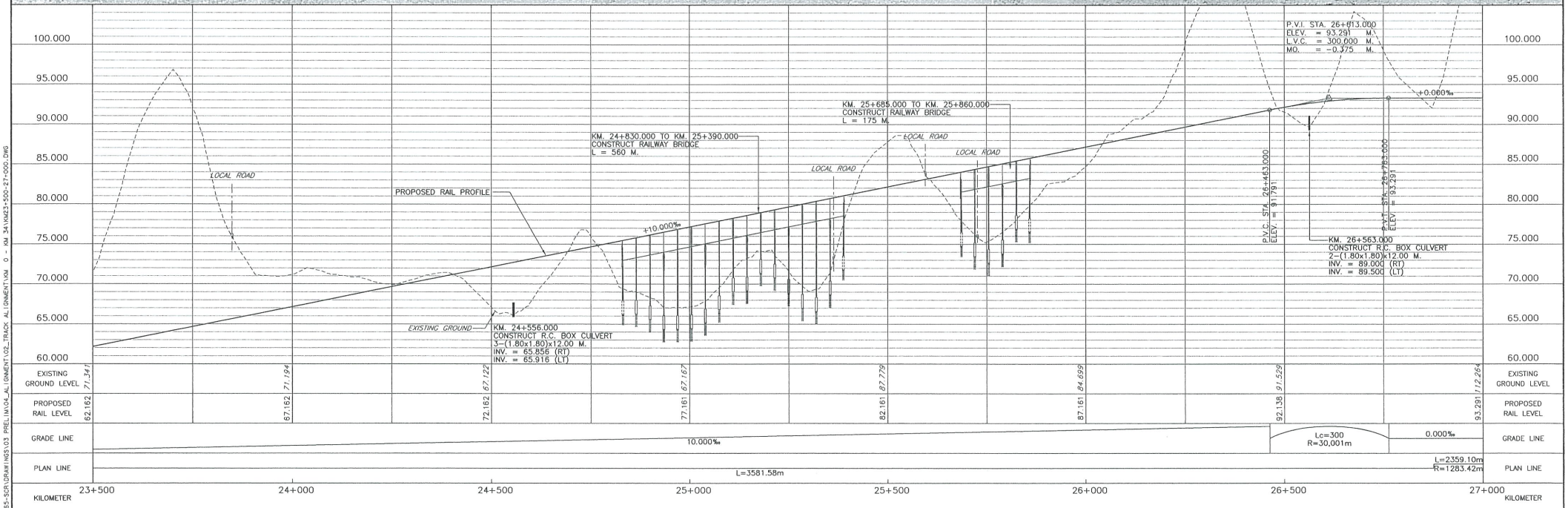
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 20+000.000 TO KM. 23+500.000

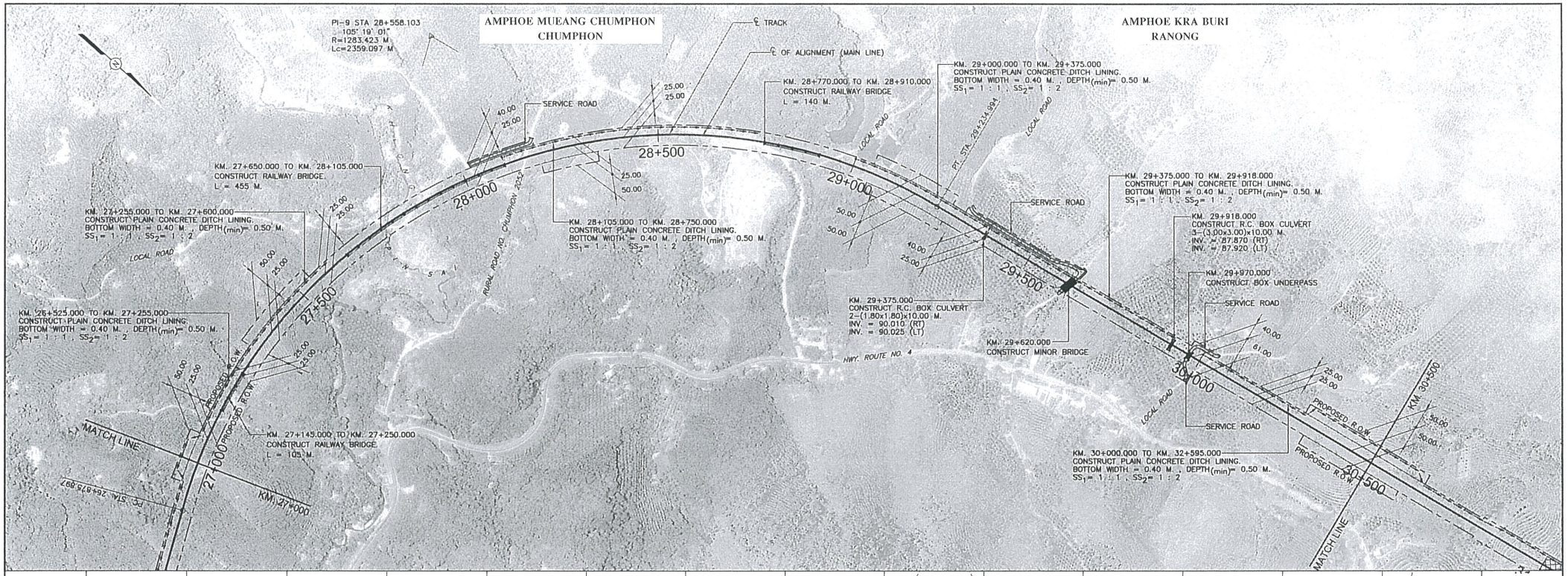
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DWG. NO.: SCR-AL-025
SHEET NO.: 57

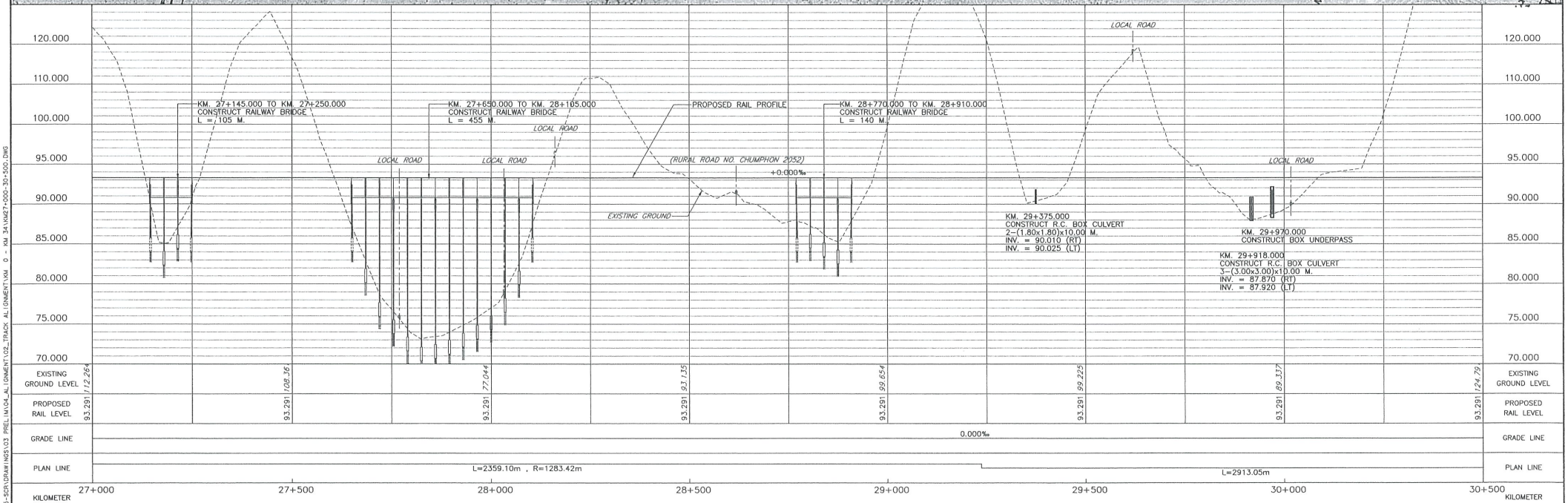




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 23+500.000 TO KM. 27+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-026	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 58





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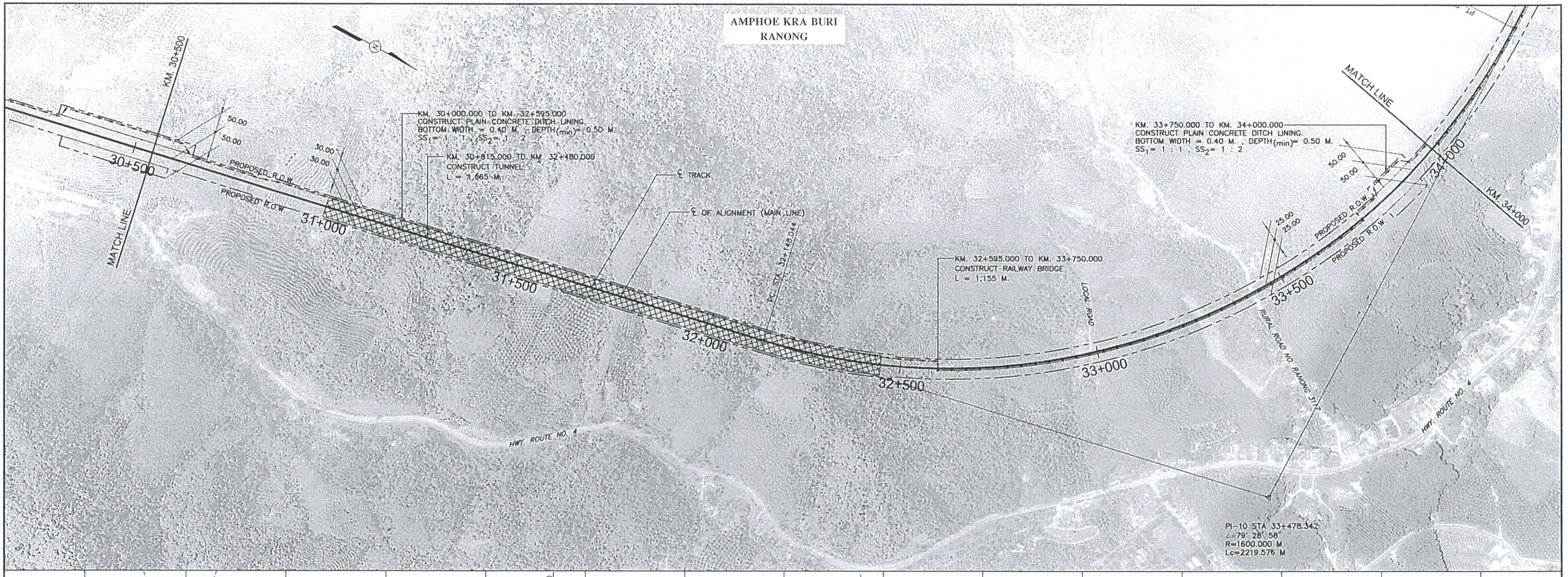
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 27+000.000 TO KM. 30+500.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG. NO.: SCR-AL-027
SHEET NO.: 59



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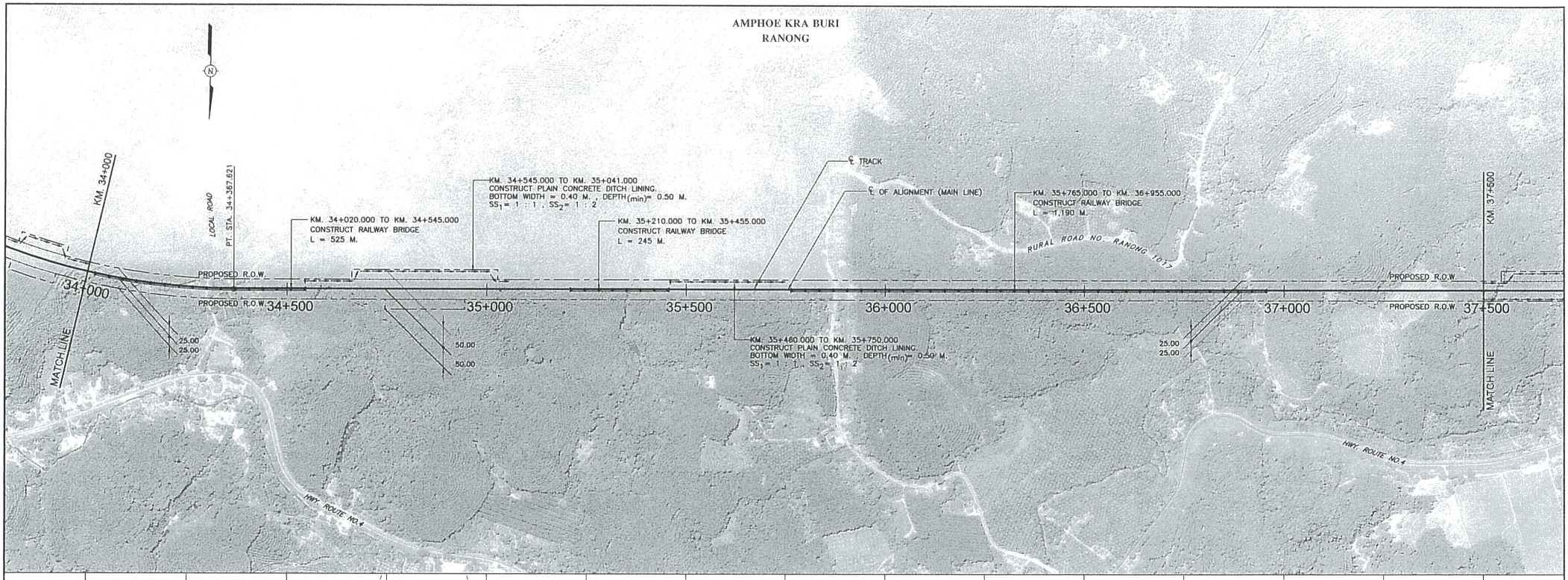
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

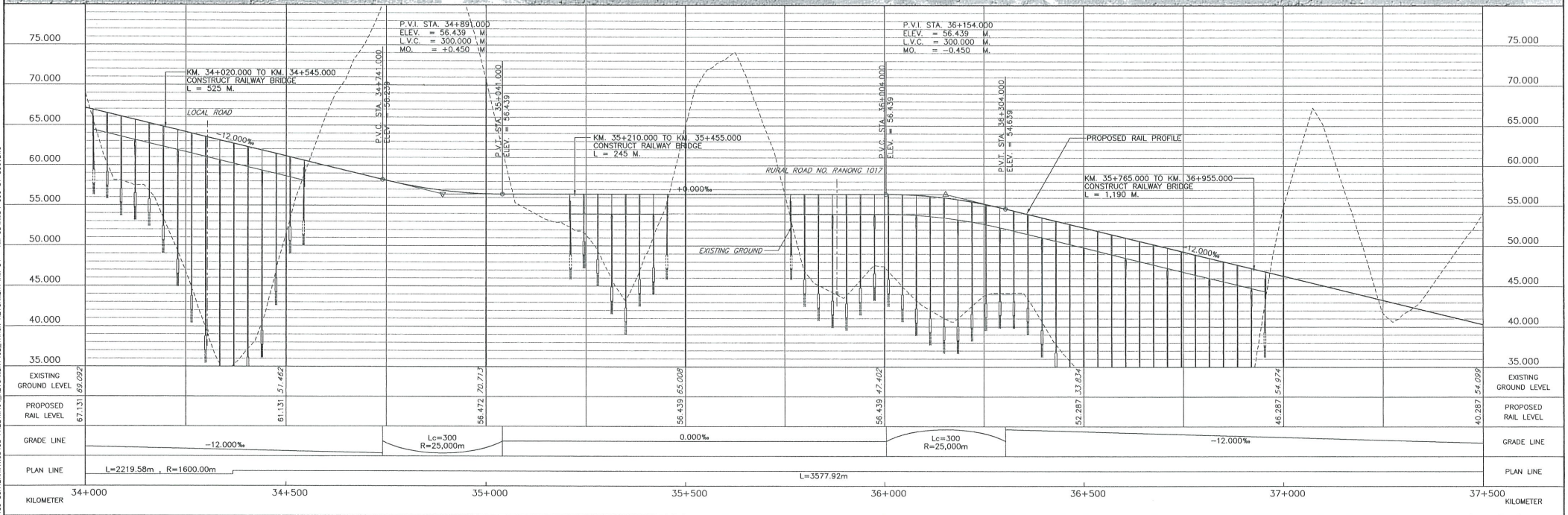
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 30+500.000 TO KM. 34+000.000

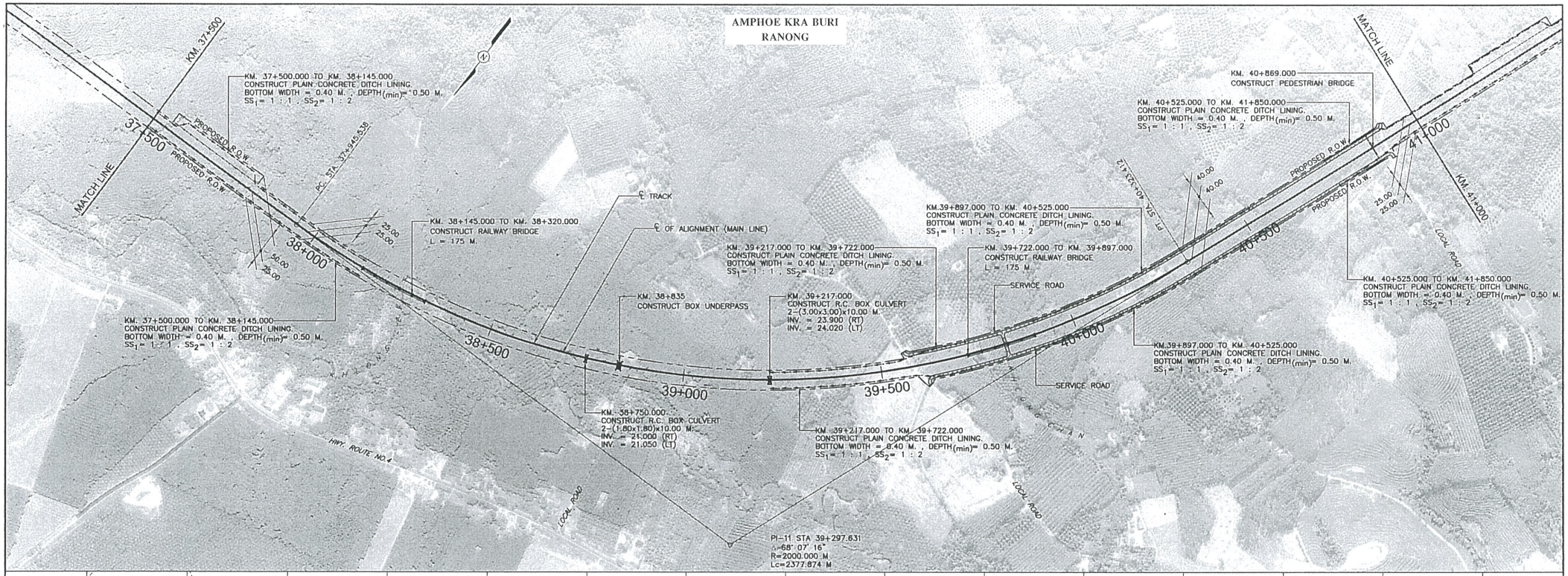
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DWG. NO.: SCR-AL-028
SHEET NO.: 60





V:\PROJECT\1455-SCR\DRAWINGS\03 PRELIMN\04_ALIGNMENT\02_TRACK ALIGNMENT\KM 34 - KM 69\KM34+000-37+500.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 34+000.000 TO KM. 37+500.000	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-029	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 61



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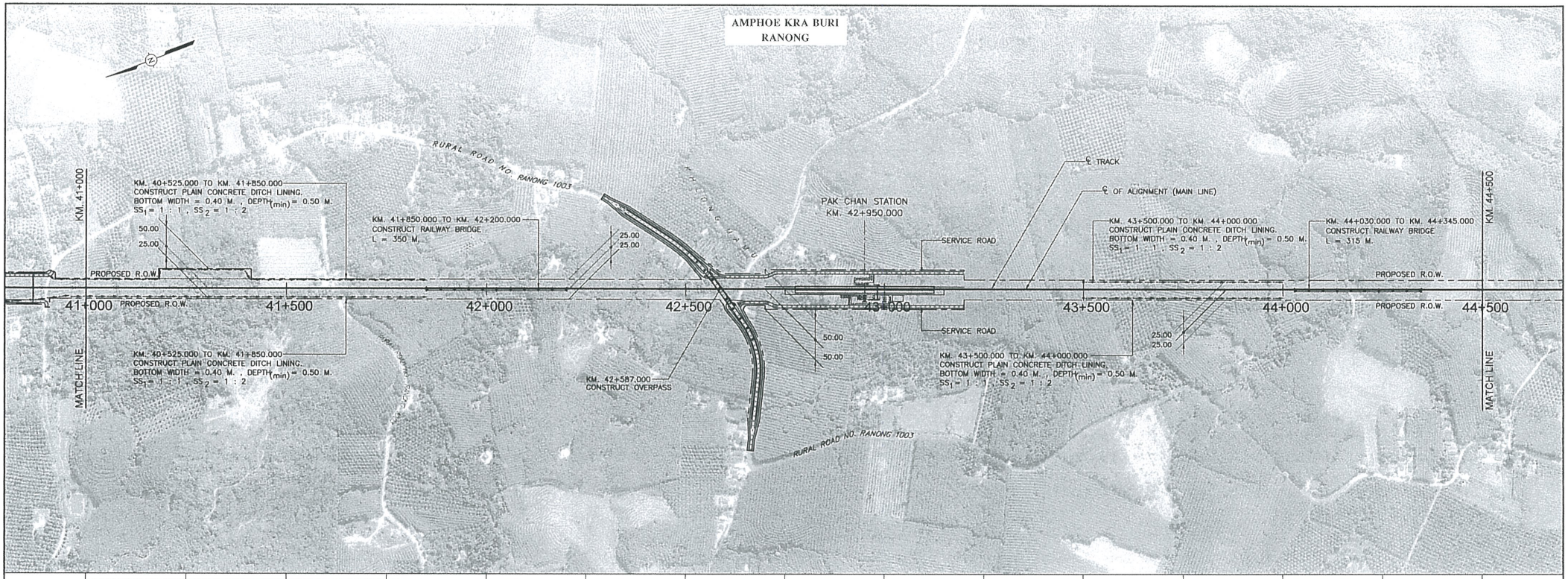
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

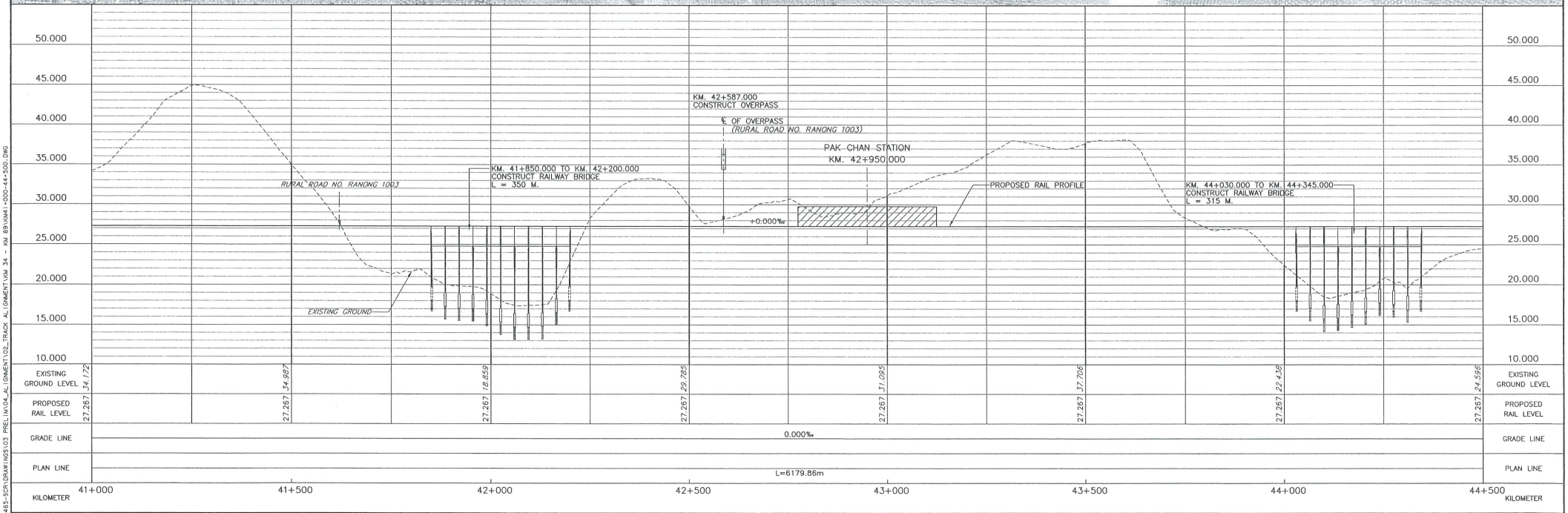
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 37+500.000 TO KM. 41+000.000

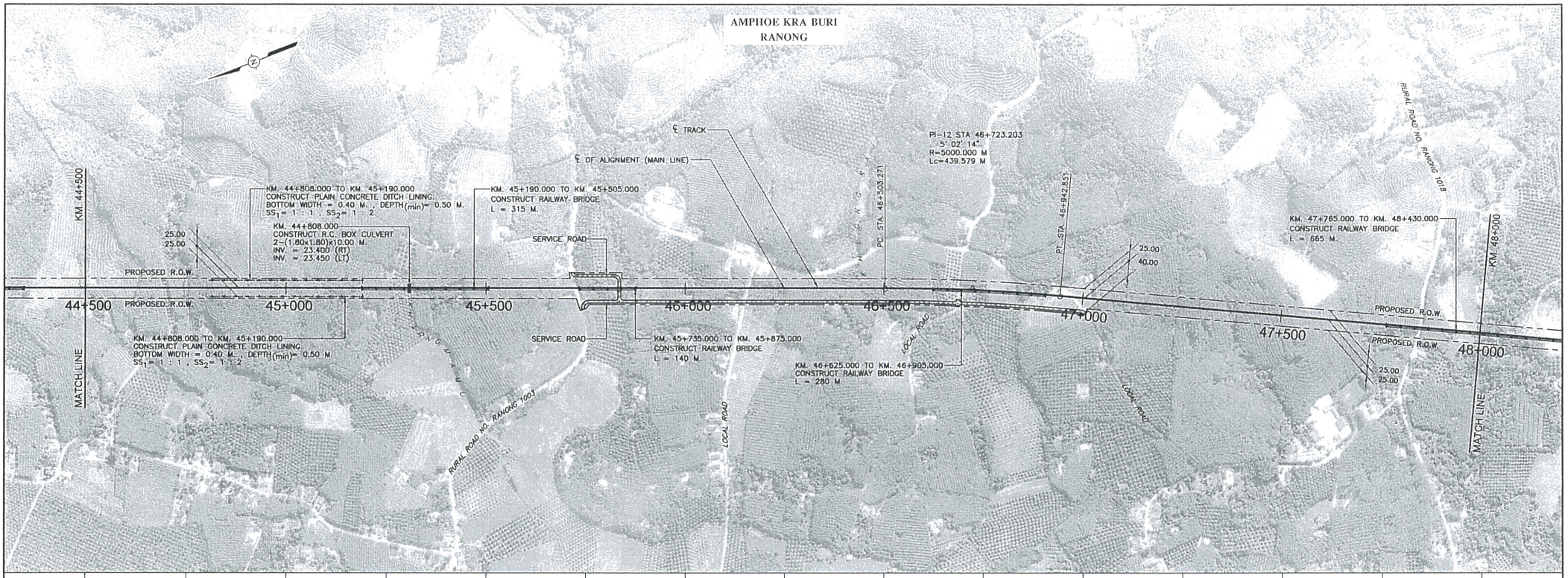
DATE: FEBRUARY 2018
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DWG NO.: SCR-AL-030
SHEET NO.: 62

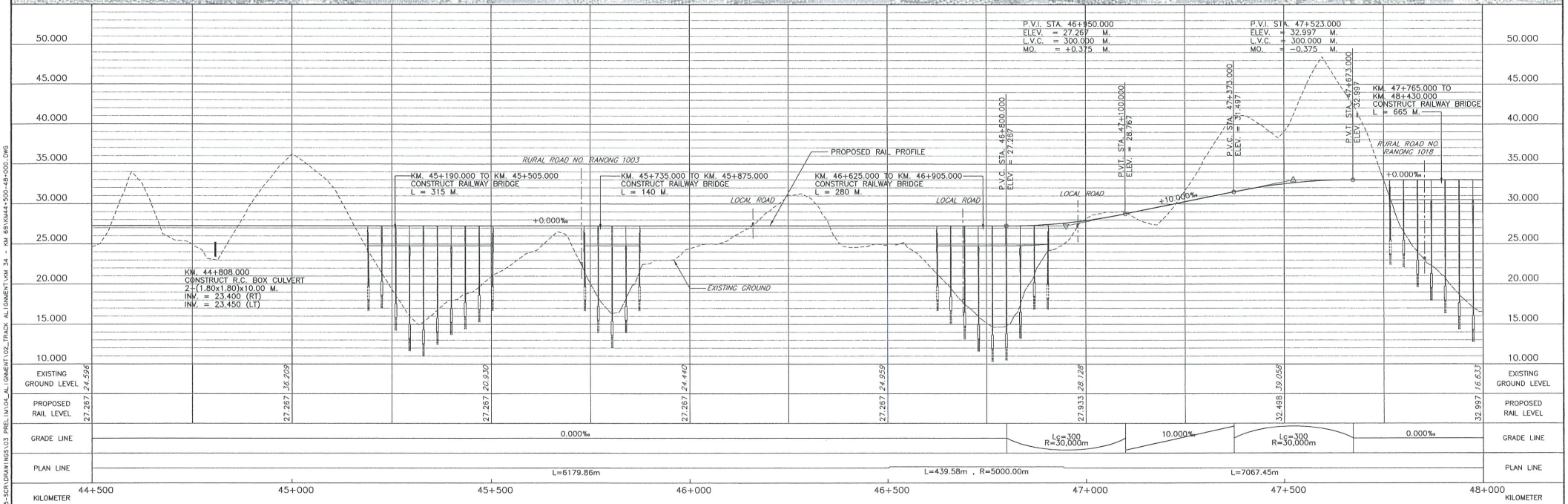




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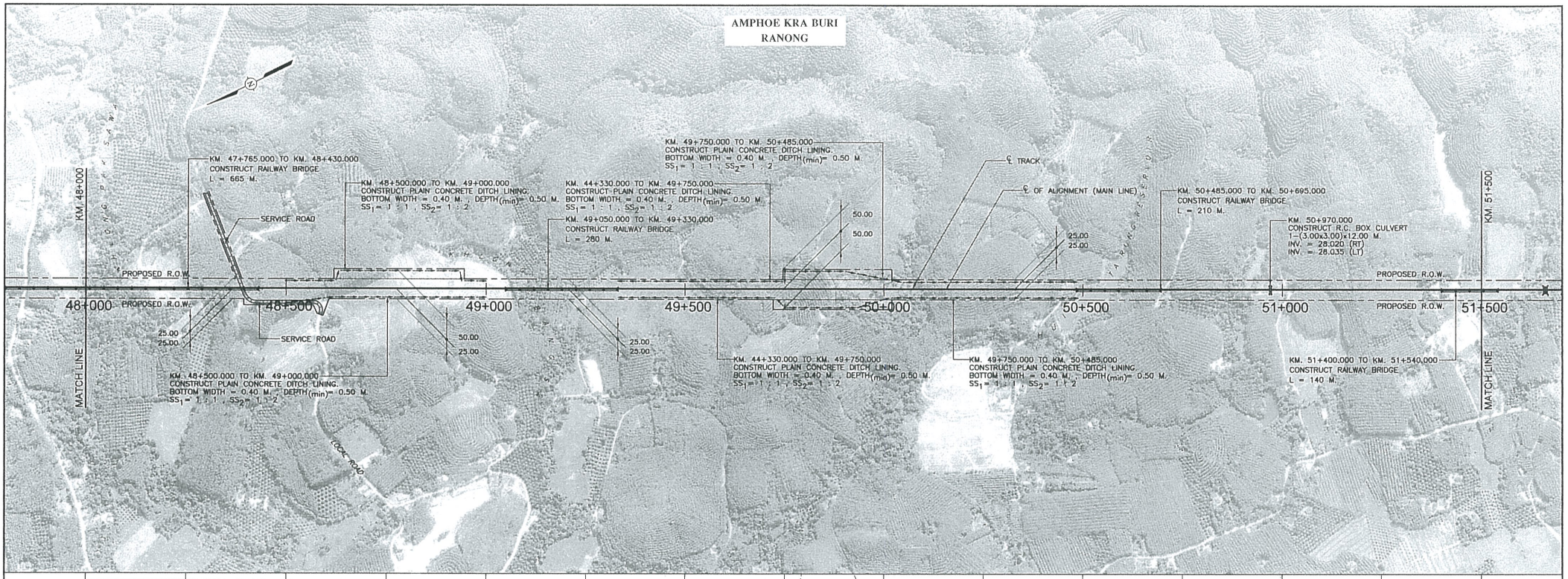
otp KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 41+000.000 TO KM. 44+500.000	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-031	SCALE: A3 H=1:10,000 V=1:500 SHEET NO. 63





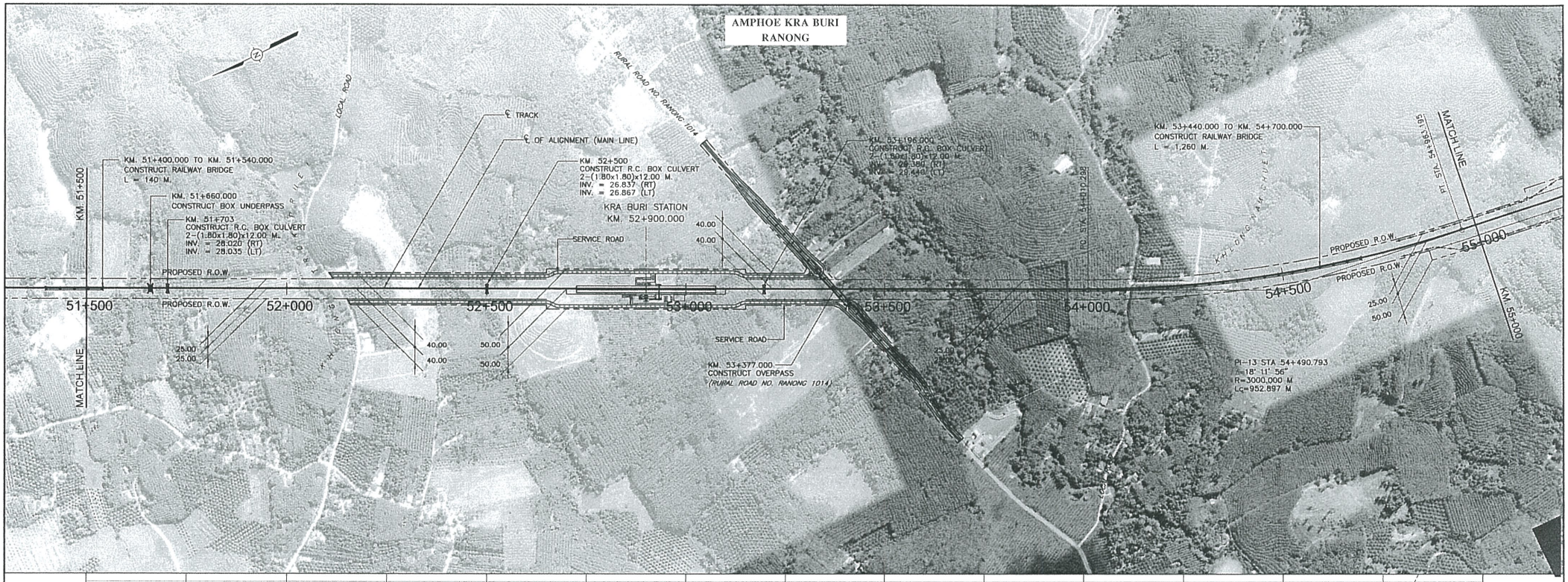
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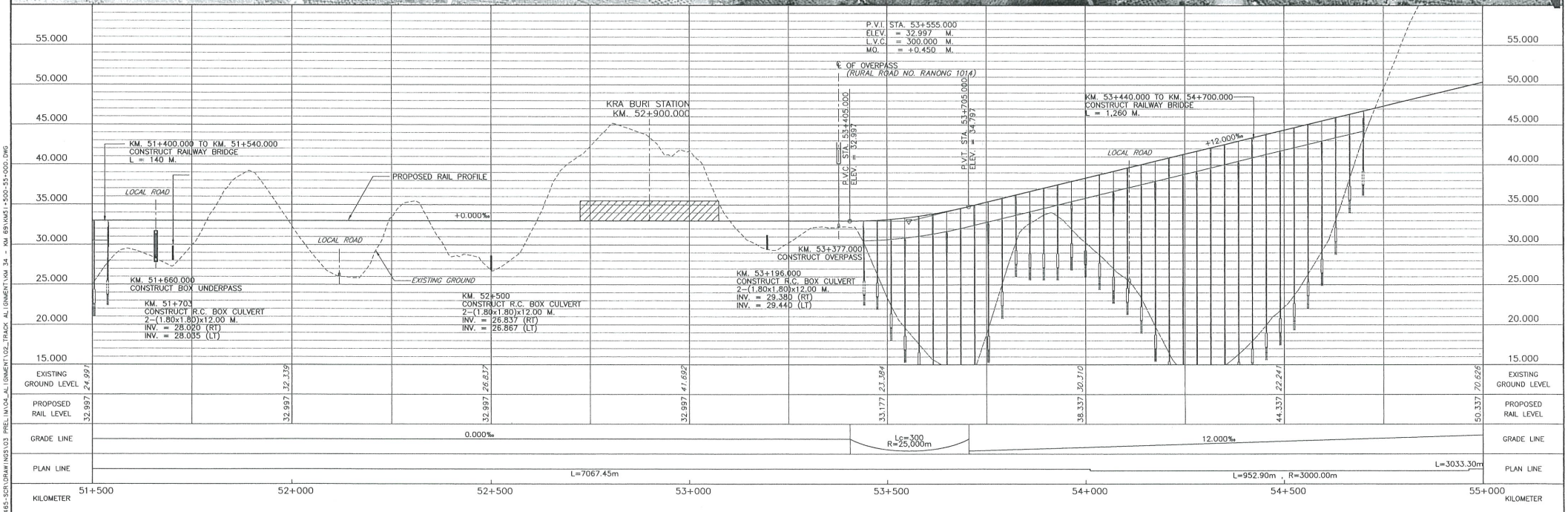
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 44+500.000 TO KM. 48+000.000	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-032	SCALE: A3 H=1:10,000 V=1:500 SHEET NO. 64



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 48+000.000 TO KM. 51+500.000	DATE: FEBRUARY 2018 DWG. NO. SCR-AL-033	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 65

V:\PROJECT\1455-SCR\DRAWINGS\03_PRELIM\04_ALIGNMENT\02_TRACK ALIGNMENT\KM 34 - KM 69\KM48+000-51+500.DWG





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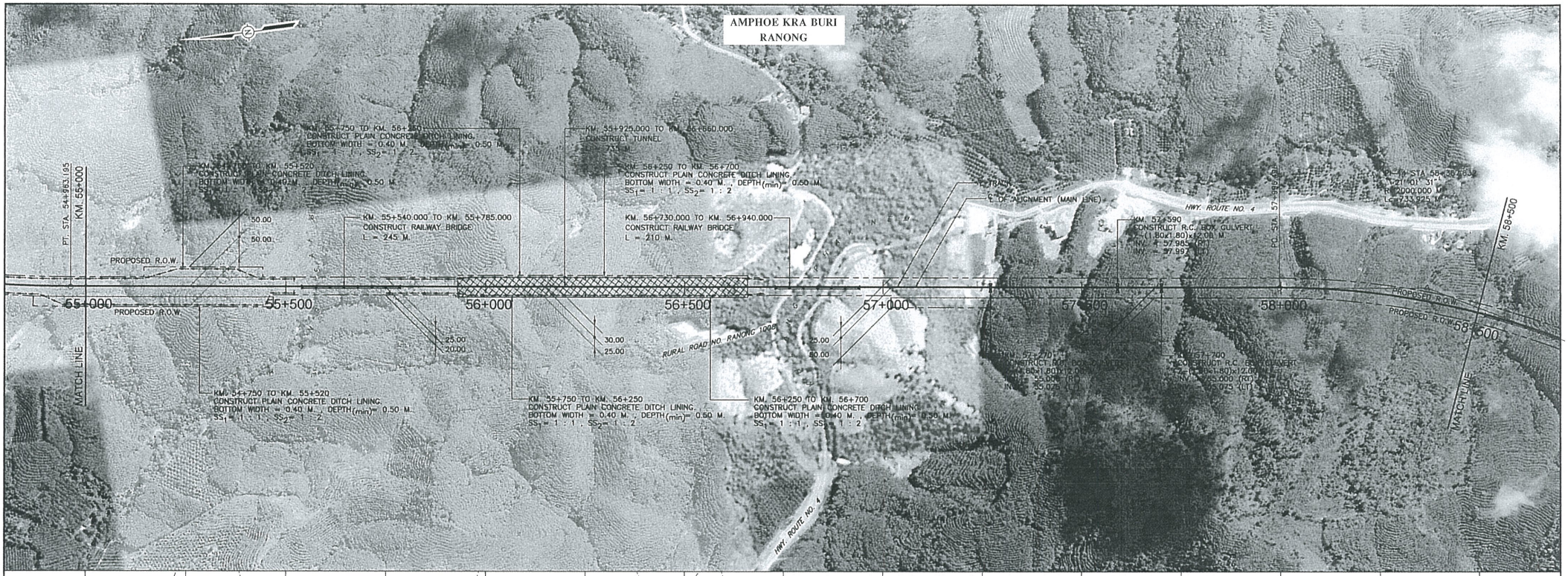
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

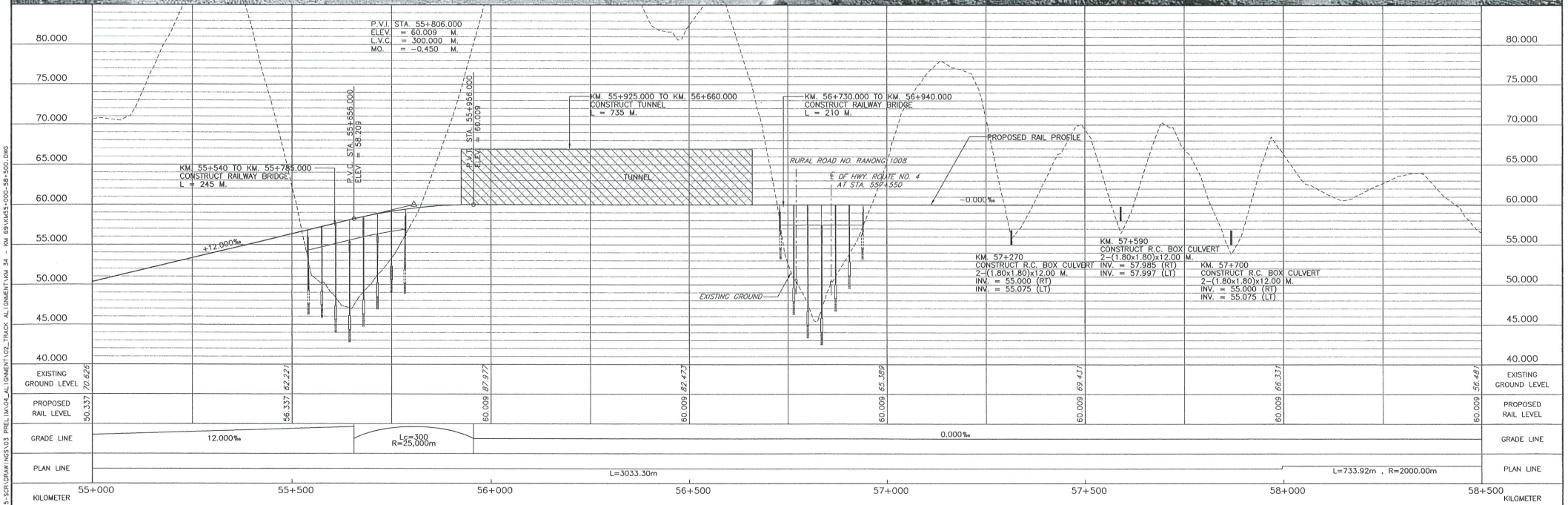
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 51+500.000 TO KM. 55+000.000

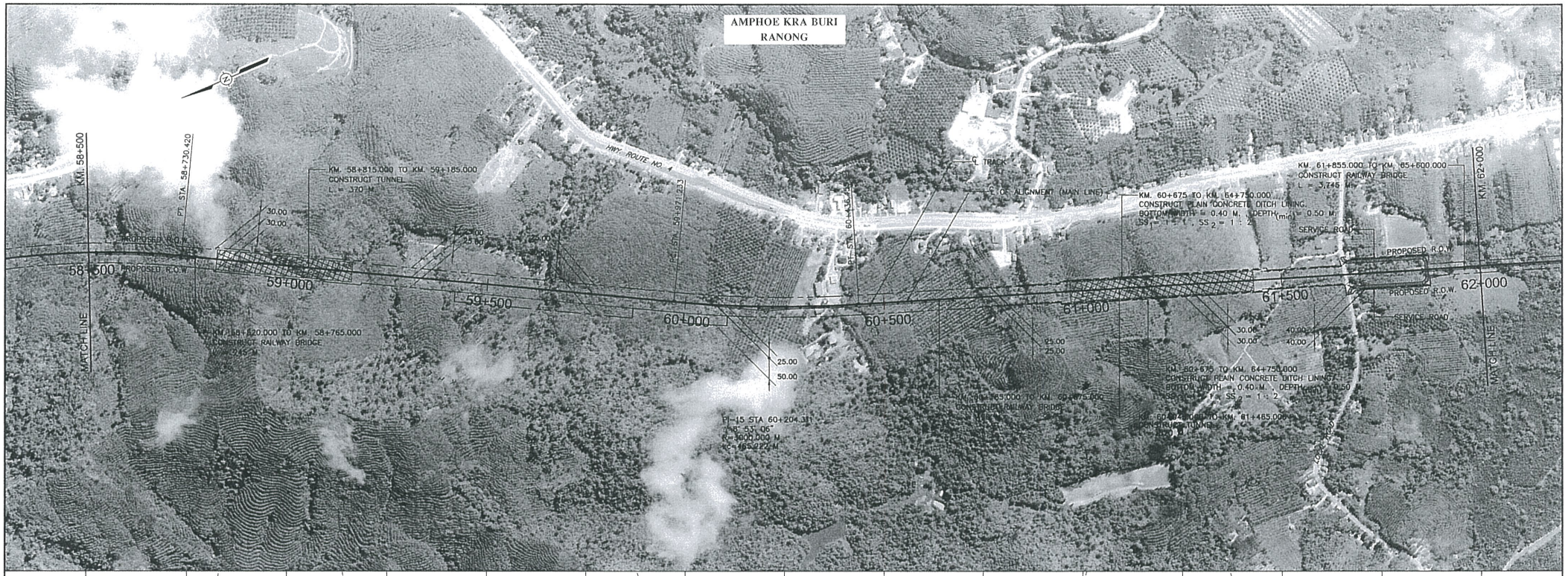
DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG. NO. SCR-AL-034
SHEET NO. 66

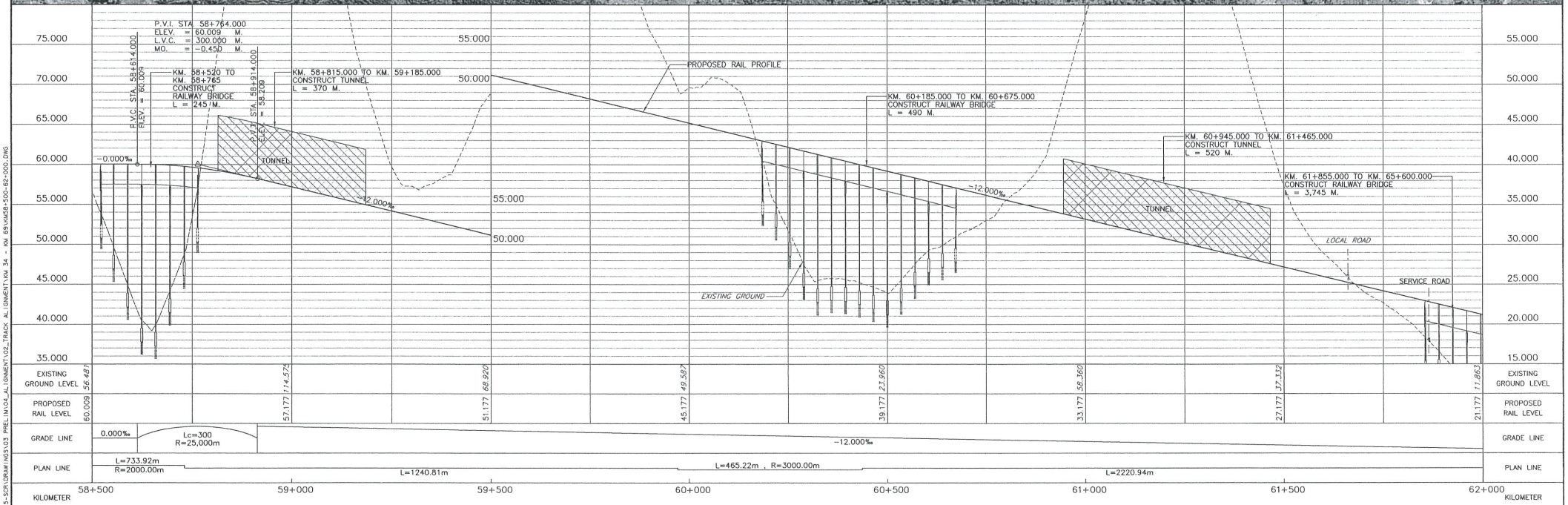




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE LINE LINE PLAN AND PROFILE KM.55+000.000 TO KM. 58+500.000	DATE: FEBRUARY 2018 SCALE: A3 H=1:10,000 V=1:500 DWG.NO.: SCR-AL-035 SHEET NO.: 67

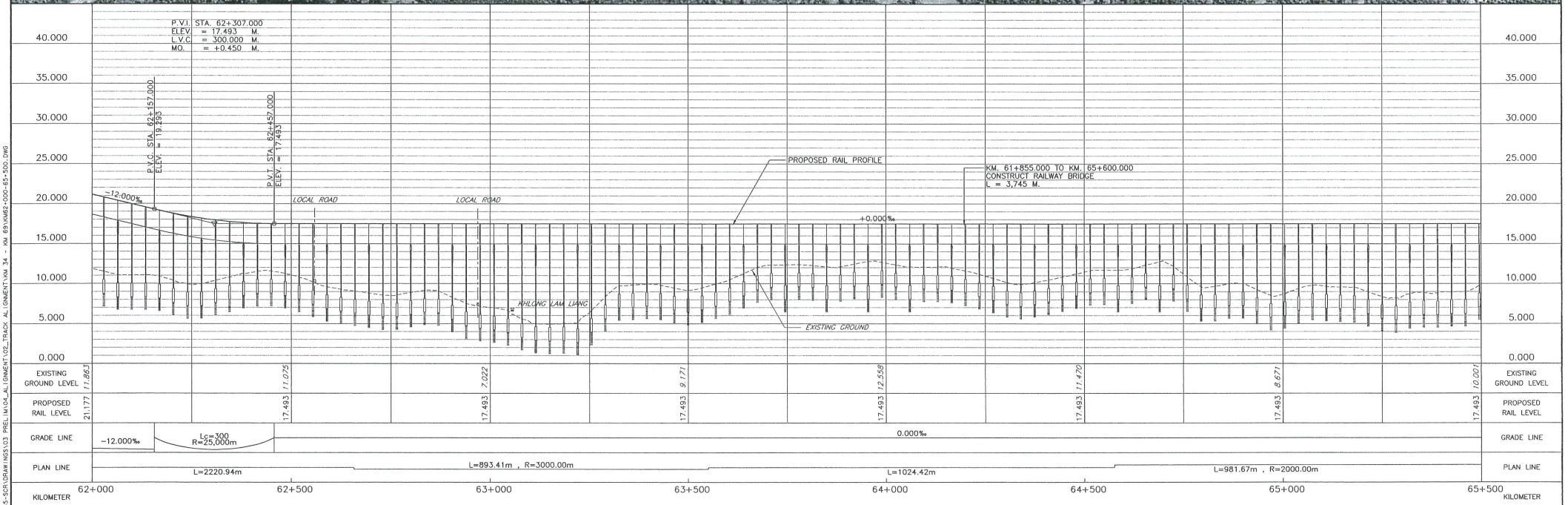




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM.58+500.000 TO KM. 62+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-036	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 68





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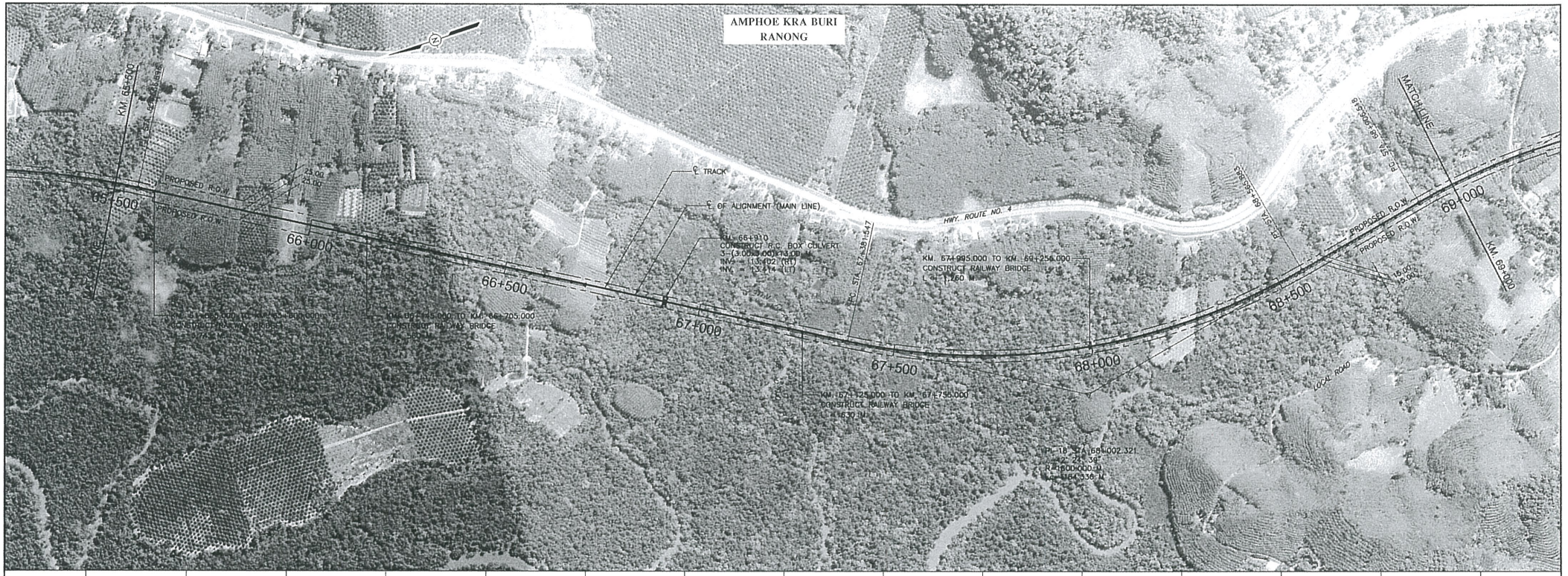
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

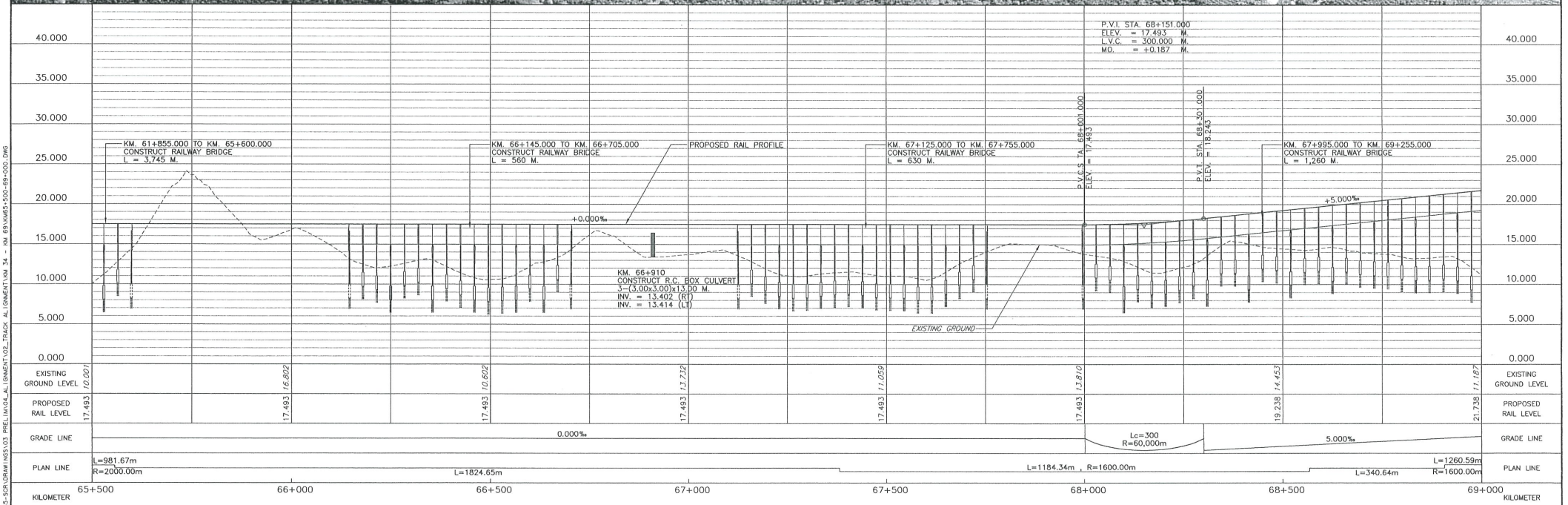
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.62+000.000 TO KM. 65+500.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG NO.: SCR-AL-037
SHEET NO.: 69





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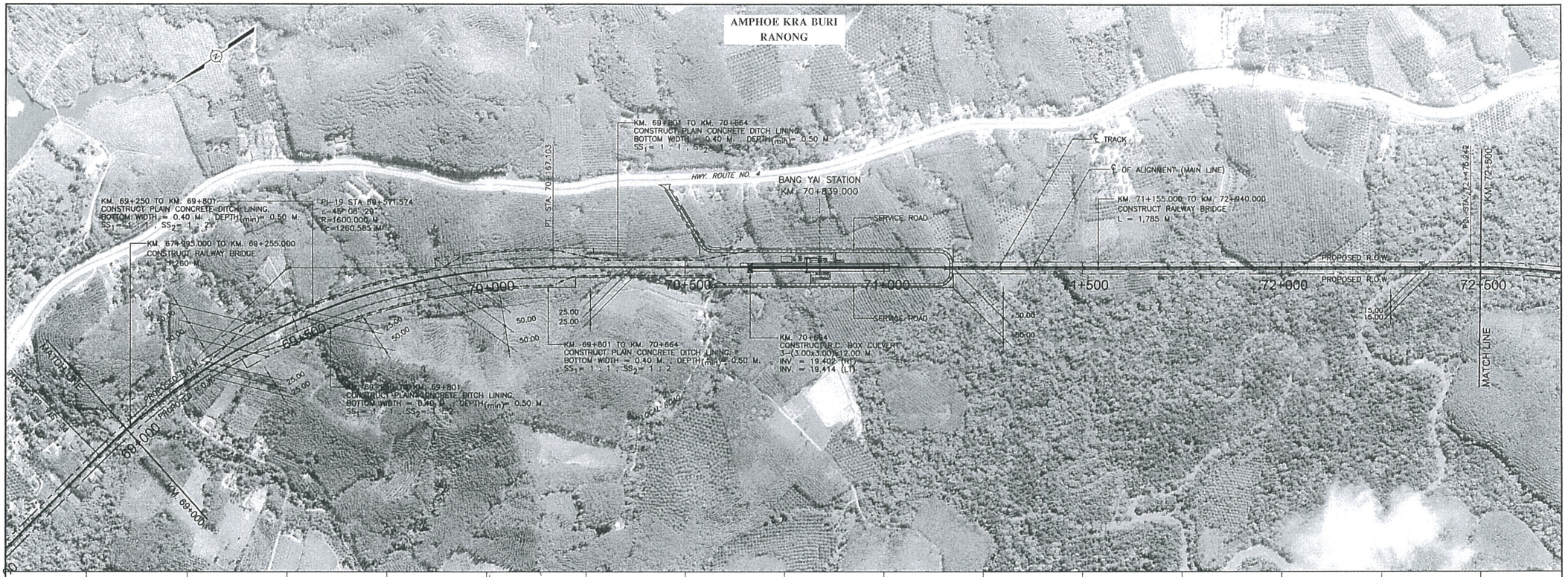
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

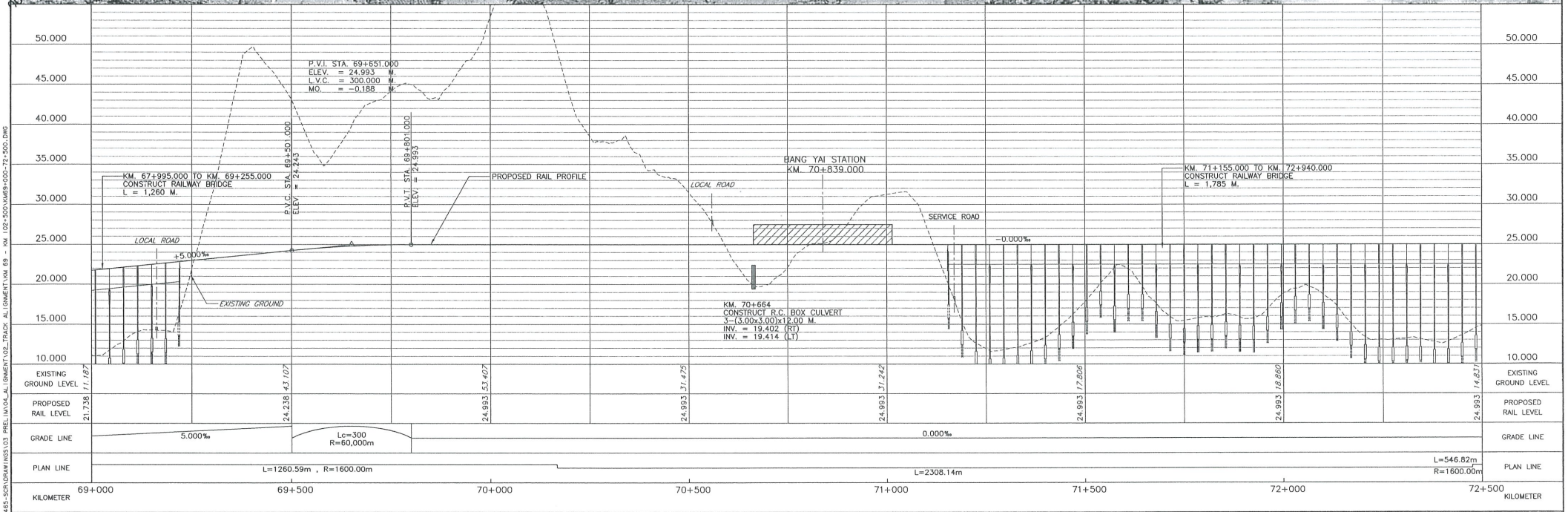
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.65+500.000 TO KM. 69+000.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG NO.: SCR-AL-038
SHEET NO.: 70





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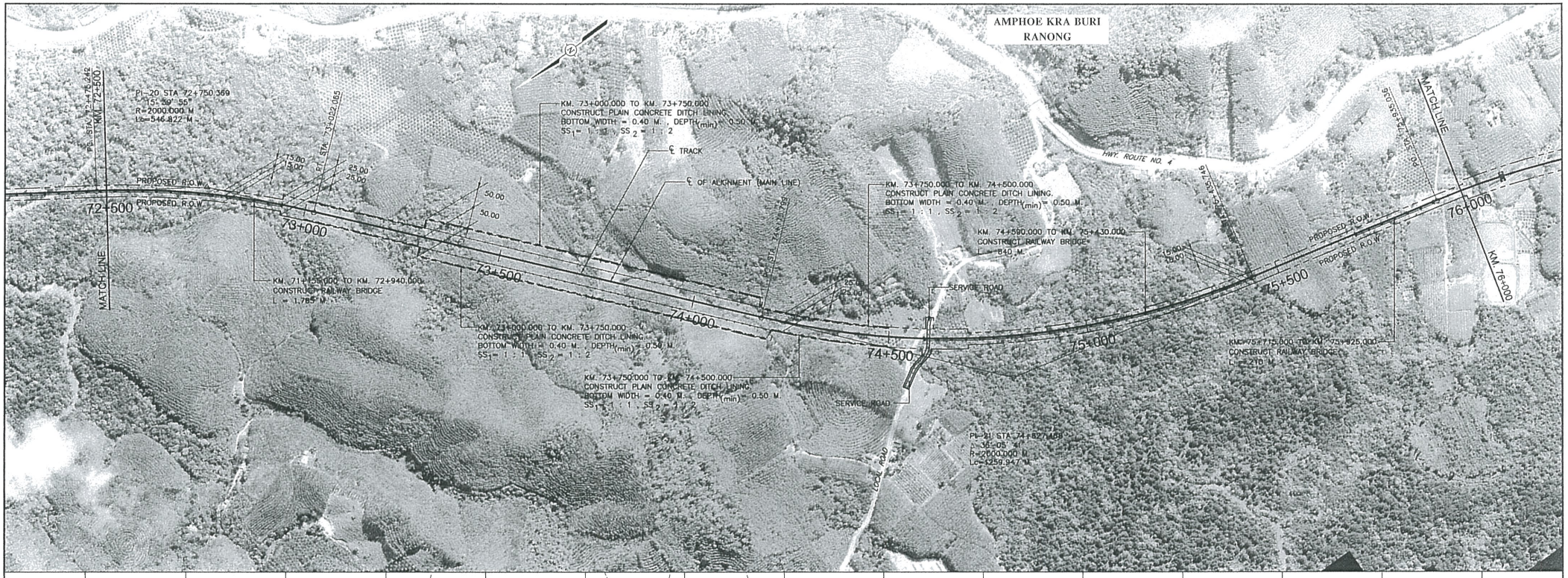
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

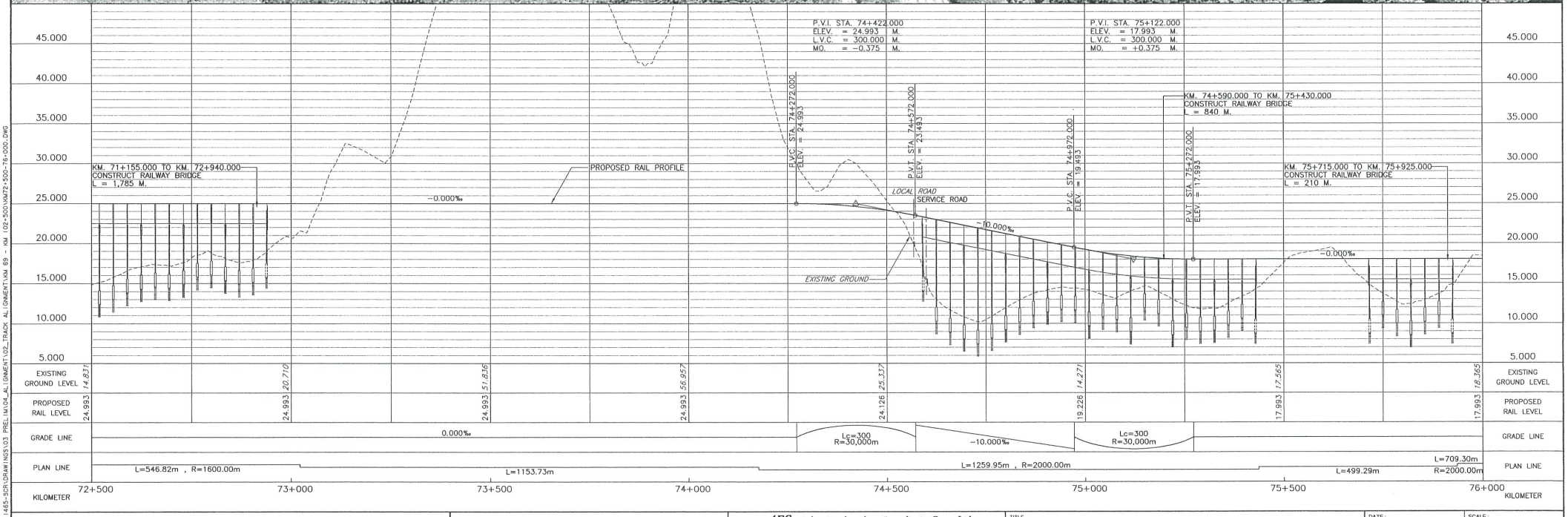
FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.69+000.000 TO KM. 72+500.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG NO.: SCR-AL-039
SHEET NO. 71





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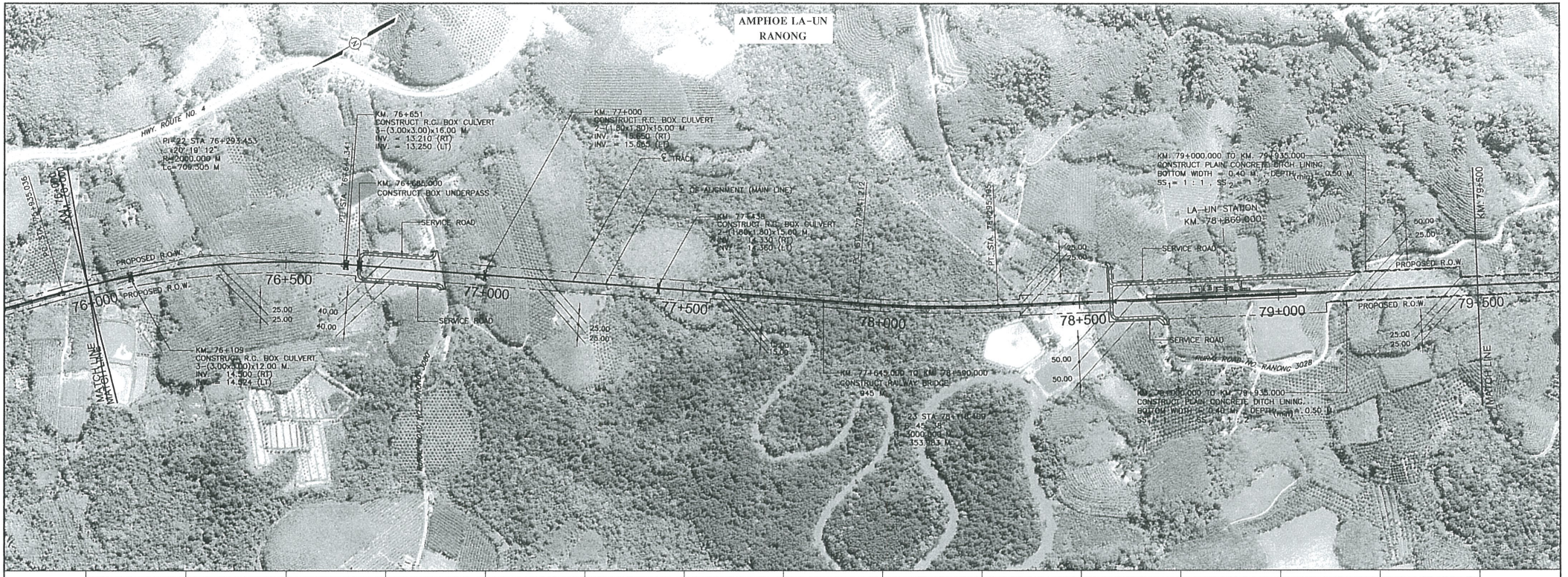
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

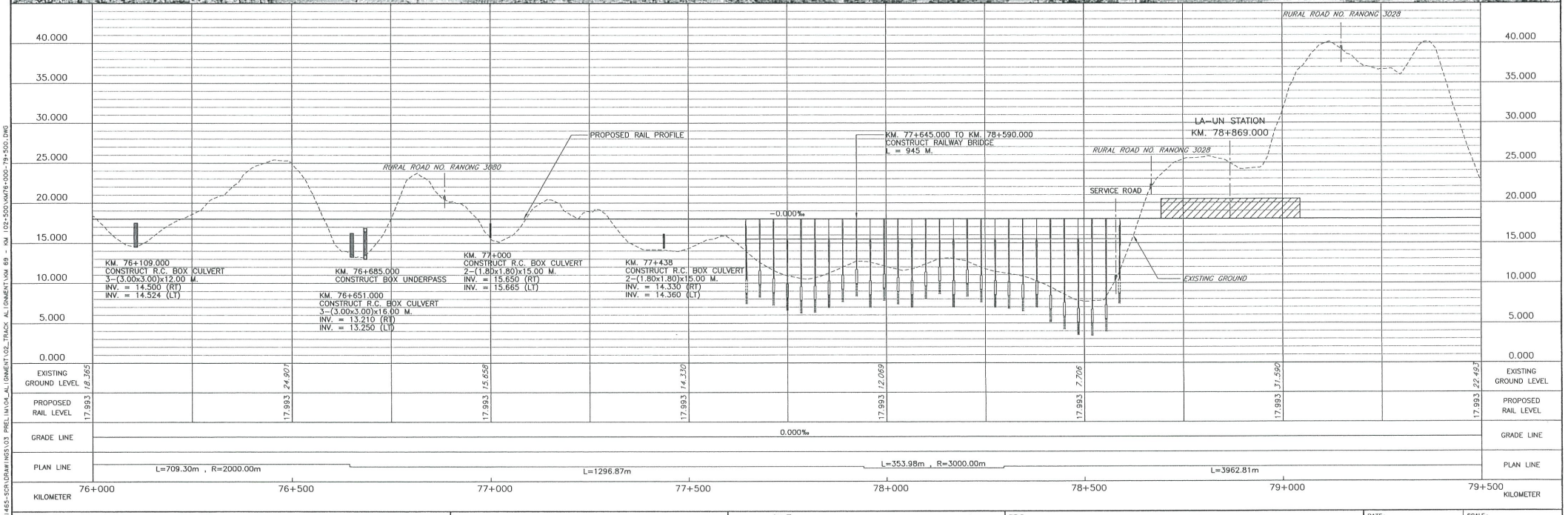
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.72+500.000 TO KM. 76+000.000

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG NO.: SCR-AL-040
SHEET NO.: 72





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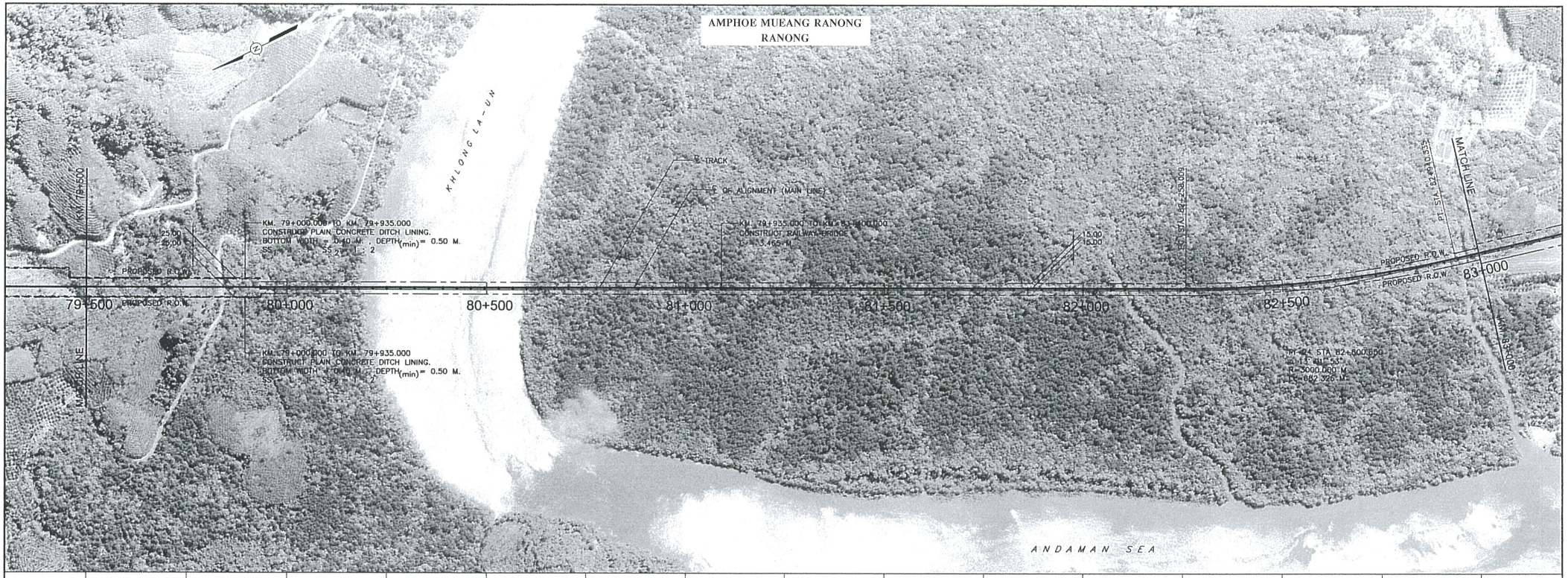
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

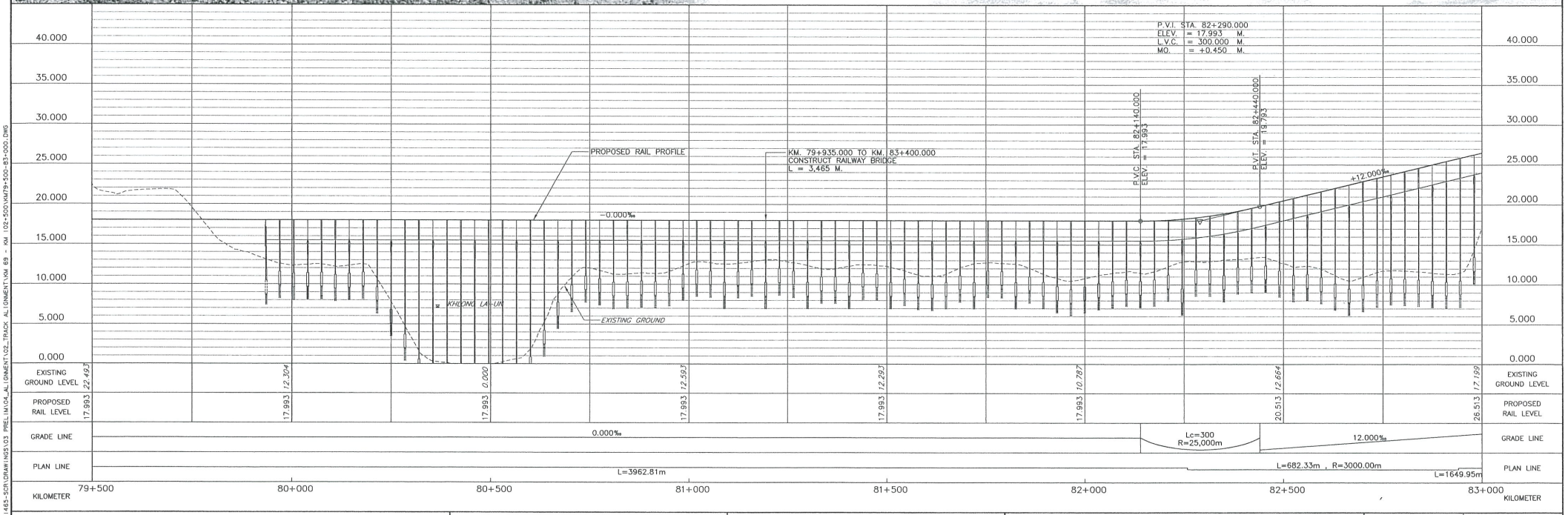
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.76+000.000 TO KM. 79+500.000

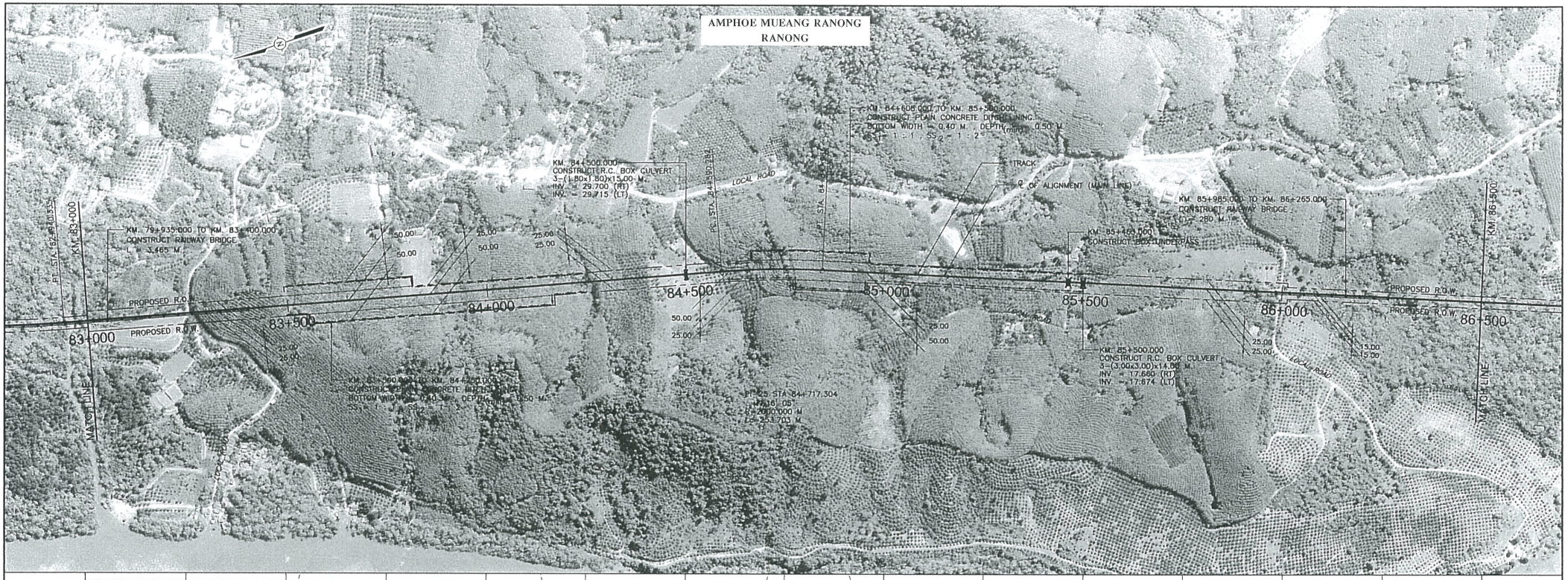
DATE: FEBRUARY 2018
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DWG.NO. SCR-AL-041
SHEET NO. 73

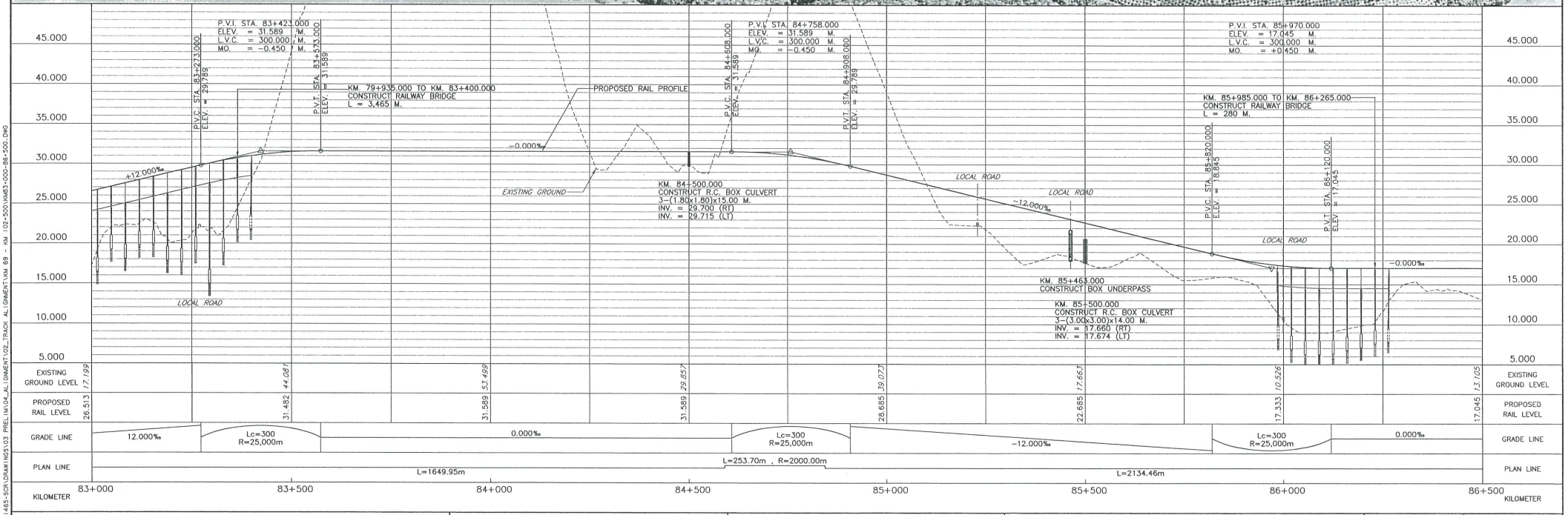




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE MAIN LINE **PLAN AND PROFILE** KM.79+500.000 TO KM. 83+000.000	DATE: FEBRUARY 2018 SCALE: A3 H=1:10,000 V=1:500 DWG. NO.: SCR-AL-042 SHEET NO.: 74





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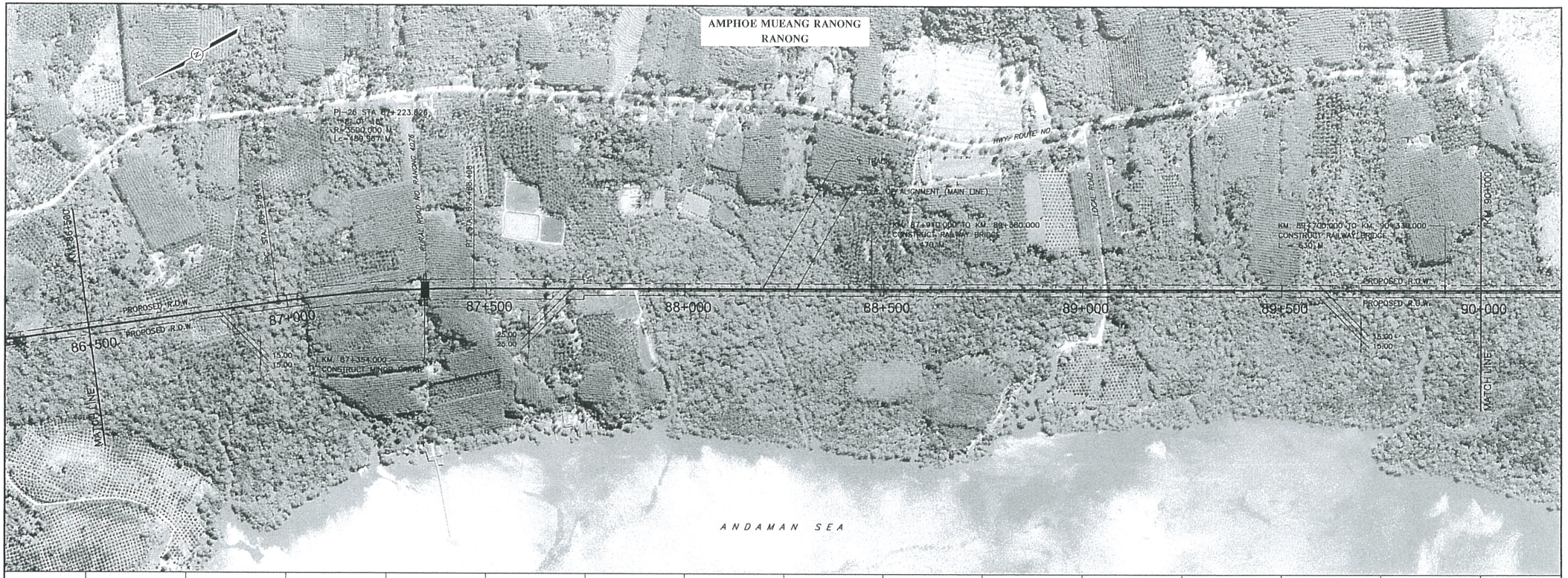
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

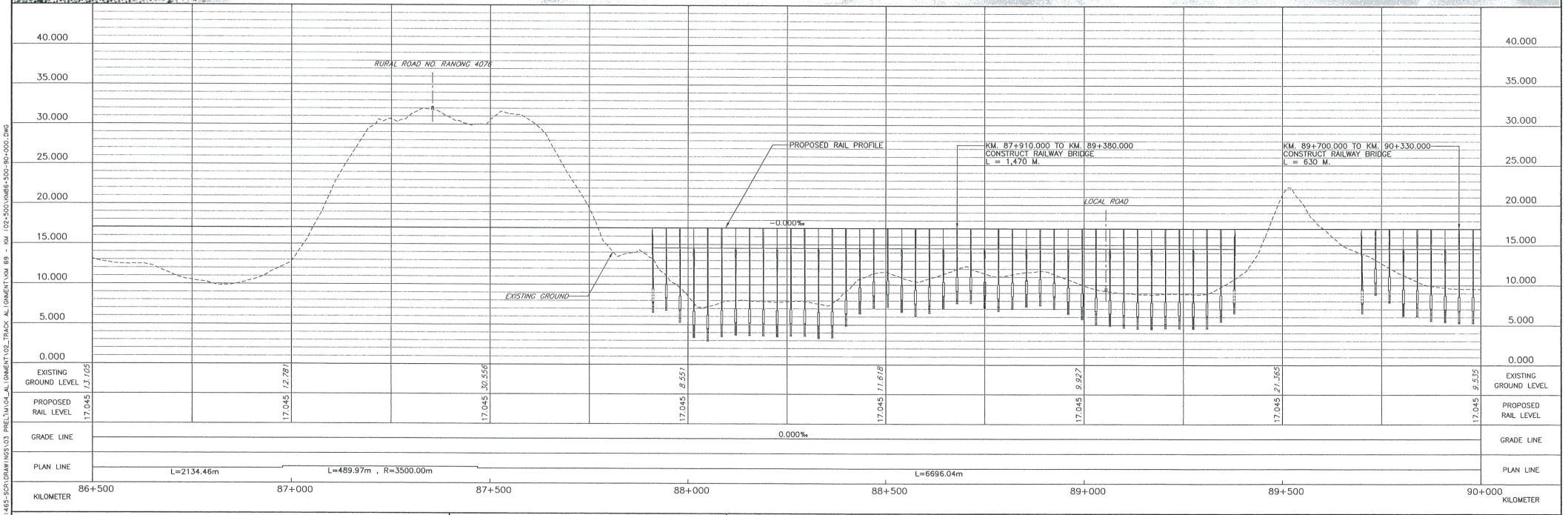
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM.83+000.000 TO KM. 86+500.000

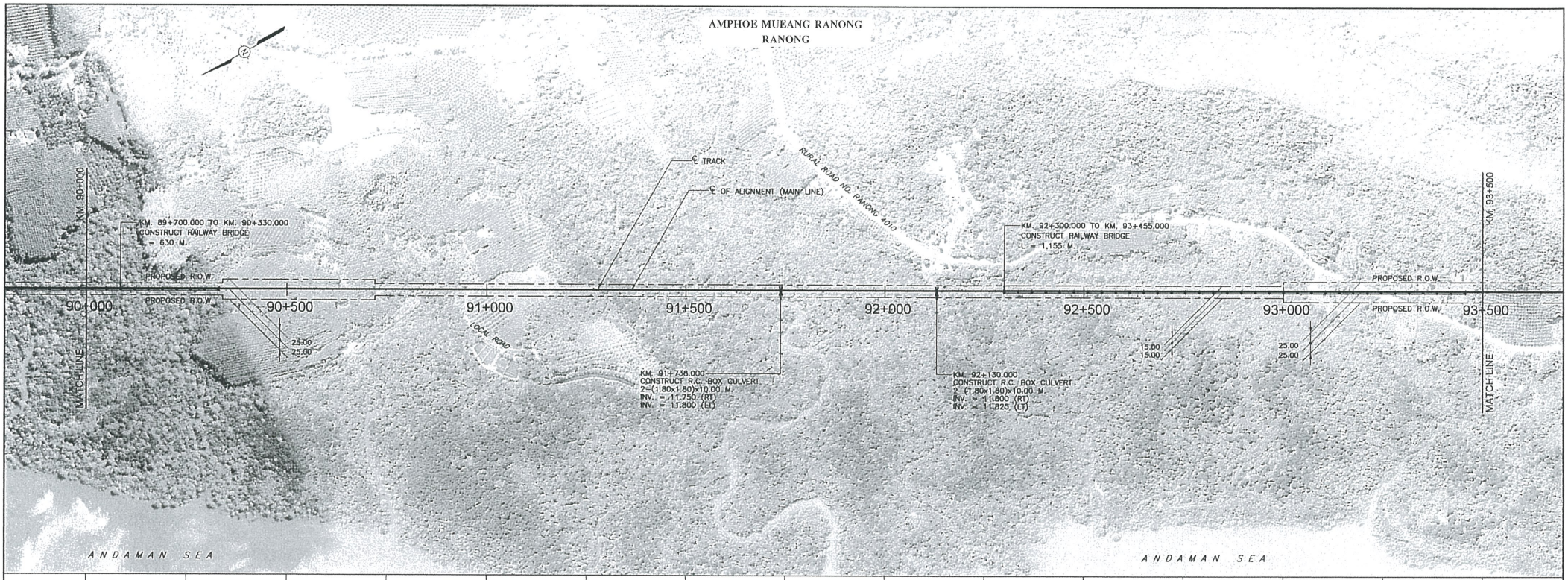
DATE: FEBRUARY 2018
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DWG. NO.: SCR-AL-043
SHEET NO.: 75

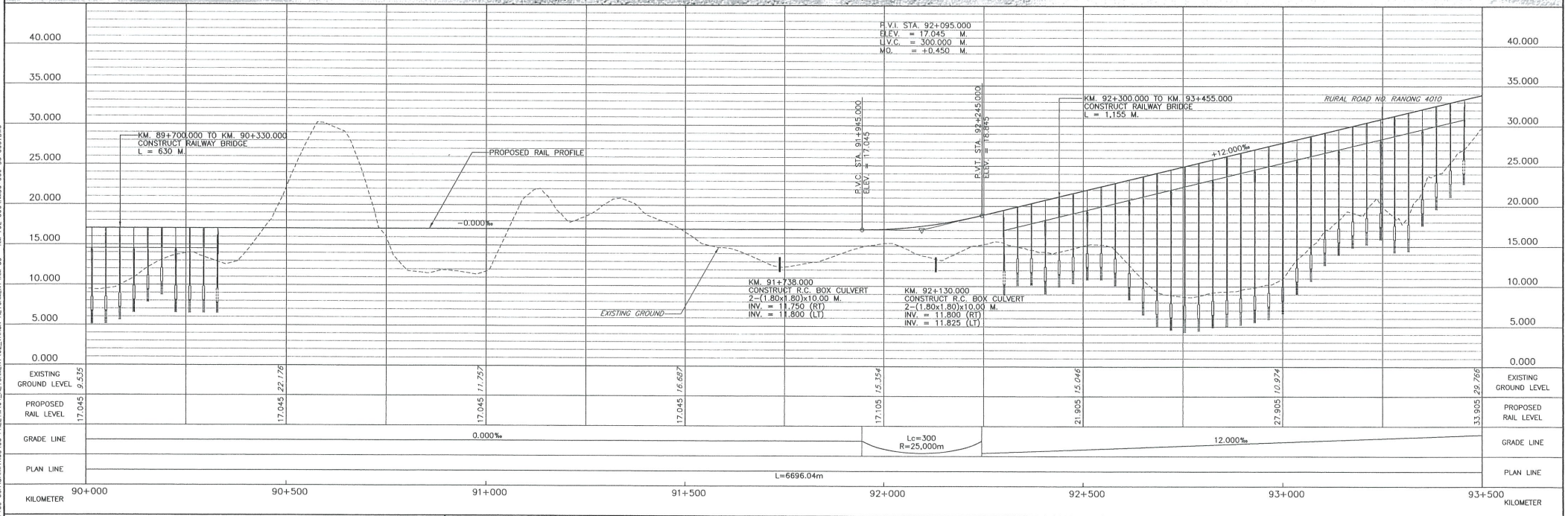




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM.86+500.000 TO KM. 90+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-044	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 76





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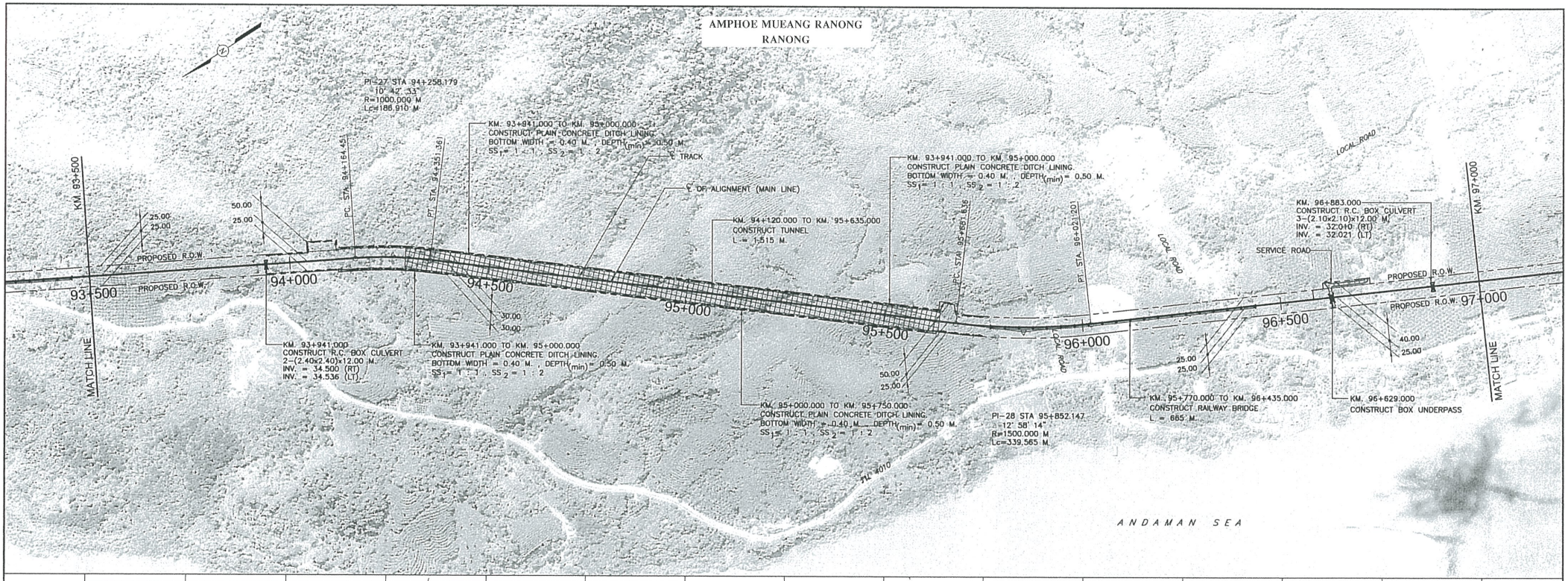
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

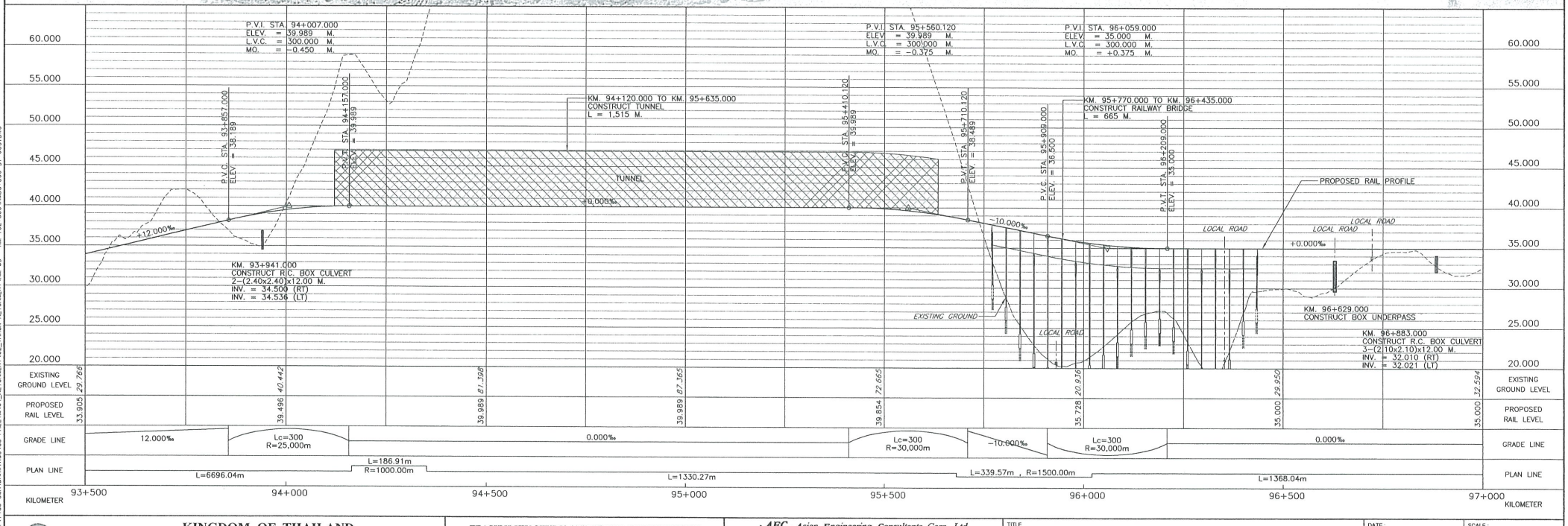
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
MAIN LINE
PLAN AND PROFILE
KM. 90+000.000 TO KM. 93+500.000

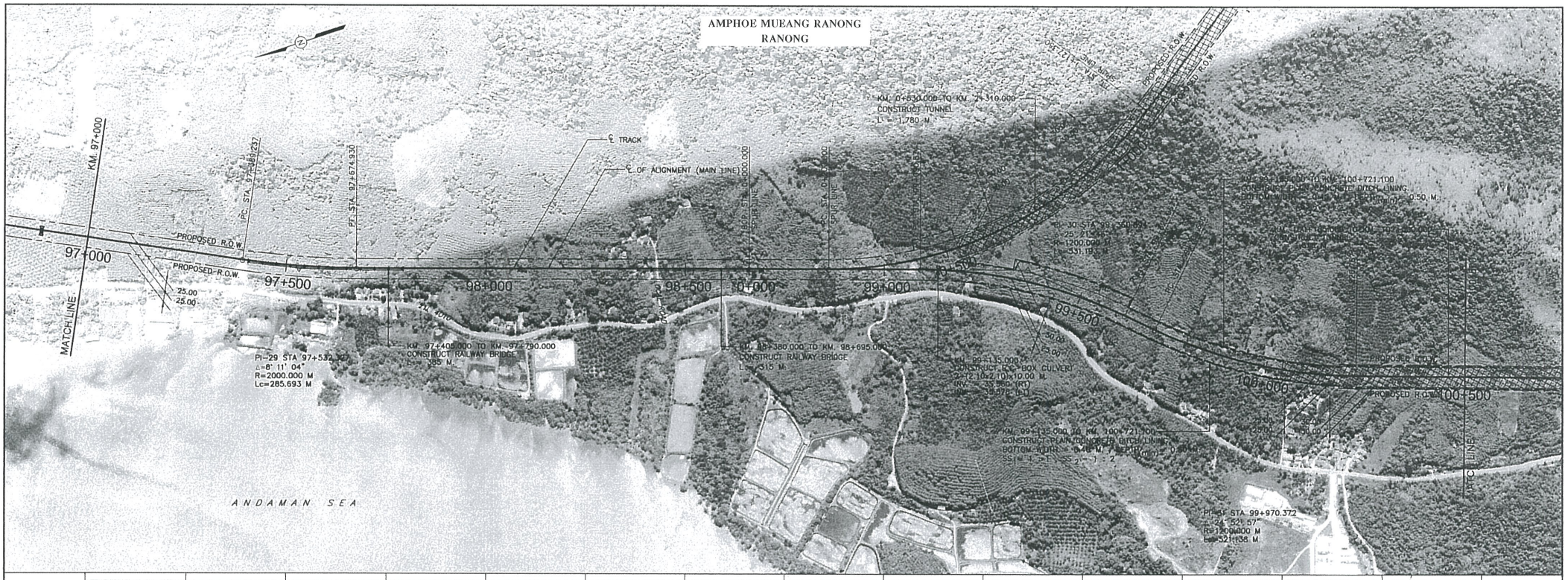
DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG. NO.: SCR-AL-045
SHEET NO.: 77

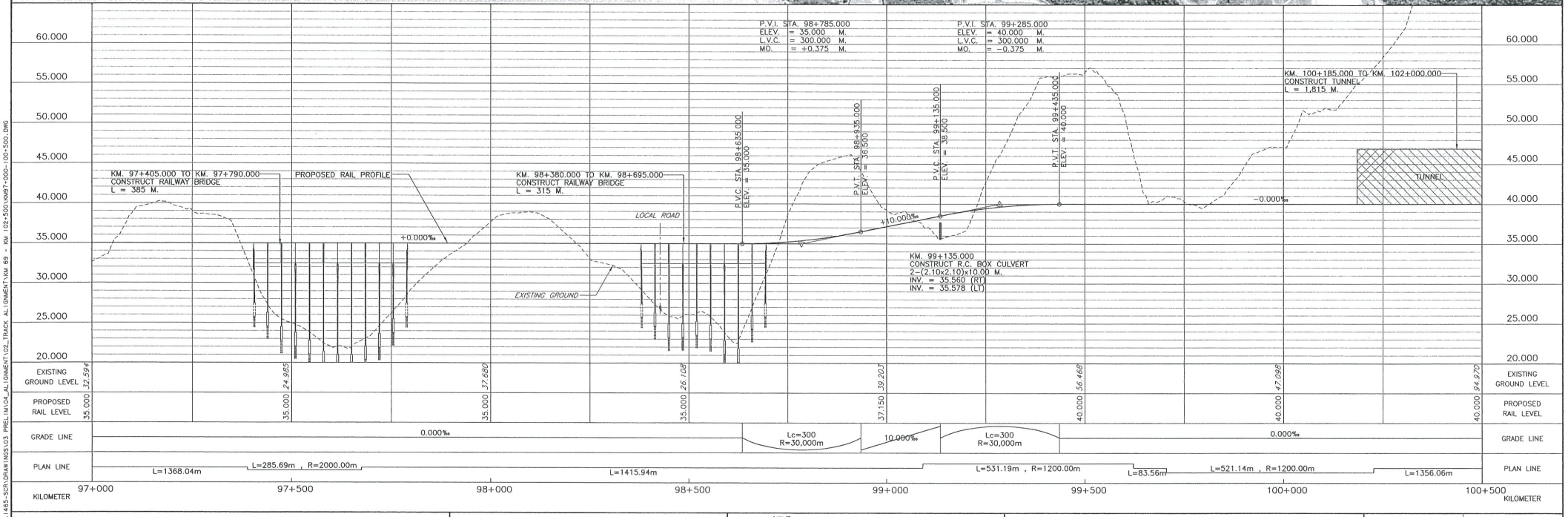




KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 93+500.000 TO KM. 97+000.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-046	SCALE: A3 H=1:10,000 V=1:500 SHEET NO. 78

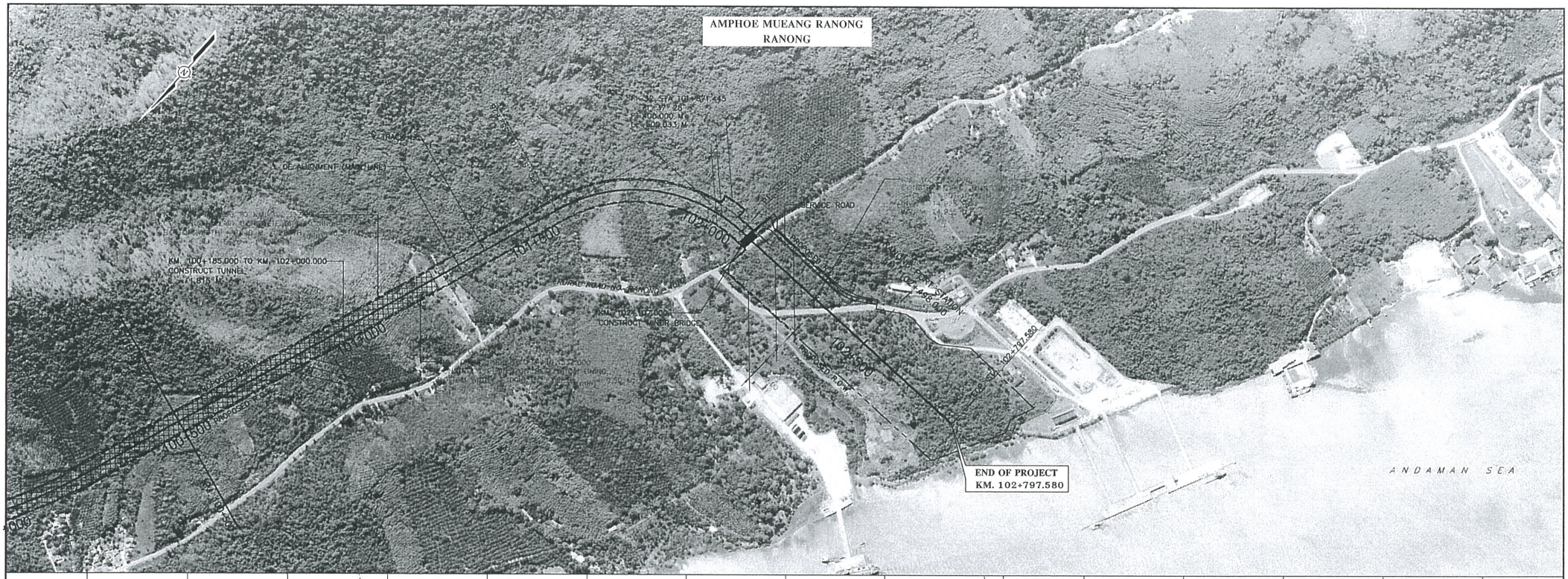
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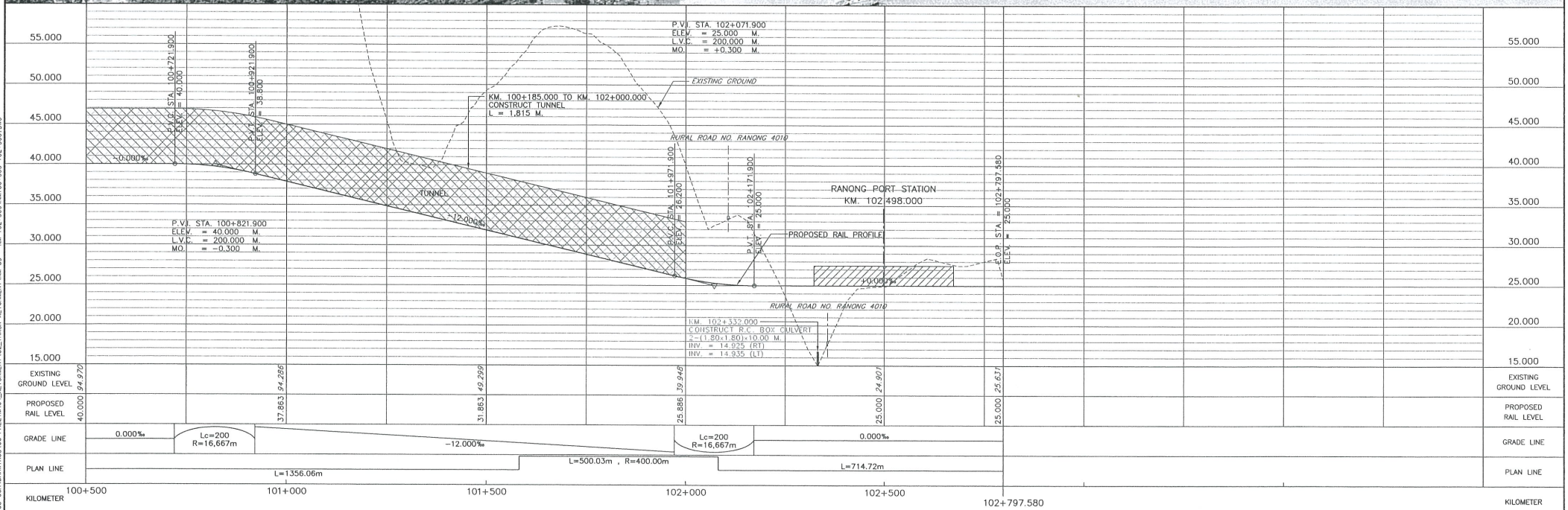




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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE MAIN LINE PLAN AND PROFILE KM. 97+000.000 TO KM. 100+500.000	DATE: FEBRUARY 2018 DWG. NO.: SCR-AL-047	SCALE: A3 H=1:10,000 V=1:500 SHEET NO.: 79

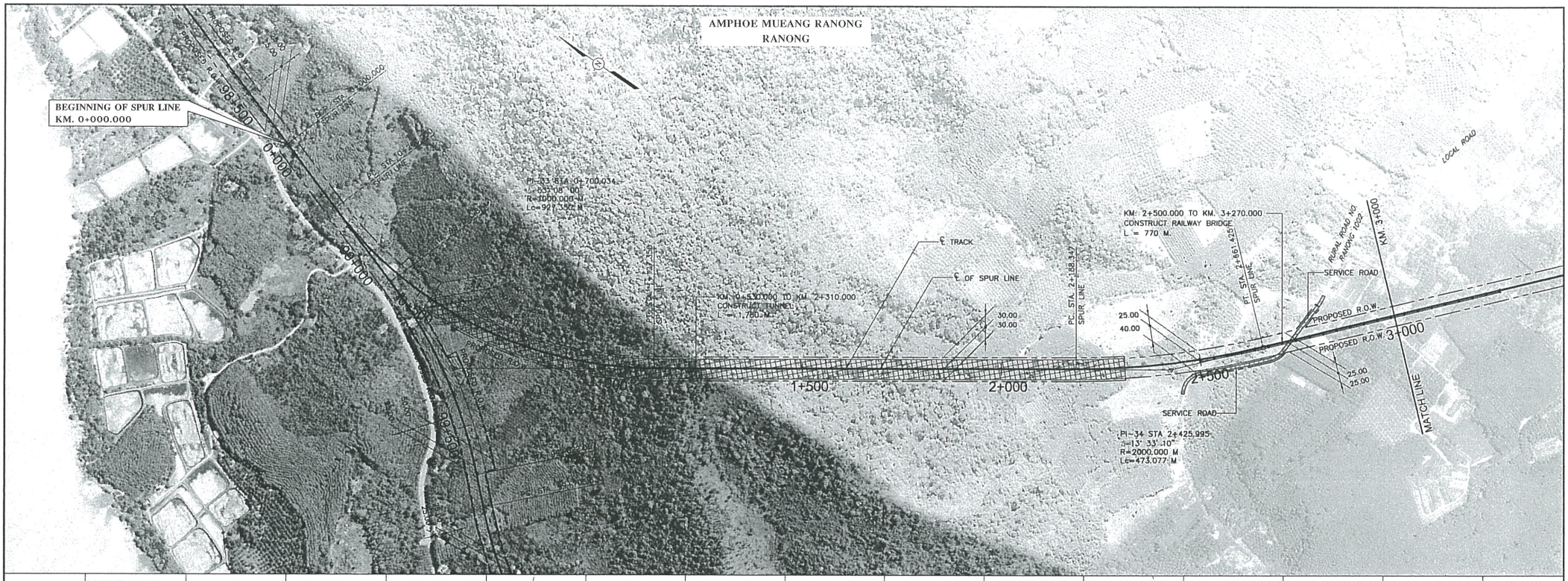


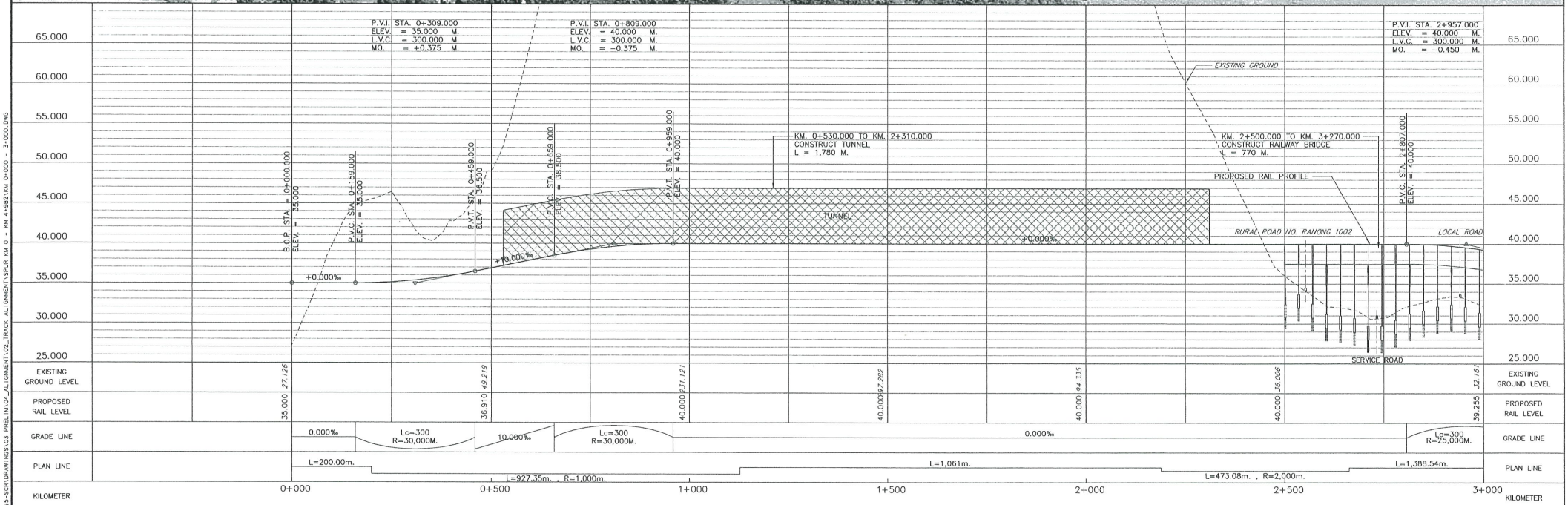


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE MAIN LINE **PLAN AND PROFILE** KM. 100+500.000 TO KM. 102+797.580

DATE: FEBRUARY 2018	SCALE: A3 H=1:10,000 V=1:500
DWG. NO. SCR-AL-048	SHEET NO. 80





V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIM\04_ALIGNMENT\02_TRACK ALIGNMENT\SPUR KM 0 - KM 4+982\KM 0+000 - 3+000.DWG

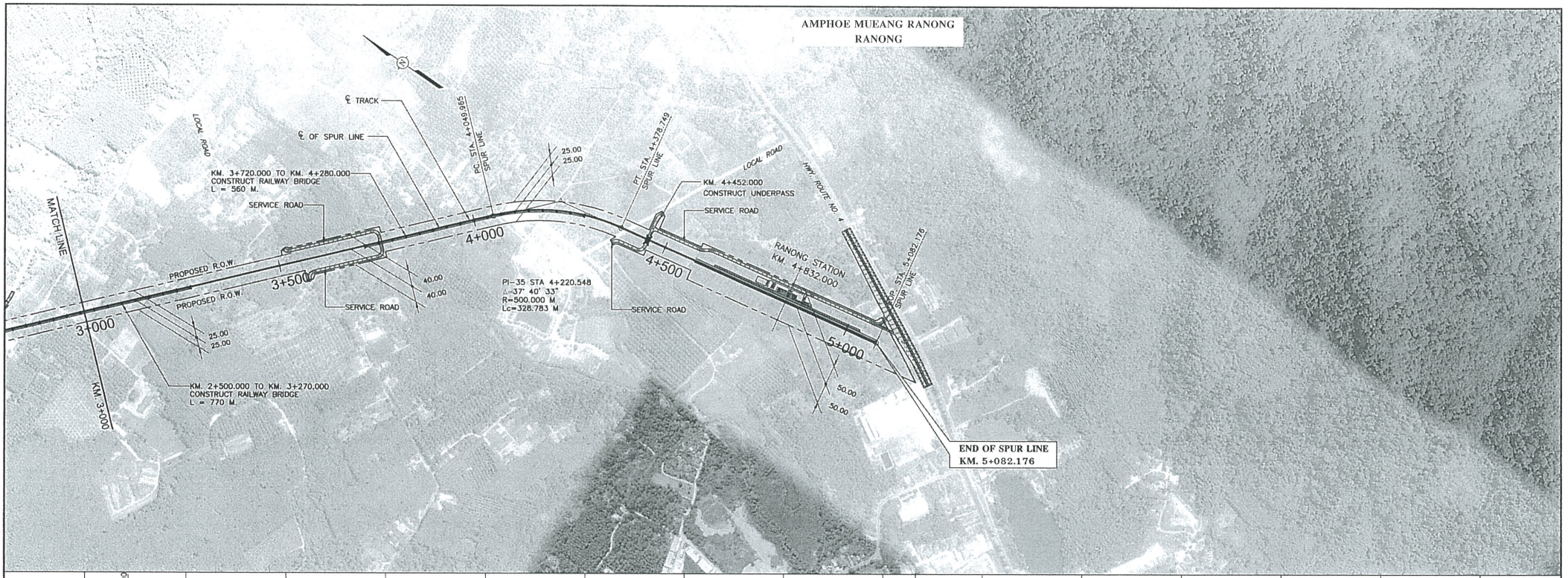
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

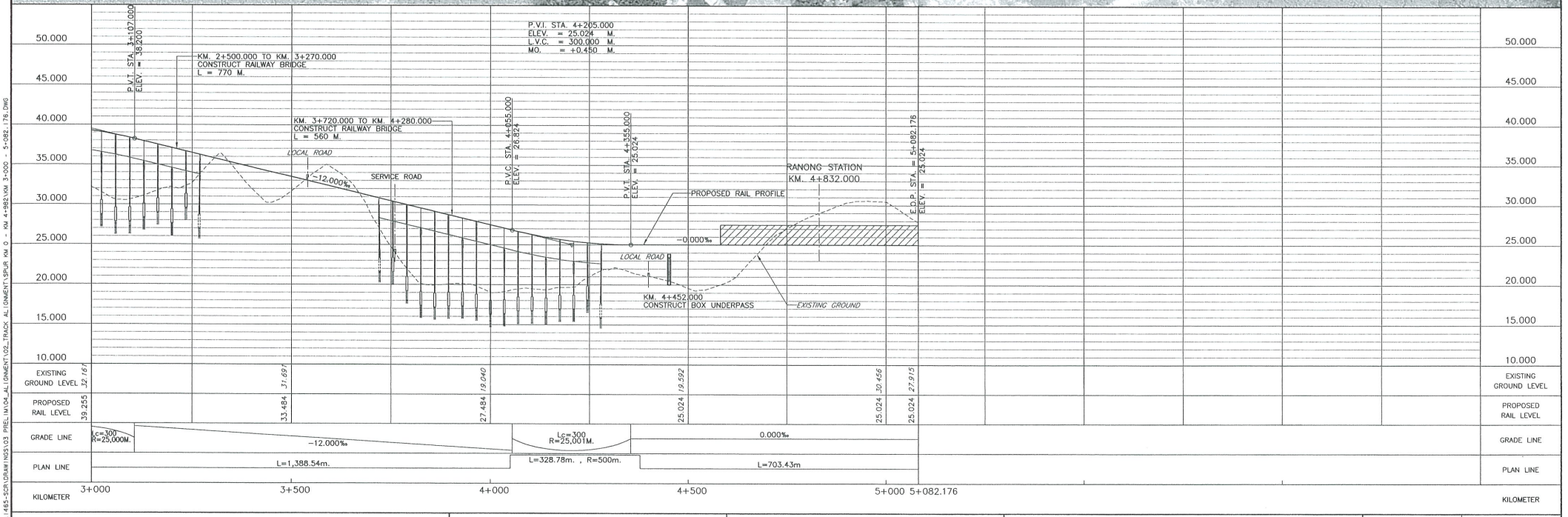
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
SPUR LINE
PLAN AND PROFILE
KM. 0+000.000 TO KM. 3+000.000

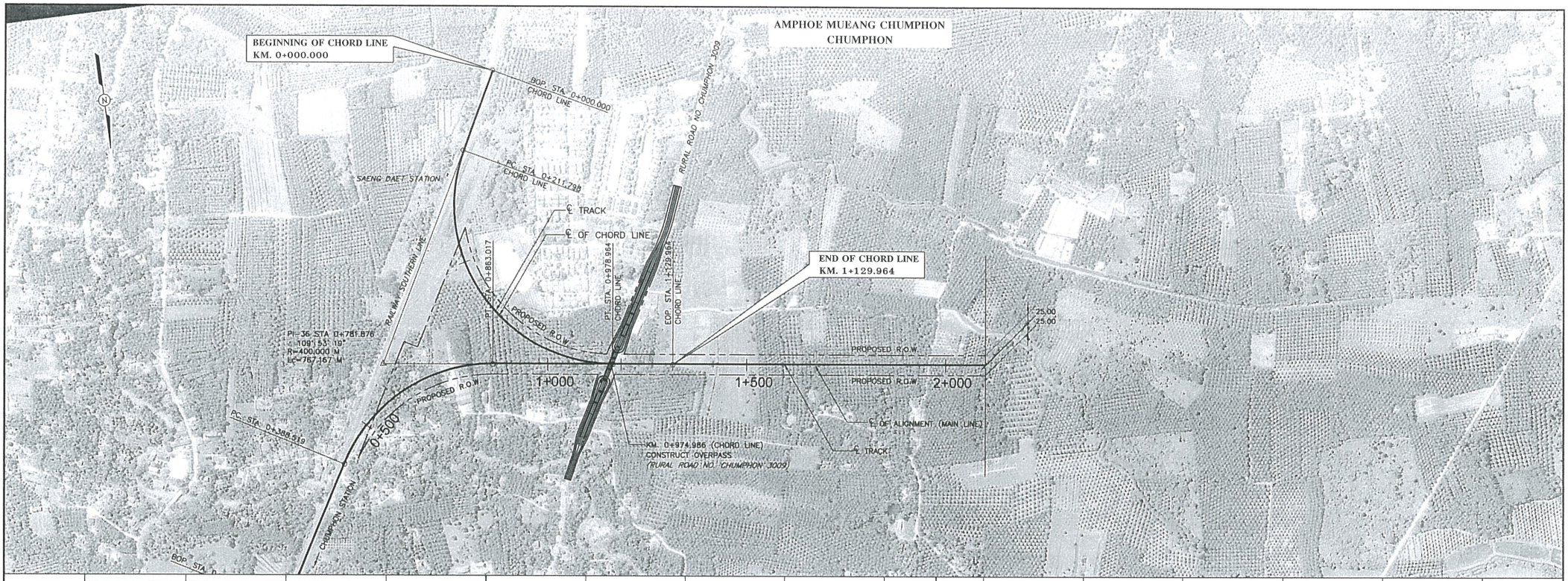
DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG. NO. SCR-AL--049
SHEET NO. 81

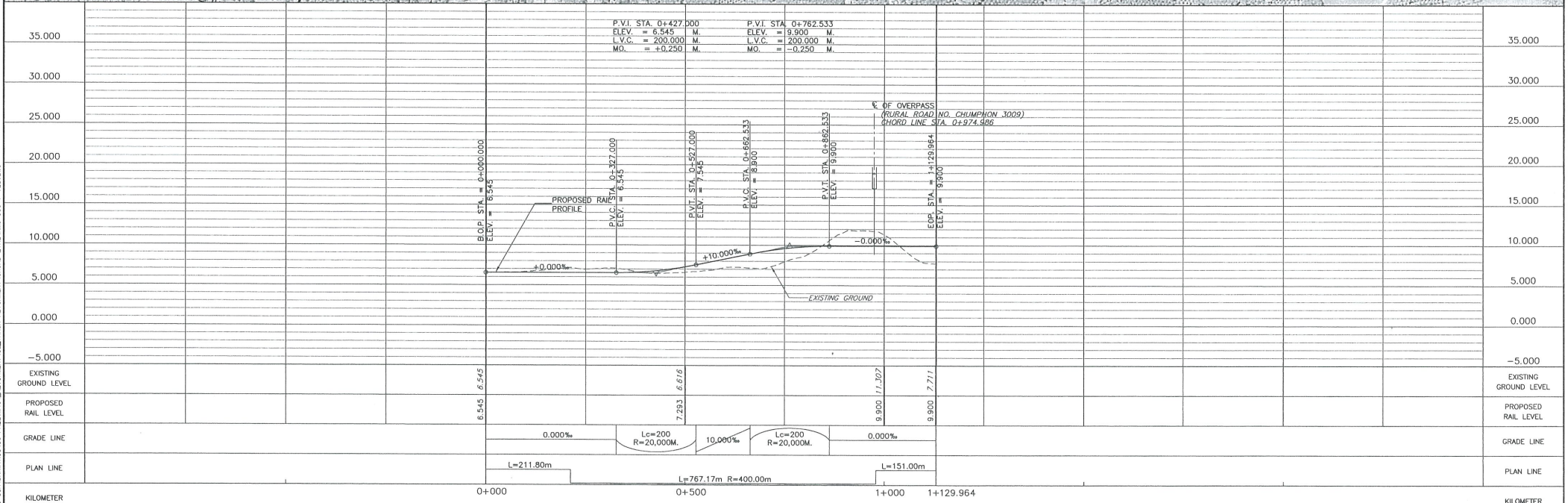




V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\04_ALIGNMENT\02_TRACK ALIGNMENT\SPUR KM 0 - KM 4+982\KM 3+000 - 5+082.176.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SPUR LINE PLAN AND PROFILE KM. 3+000.000 TO KM. 5+082.176	DATE: FEBRUARY 2018 SCALE: A3 H=1:10,000 V=1:500 DWG. NO. SCR-AL-050 SHEET NO.: 82	





V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIMINARY ALIGNMENT\02_TRACK ALIGNMENT\CHORD LINE\KM0+000-1+129.DWG

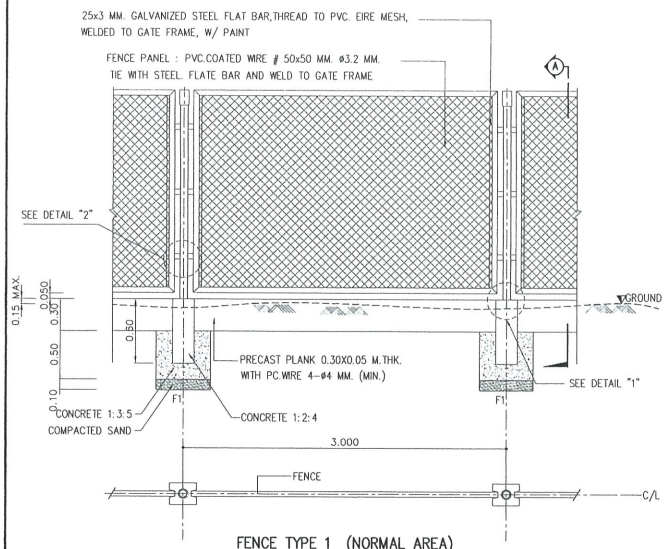
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

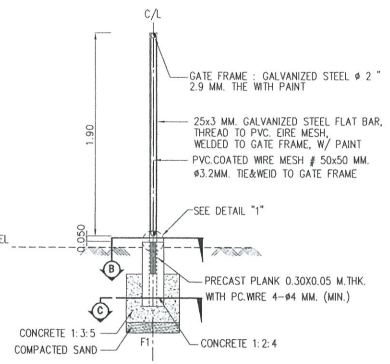
TITLE
CHORD LINE
PLAN AND PROFILE
KM. 0+000.000 TO KM. 1+129.964

DATE: FEBRUARY 2018
SCALE: A3 H=1:10,000 V=1:500
DWG. NO.: SCR-AL-051
SHEET NO.: 83

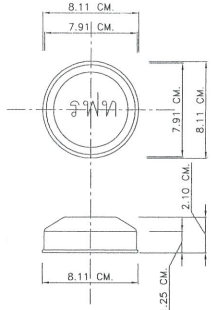


FENCE TYPE 1 (NORMAL AREA)

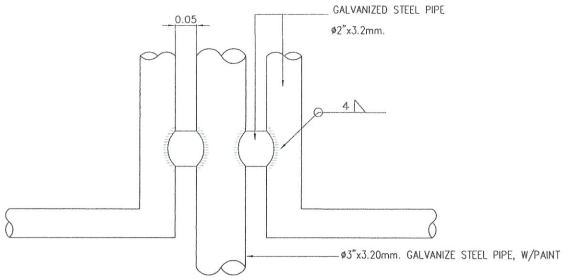
NOT TO SCALE



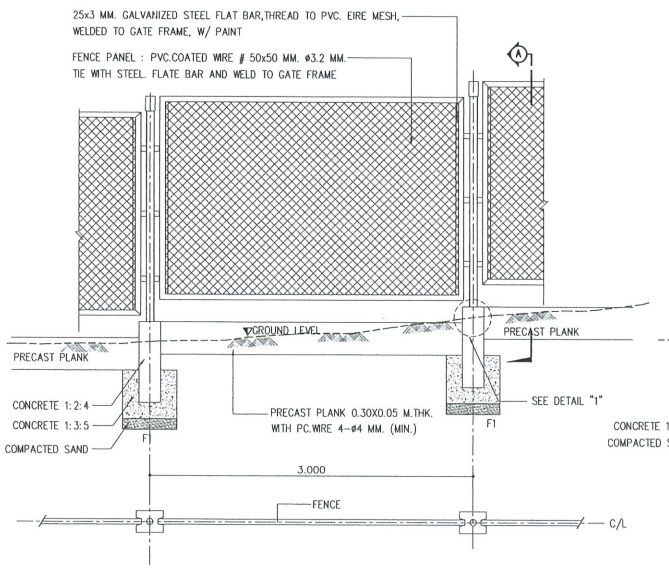
SECTION A – A



STEEL CAP

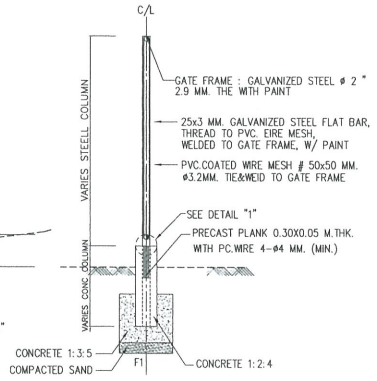


DETAIL "2"

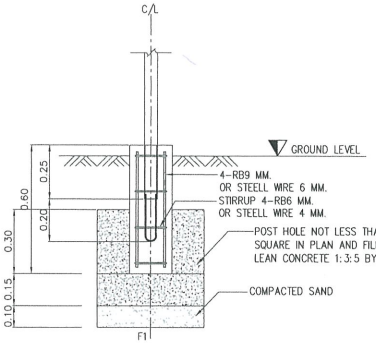


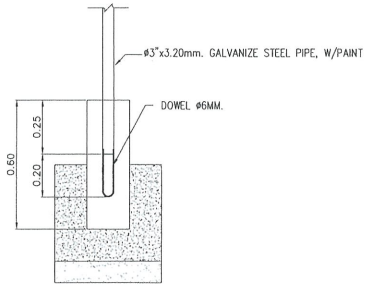
FENCE TYPE 1 (SLOPE AREA)

NOT TO SCALE

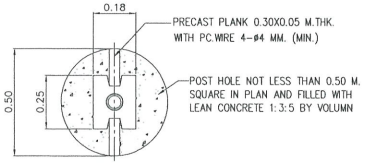


SECTION A – A

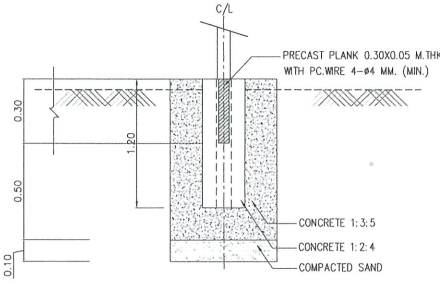




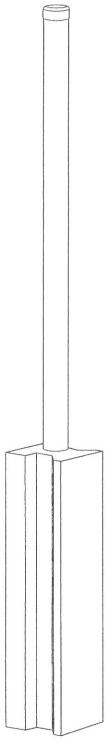
SECTION F1



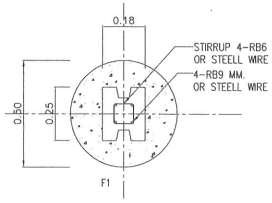
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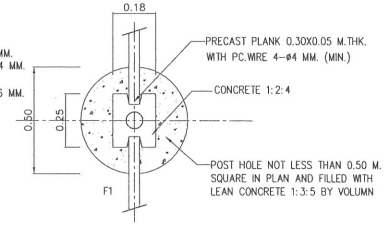
SECTION F4, F5



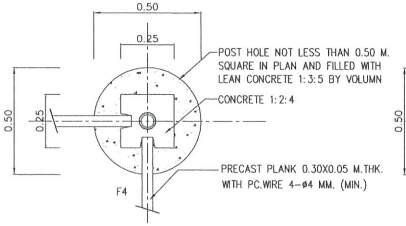
COLUMN



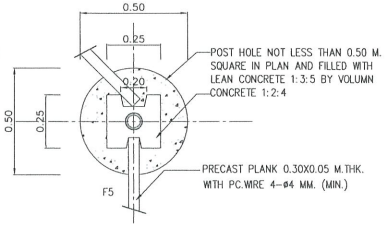
SECTION C – C



SECTION B – B



AT CORNER 90°



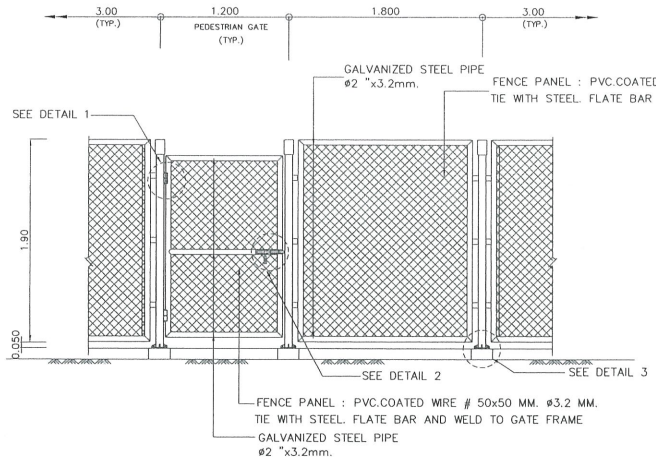
AT CORNER >90° OR <90°

NOTES:

1. LOCATION OF FENCE WILL BE INDICATED IN LAYOUT DWG.
2. SUPPORTING STEEL SHALL BE CONFORM WITH TIS.20 CLASS SR 24
3. WIRE MESH SHALL BE GALVANIZED PVC COATED IRON WIRE #50X50 MM. ø 3.2 MM.
4. ALL STEEL WORKS SHALL BE GALVANIZED STEEL WITH POLYURETHANE PAINT SYSTEM, PAINT – COLOR SHALL BE SAME AS PVC COATED WIRE

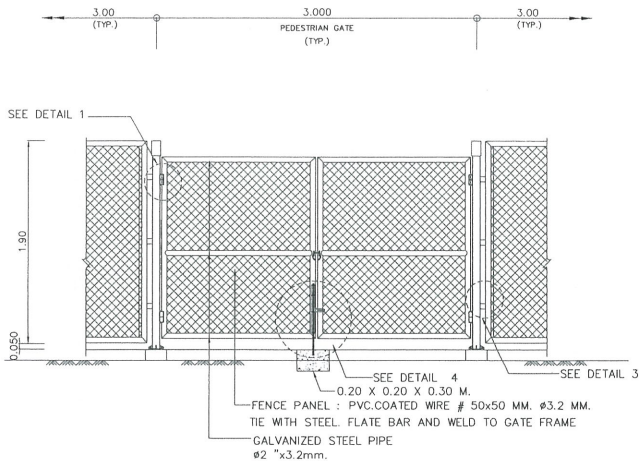
V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIM\04_ALIGNMENT\03_FENCE\SCR-AL-052.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: TYPICAL GALVANIZE WIRE MESH FENCE	DATE: FEBRUARY 2018 SCALE: A3 NONE DWG. NO.: SCR-AL-052 SHEET NO.: 84



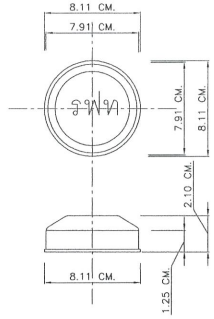
DOORS OPEN TYPE 1

SCALE NTS

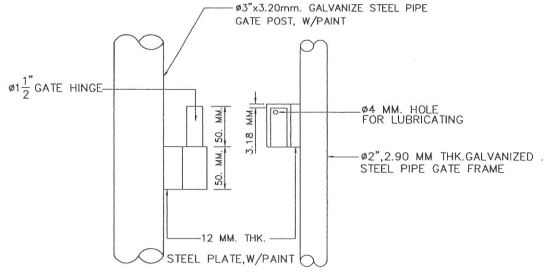


DOUBLE DOORS OPEN TYPE 2

SCALE NTS

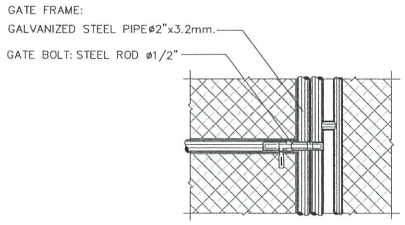


STEELL CAP



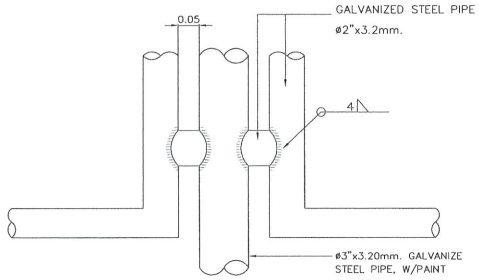
DETAIL 1

UNIT : MM.



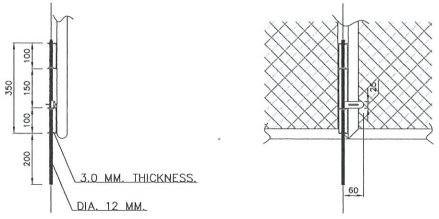
DETAIL 2

SCALE NTS



DETAIL 3

SCALE NTS



DETAIL 4

UNIT : MM.

NOTES:

1. LOCATION OF FENCE WILL BE INDICATED IN LAYOUT DWG.
2. SUPPORTING STEEL SHALL BE CONFORM WITH TIS.20 CLASS SR 24
3. WIRE MESH SHALL BE GALVANIZED PVC COATED IRON WIRE #50X50 MM. ø 3.2 MM.
4. ALL STEEL WORKS SHALL BE GALVANIZED STEEL WITH POLYURETHANE PAINT SYSTEM , PAINT – COLOR SHALL BE SAME AS PVC COATED WIRE

F:\PROJECT\1465-SCR\DRAWINGS\03_PRELIM\04_ALIGNMENT\03_FENCE\SCR-AL-053.DWG

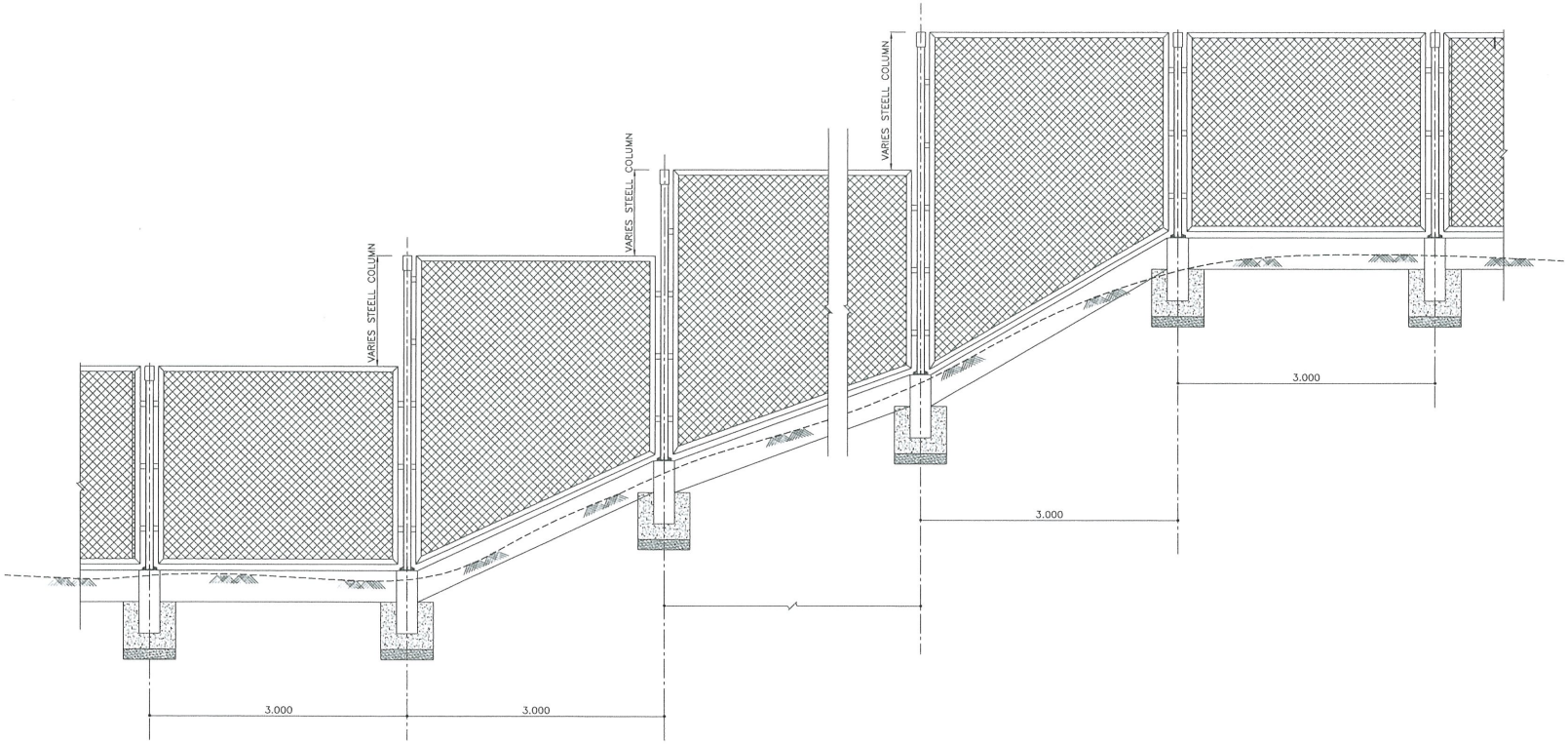
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL GALVANIZE WIRE MESH GATE

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-AL-053
SHEET NO.: 85



FENCE INSTALLATION (STEEP SLOPE)

SCALE NTS

I:\PROJECT\1465-SCR\DRAWINGS\03 PRELIMY\04_ALIGNMENT\03_FENCE\SCR-AL-054.DWG

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

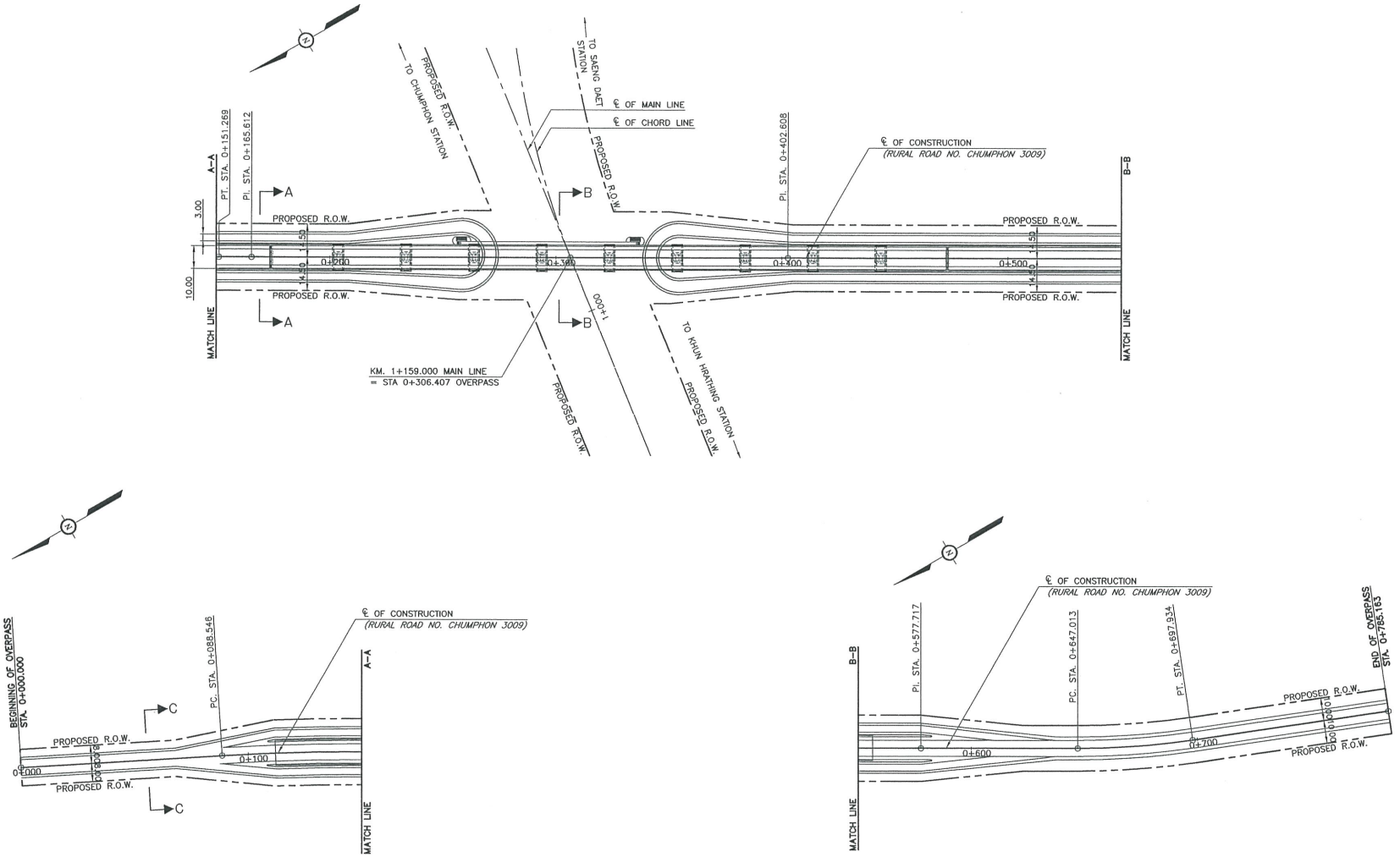
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
INSTALLATION GALVANIZE WIRE MESH FENCE
FOR STEEP SLOPE

DATE:	SCALE:
FEBRUARY 2018	A3 NONE
DWG. NO.:	SHEET NO.:
SCR-AL-054	86

CIVIL AND ROAD WORK

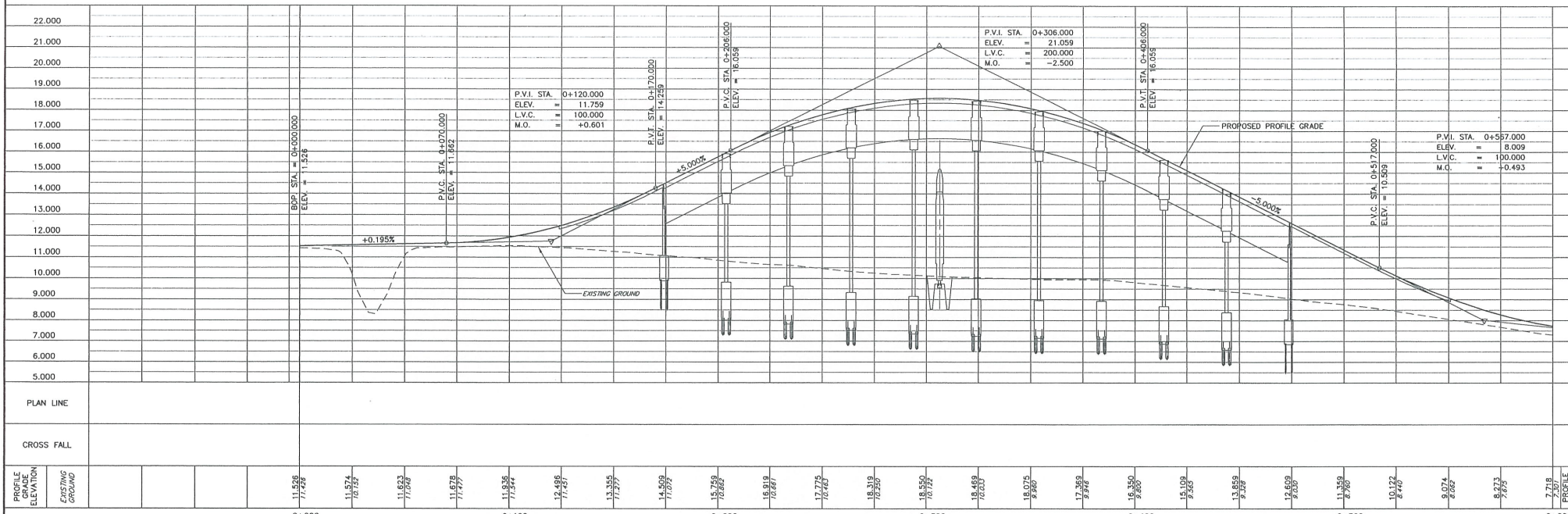


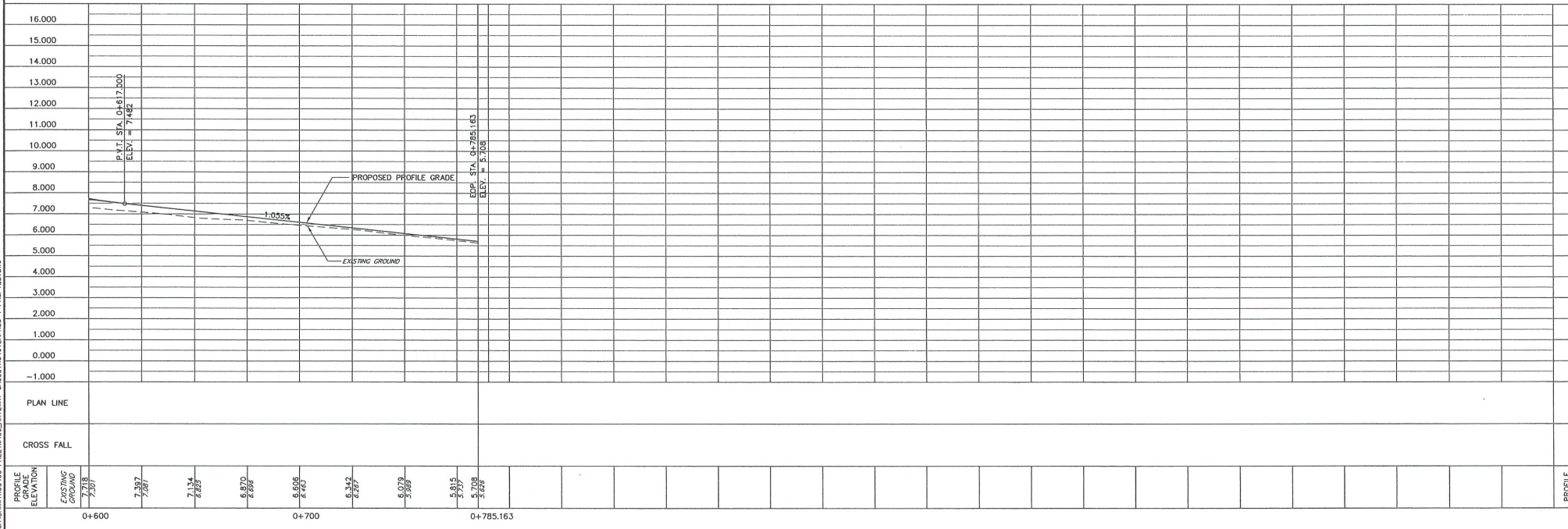
PLAN OF OVERPASS AT KM. 1+159.000

SCALE
A1 = 1:1,000
A3 = 1:2,000

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSING\OVERPASS-1-PLAN.DWG

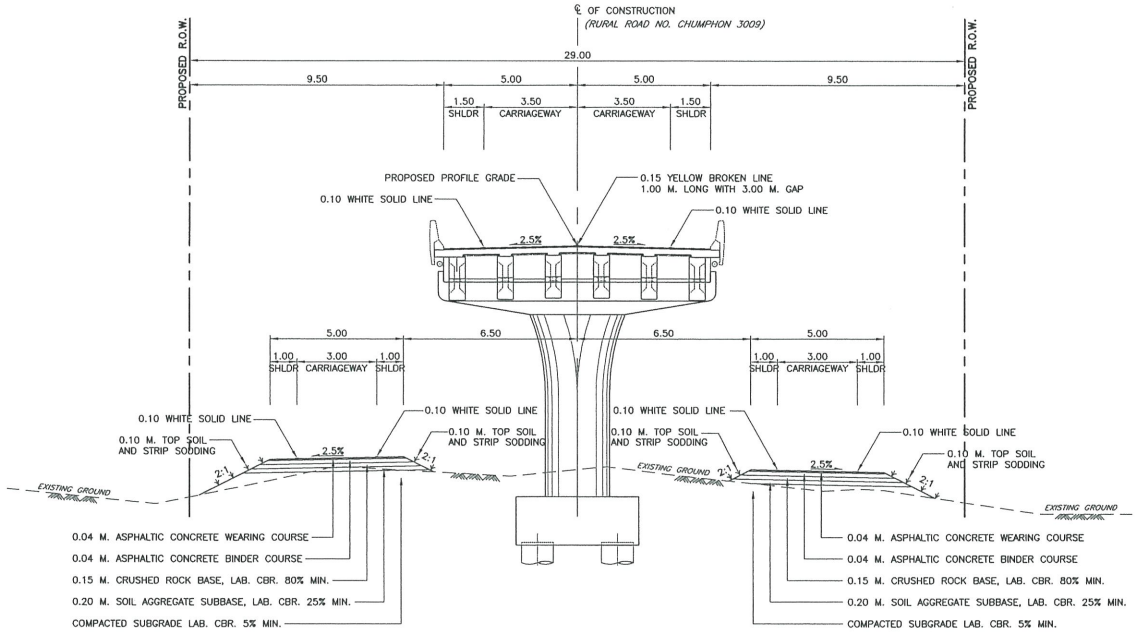
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE OVERPASS AT KM. 1+159.000 PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-001	SCALE: A3 1:2,000 SHEET NO.: 87





V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSINGS\OVERPASS-1-PROFILE.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 1+159.000 PROFILE	DATE: FEBRUARY 2018 SCALE: A3 H=1:2,000 V=1:200 DWG. NO.: SCR-C-002 SHEET NO.: 88

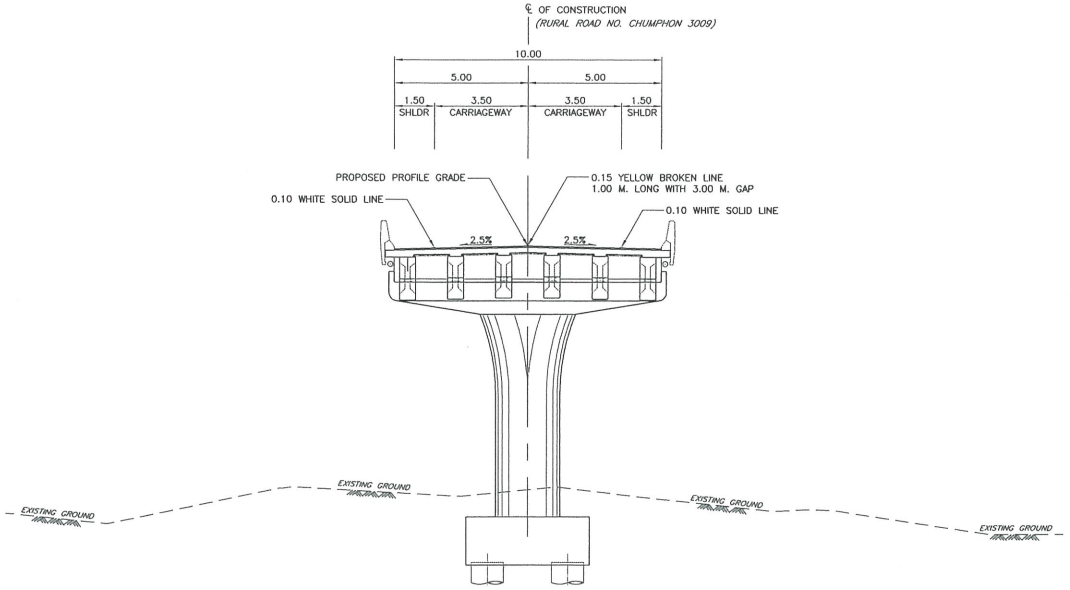


SECTION A–A

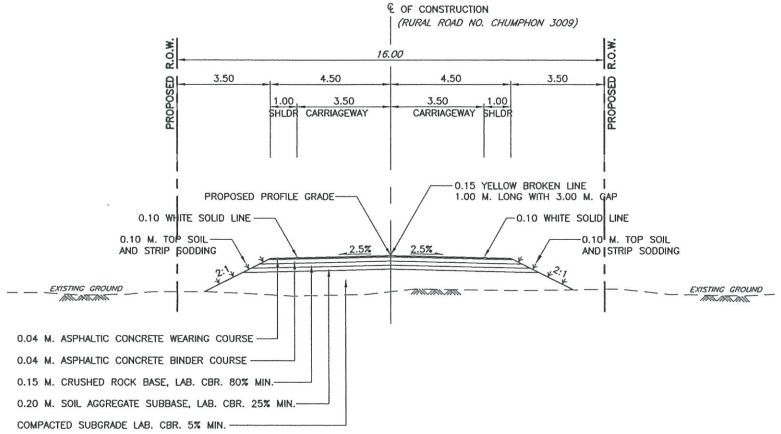
SCALE A1=1:100
A2=1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 1+159.000 SECTIONS – 1	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–003	SCALE: A3 1:200 SHEET NO.: 89



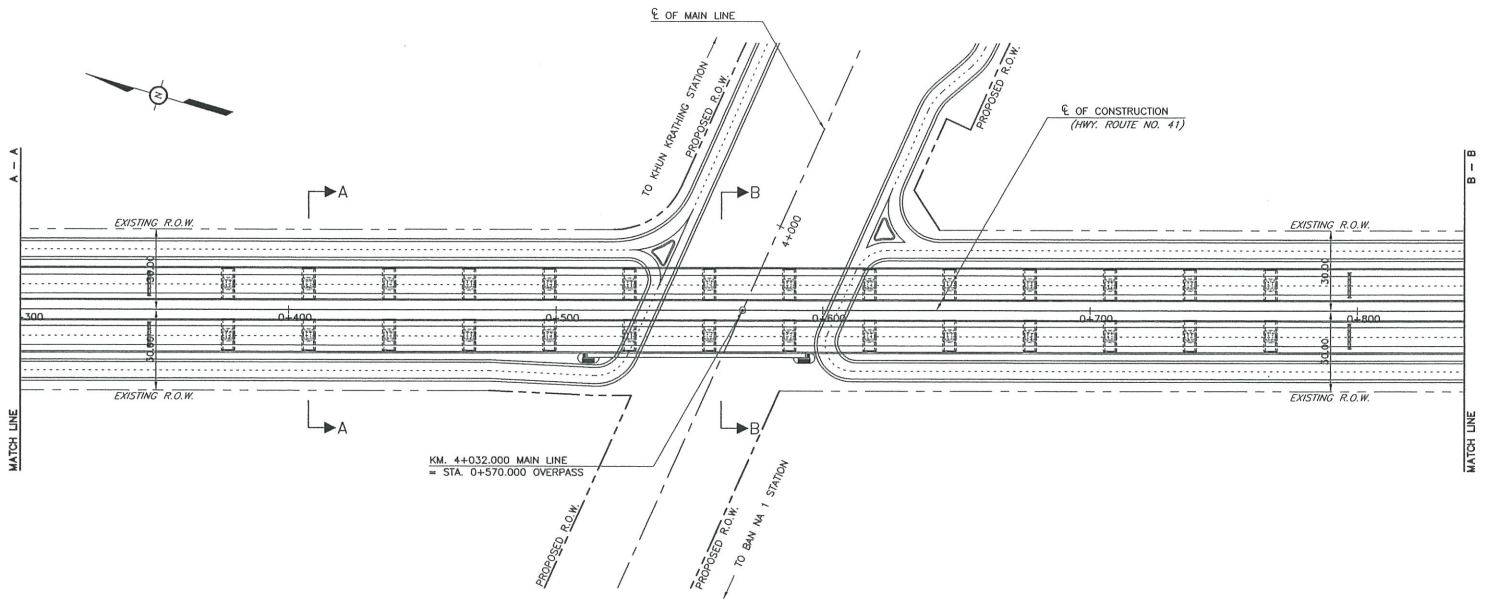
SECTION B–B
SCALE A1=1:100
A2=1:200

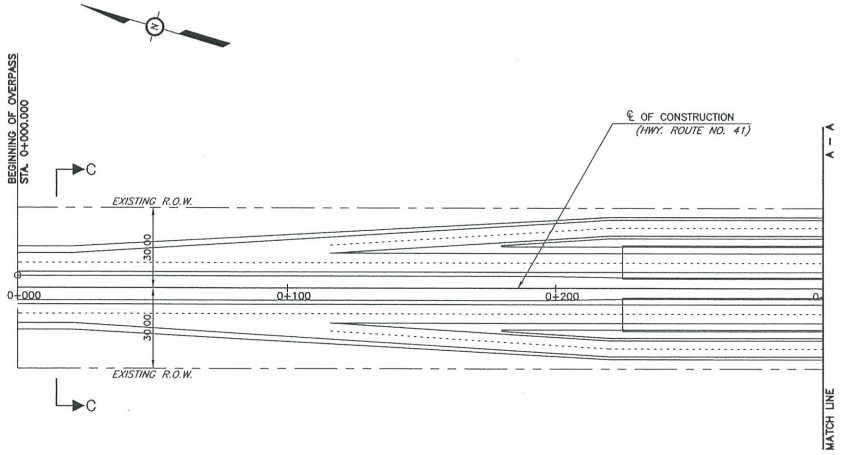


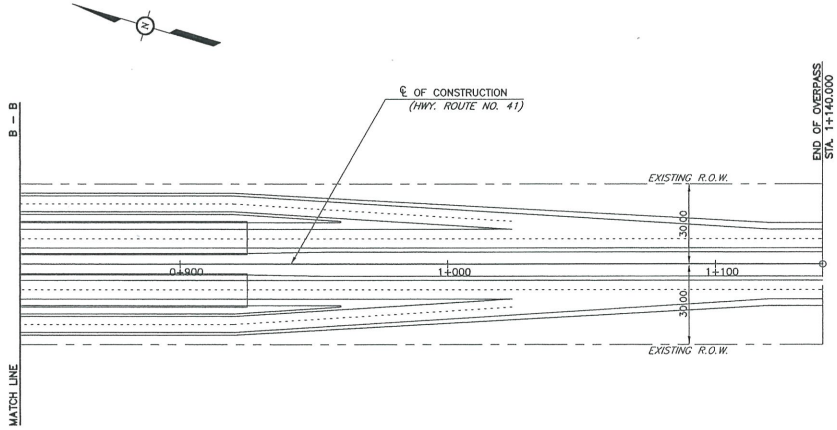
SECTION C–C
SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 1+159.000 SECTIONS – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–004	SCALE: A3 1:200 SHEET NO.: 90





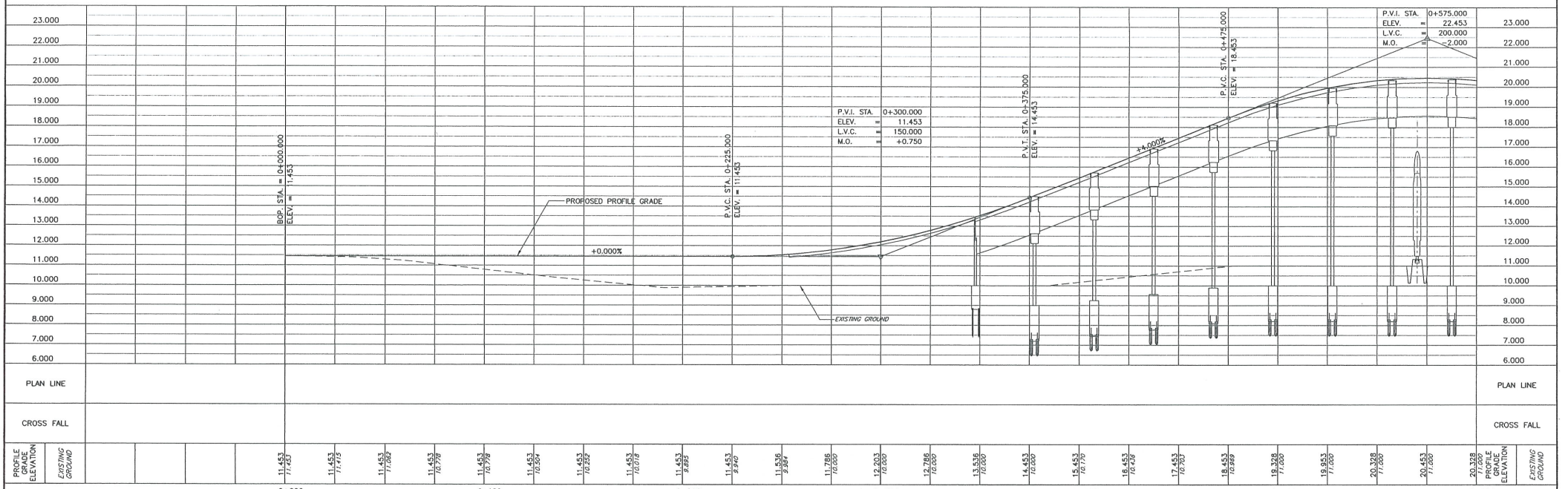


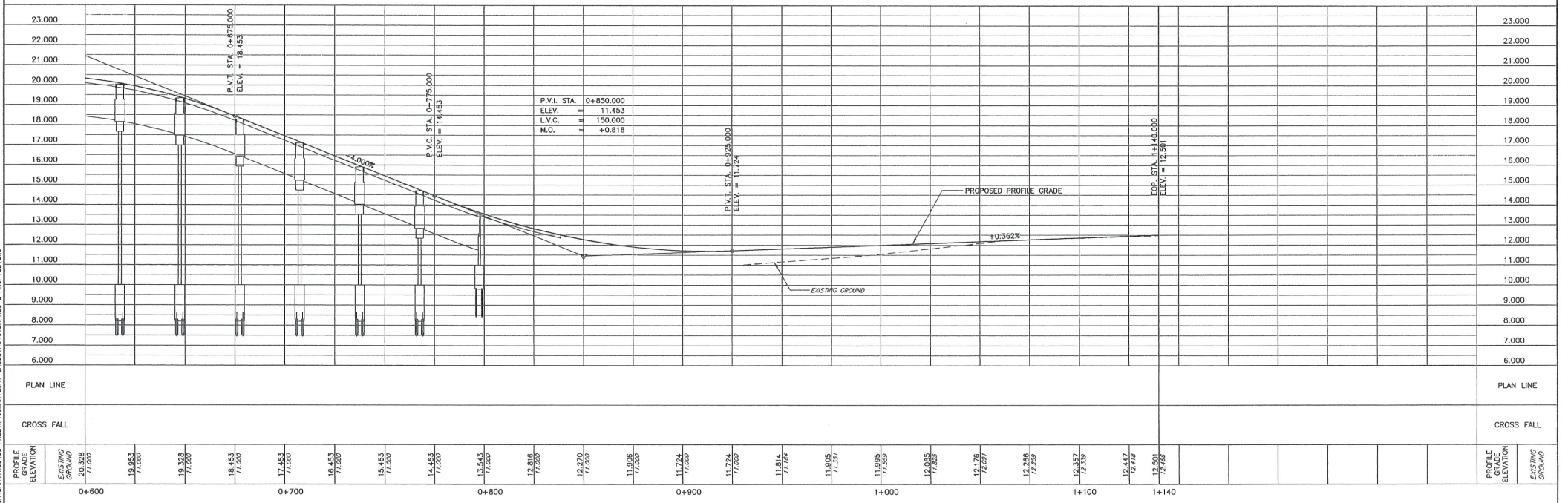
PLAN OF OVERPASS AT KM. 4+032.000

SCALE
A1 = 1:1,000
A3 = 1:2,000

V:\PROJECT\1455-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSINGS\OVERPASS-2-PLAN.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 4+032.000 PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-005	SCALE: A3 1:2,000 SHEET NO.: 91





KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

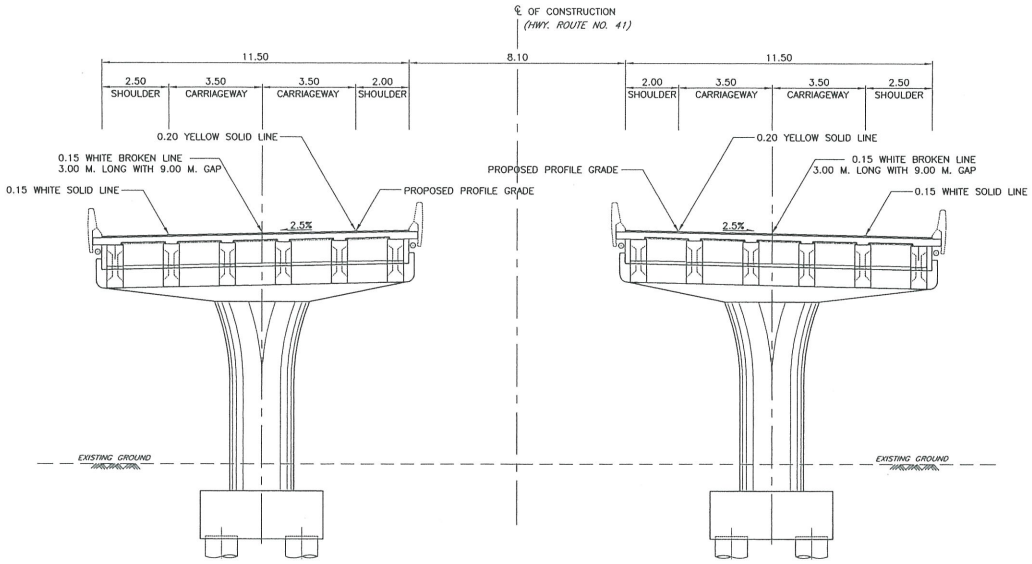
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: OVERPASS AT KM. 44+032.000
PROFILE

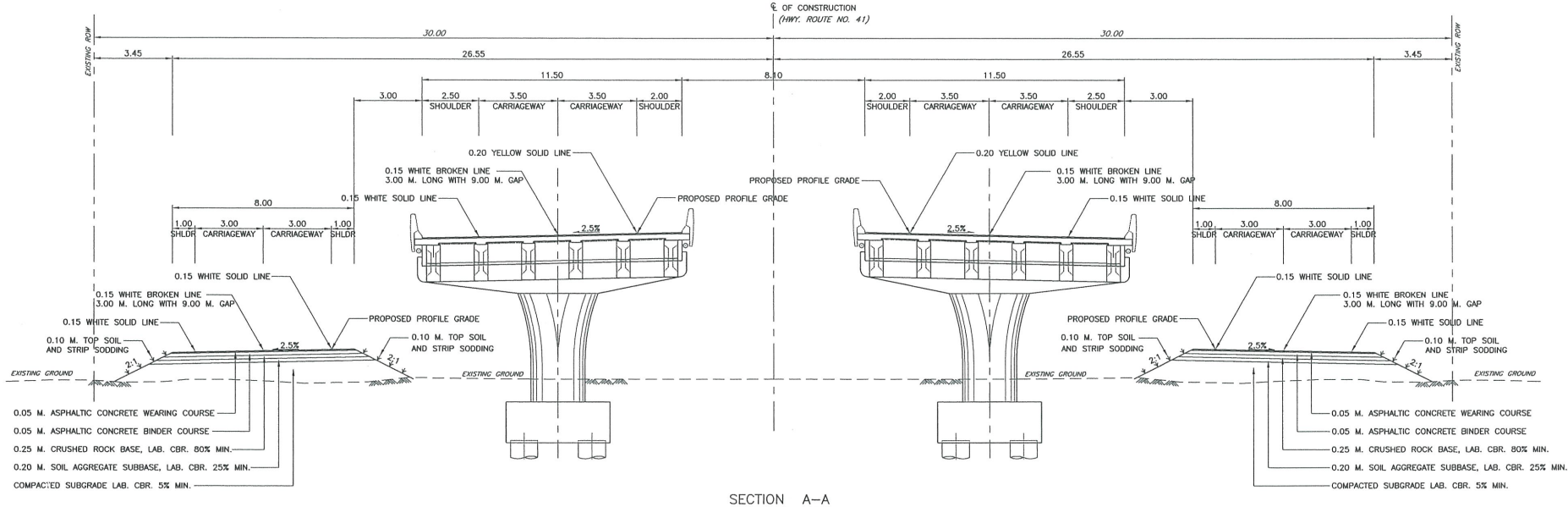
DATE: FEBRUARY 2018
SCALE: A3 H=1:1,000 V=1:100
DWG. NO.: SCR-C-006
SHEET NO.: 92

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SECTION B–B

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A3 = 1:200

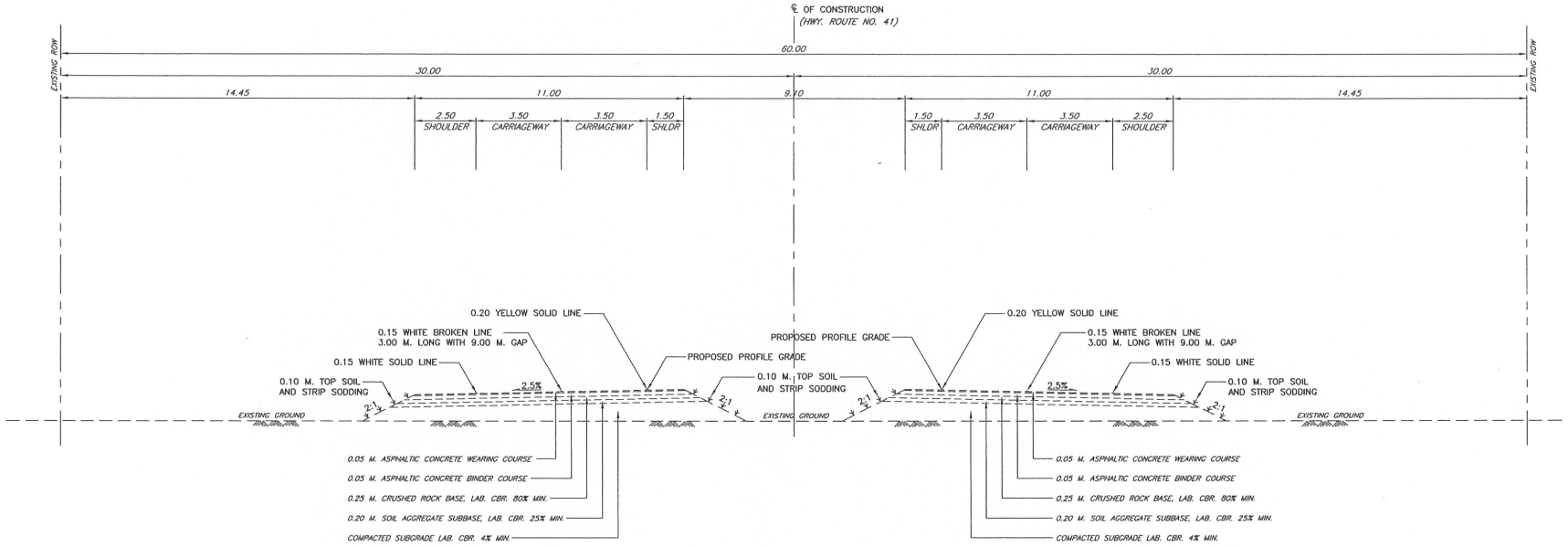


SECTION A–A

SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT otp OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 4+032.000 SECTION – 1	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–007	SCALE: A3 1:200 SHEET NO.: 93

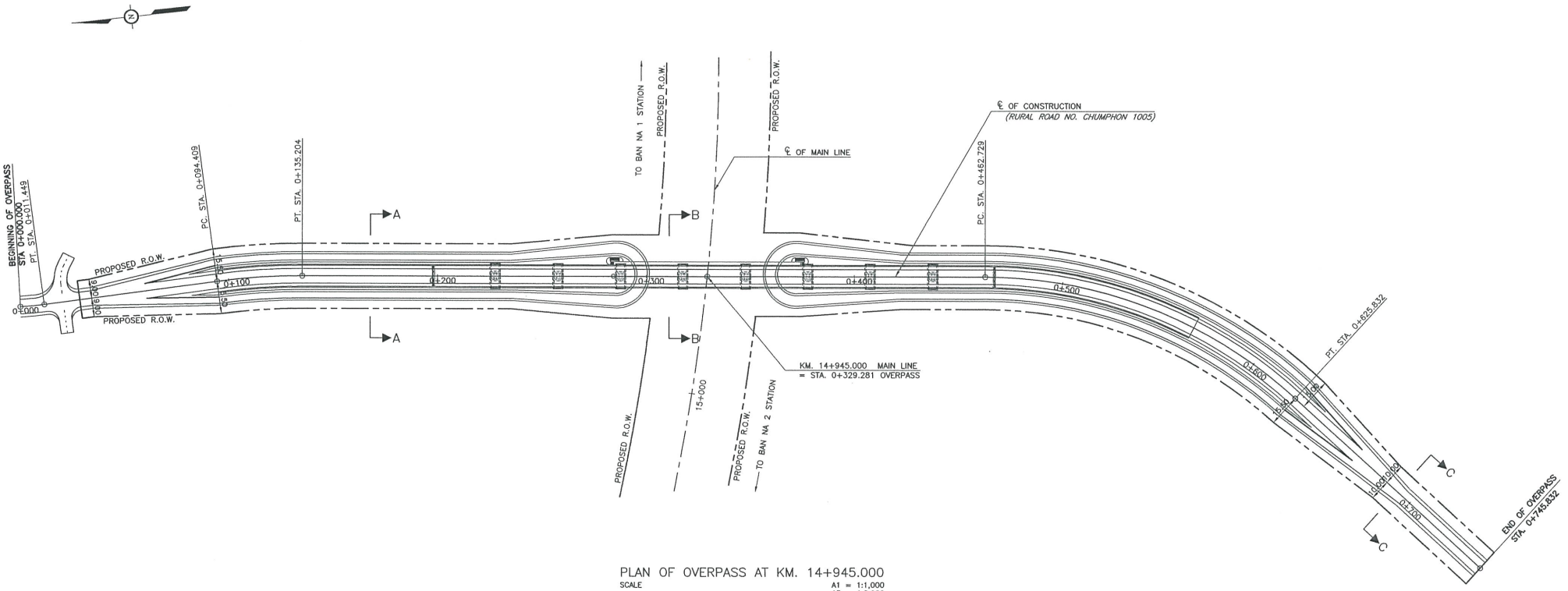


SECTION C–C

SCALE A1 = 1:100
A3 = 1:200

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSING\OVERPASS-2-SECTION-1-2.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 4+032.000 SECTION – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–008	SCALE: A3 1:200 SHEET NO.: 94

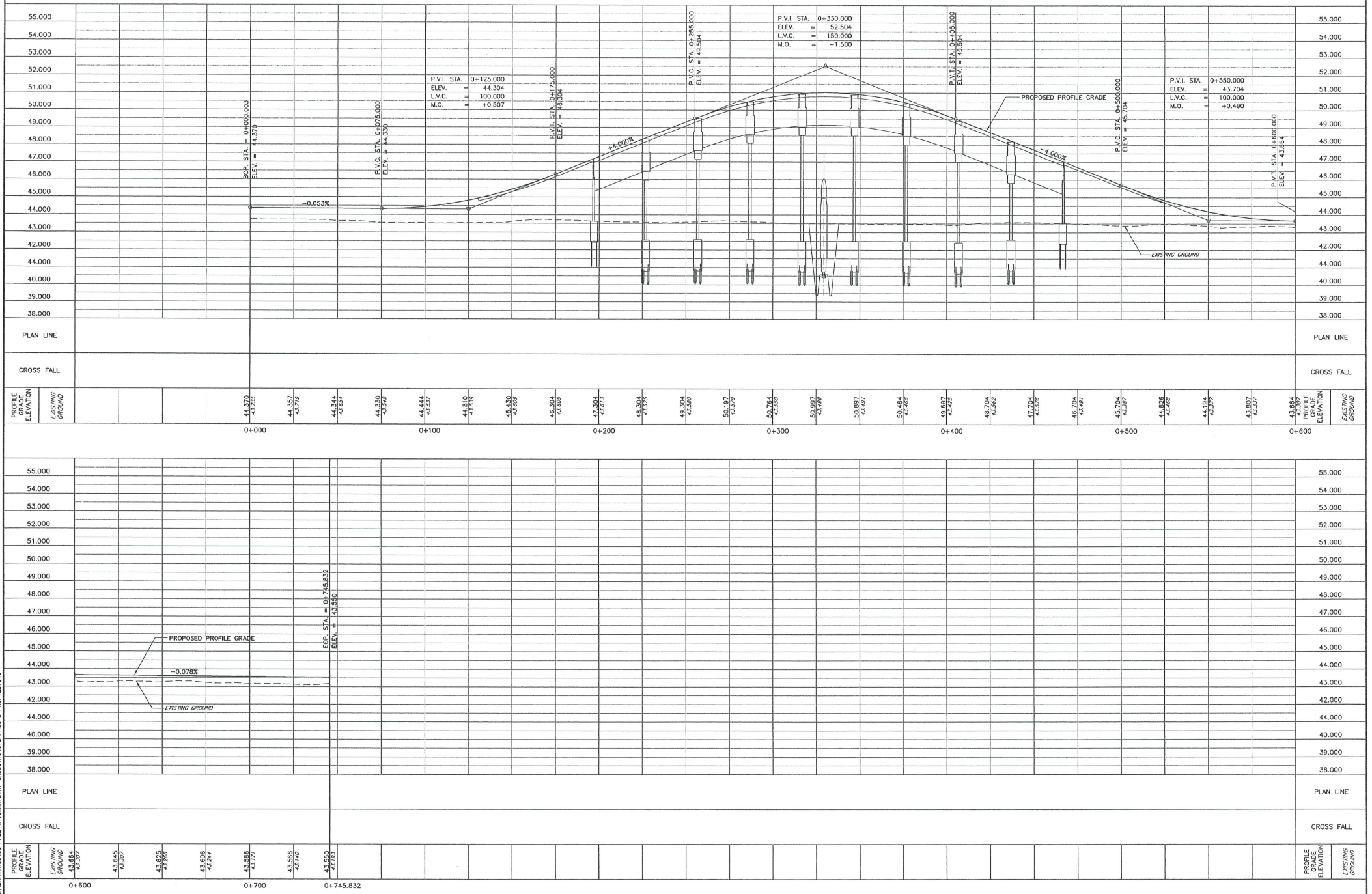


PLAN OF OVERPASS AT KM. 14+945.000

SCALE
A1 = 1:1,000
A3 = 1:2,000

V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSINGS\OVERPASS-3-PLAN.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. KM. 14+945.000 PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-009	SCALE: A3 1:2,000 SHEET NO.: 95



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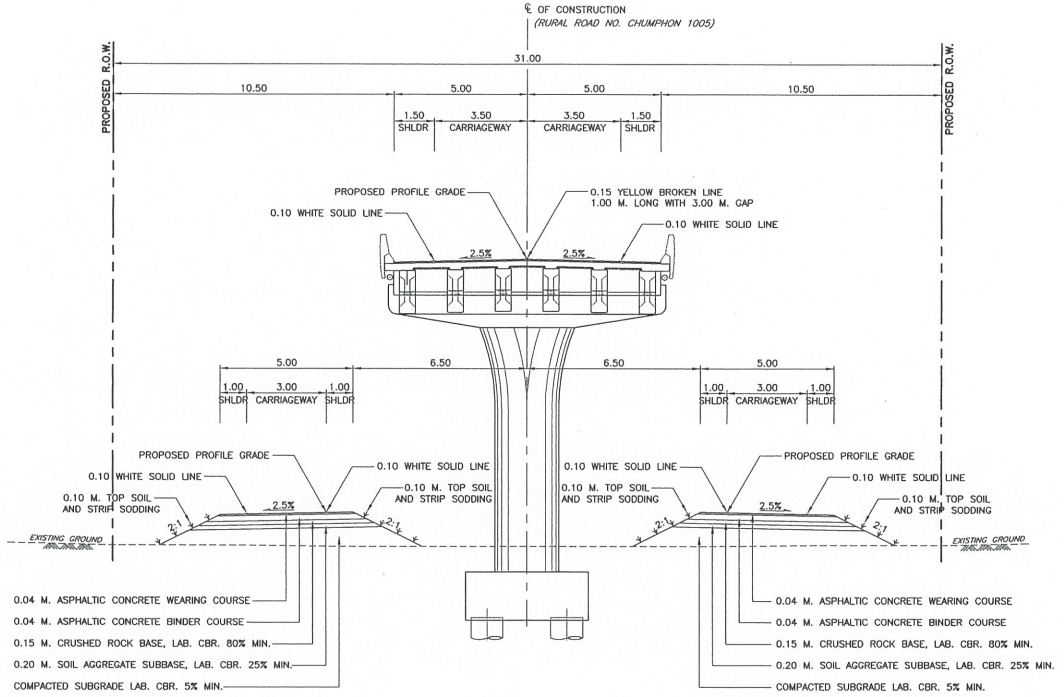
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
OVERPASS AT KM. KM. 14+945.000
PROFILE

DATE: FEBRUARY 2018
SCALE: A3 H=1:2,000 V=1:200
DWG. NO.: SCR-C-010
SHEET NO.: 96

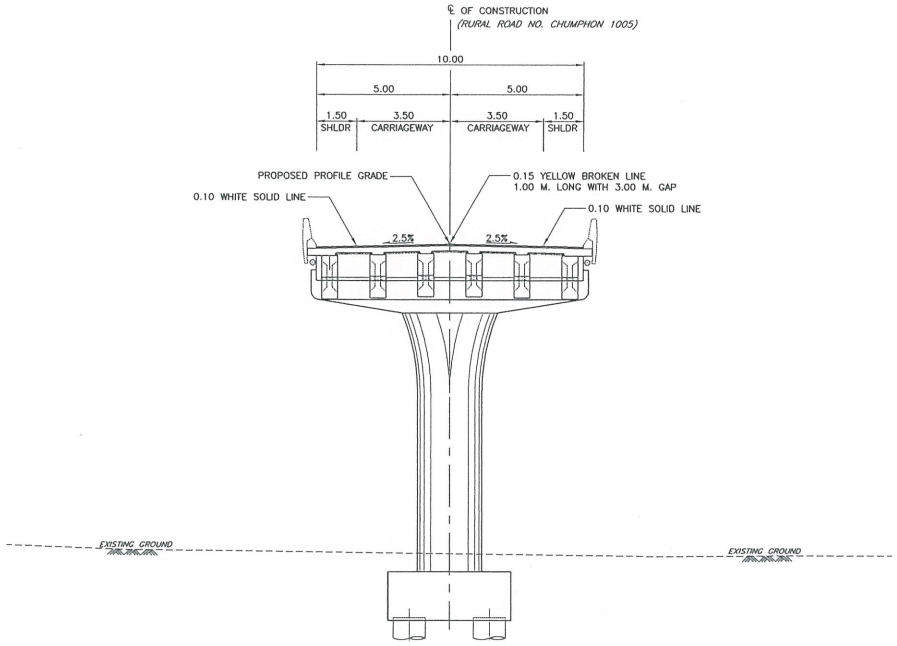


SECTION A–A

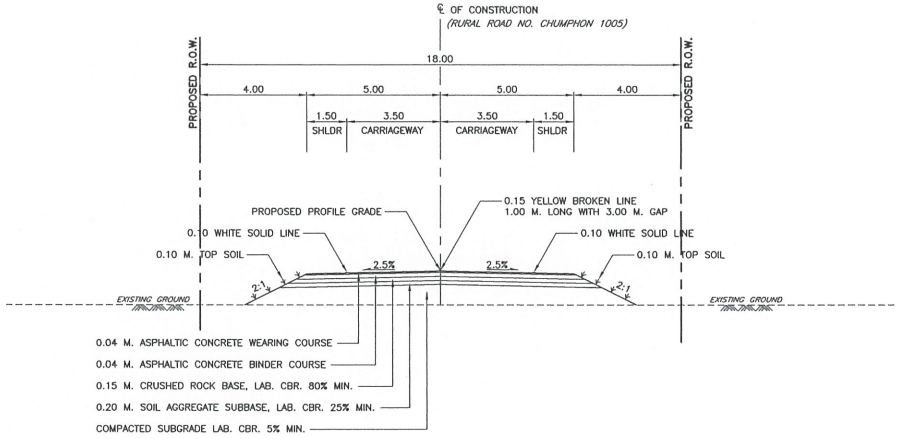
SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. KM. 14+945.000 SECTION – 1	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–011	SCALE: A3 1:200 SHEET NO.: 97



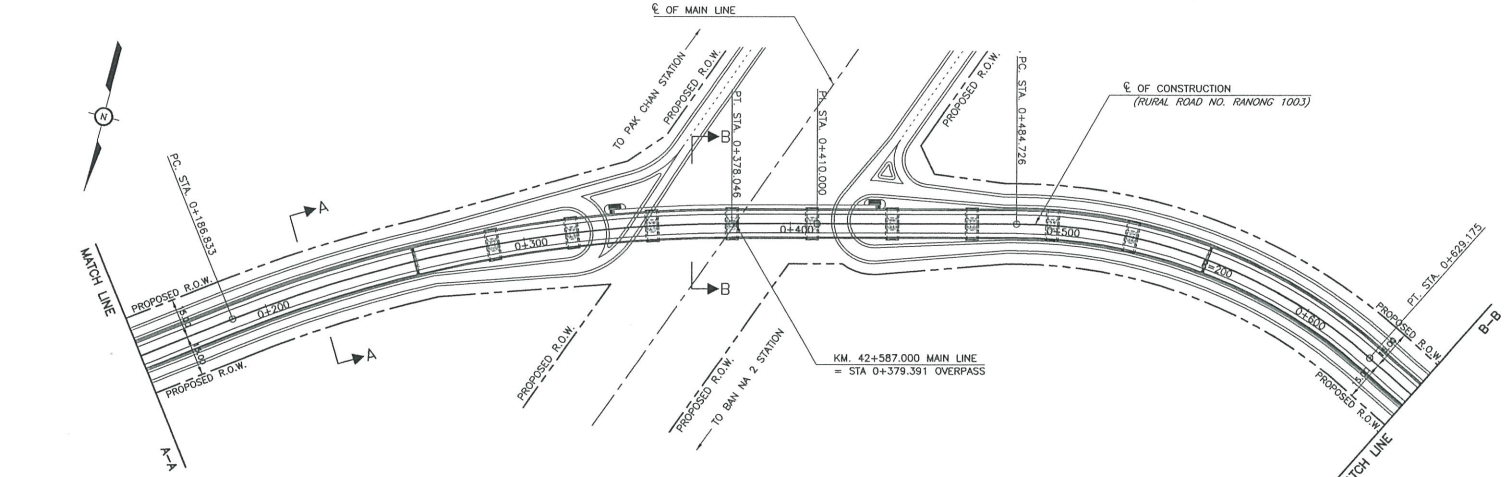
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A3 = 1:200

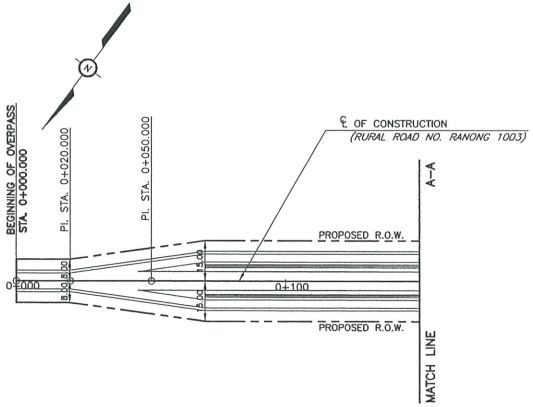


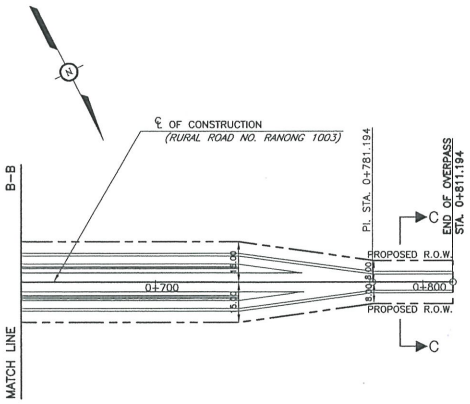
SECTION C–C
SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. KM. 14+945.000 SECTION – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–012	SCALE: A3 1:200 SHEET NO.: 98





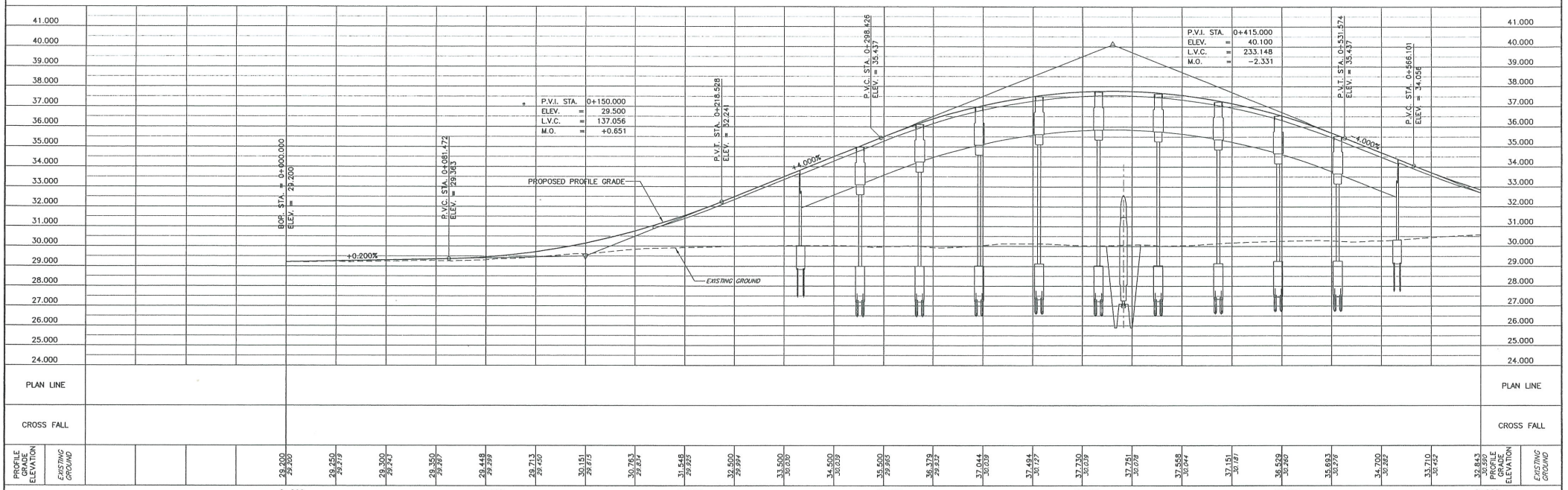


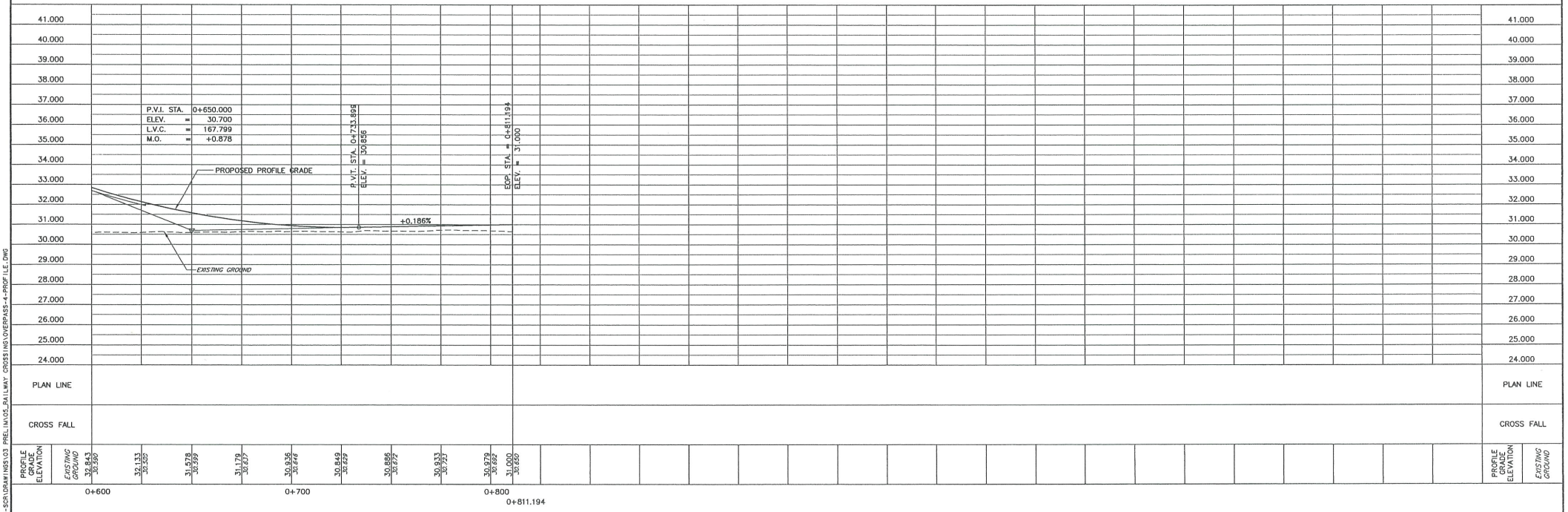
PLAN OF OVERPASS AT KM. 42+587.000

SCALE
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A3 = 1:2,000

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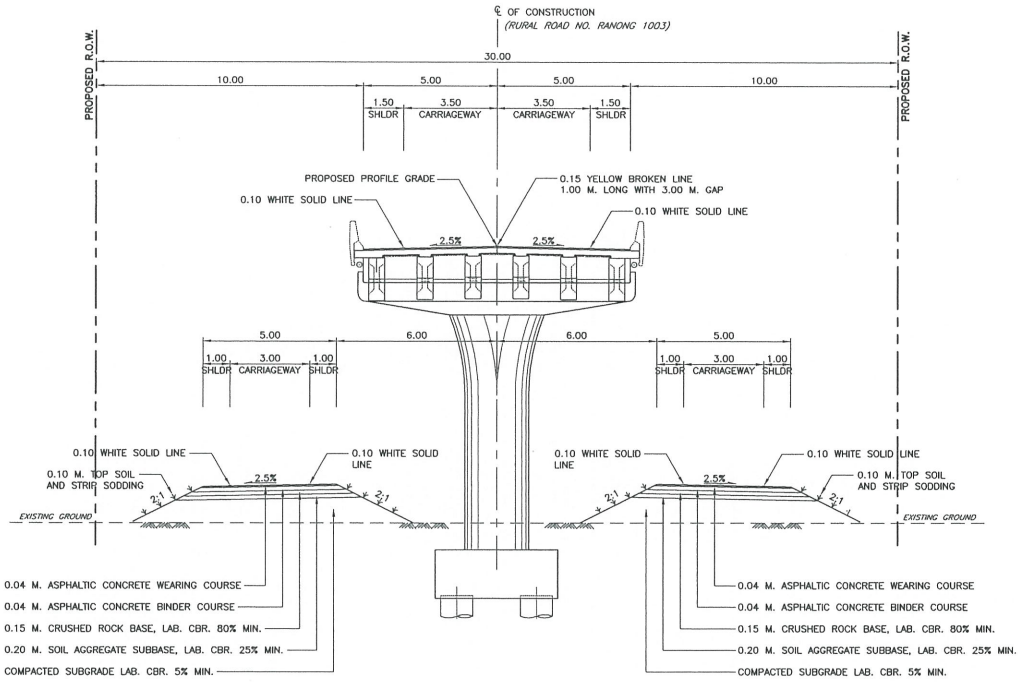
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE OVERPASS AT KM. 42+587.000 PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–013	SCALE: A3 1:2,000 SHEET NO.: 99





V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSINGS\OVERPASS-4-PROFILE.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: OVERPASS AT KM. 42+587.000 PROFILE	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-014	SCALE: A3 H=1:2,000 V=1:200 SHEET NO.: 100

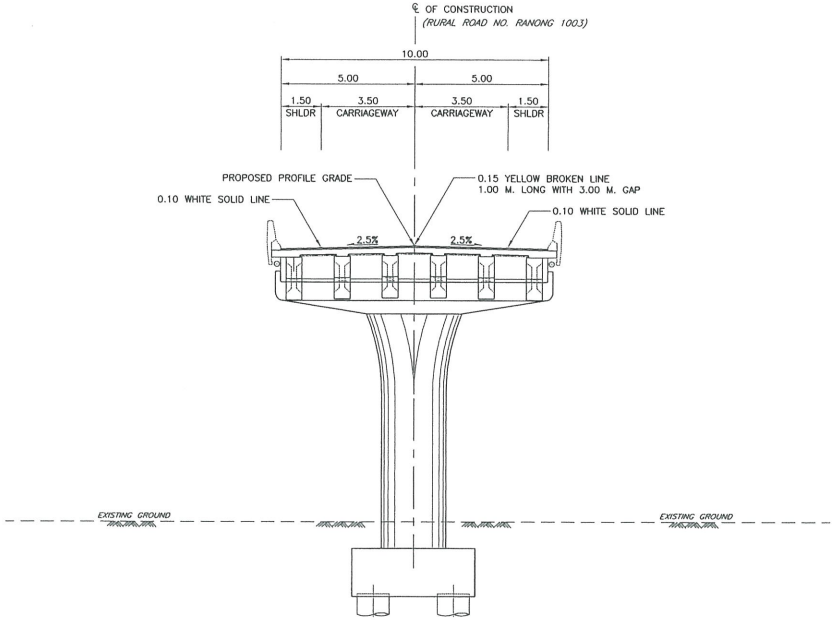


SECTION A–A

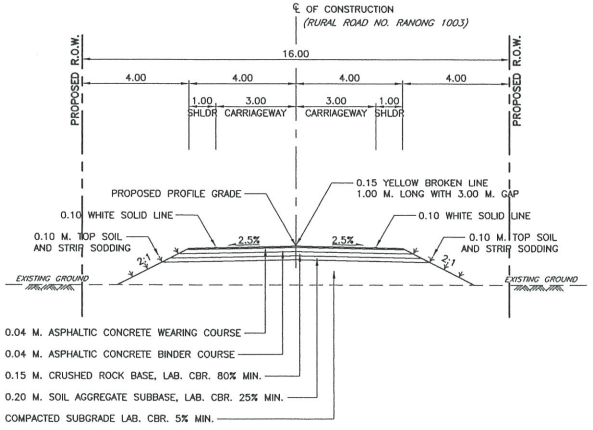
SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 42+587.000 SECTION – 1	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–015	SCALE: A3 1:200 SHEET NO.: 101



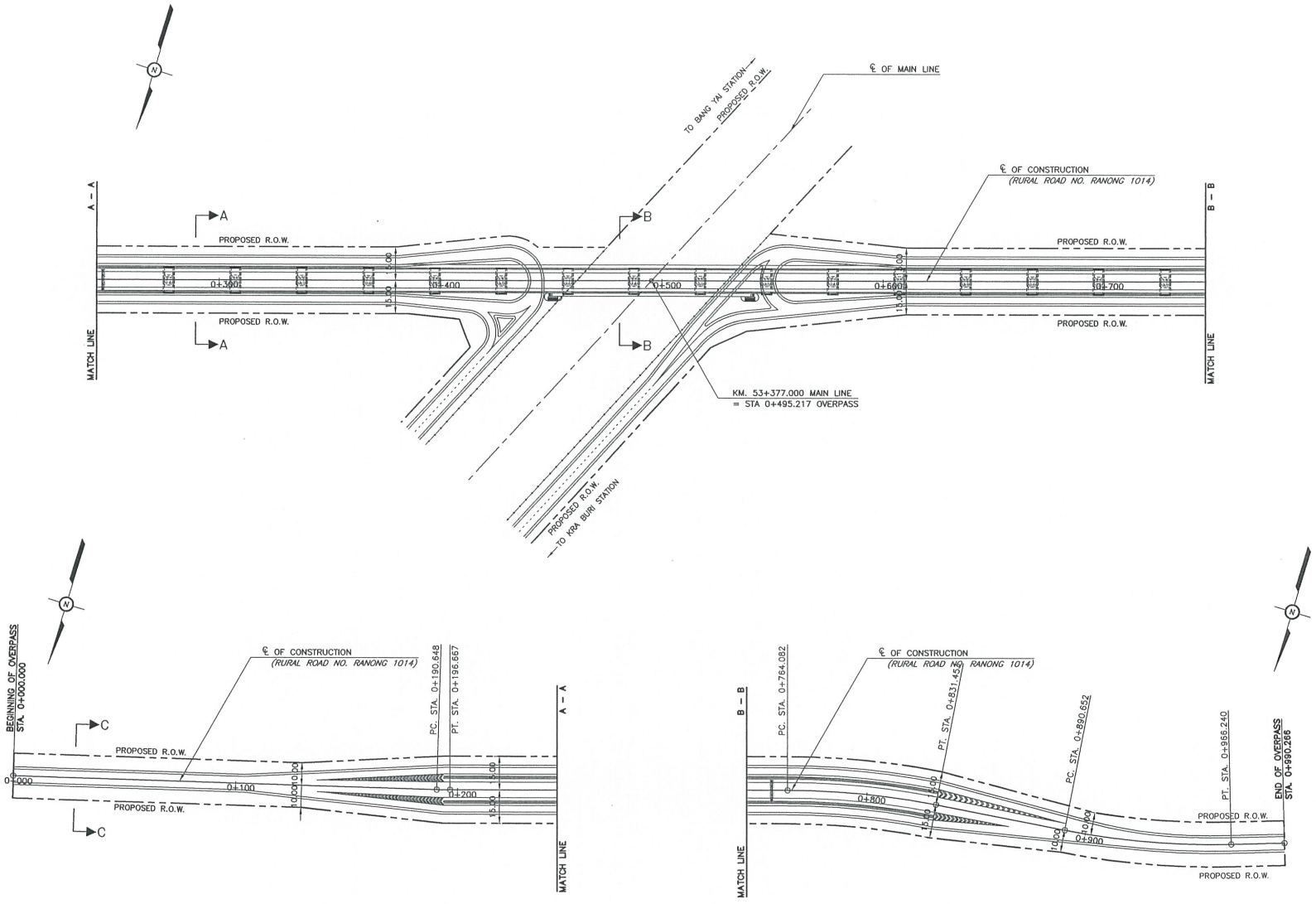
SECTION B–B
SCALE A1=1:100
A2=1:200



SECTION C–C
SCALE A1=1:100
A2=1:200

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\05_RAILWAY CROSSING\OVERPASS-4-SECTION-1-2.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 42+587.000 SECTION – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-016	SCALE: A3 1:200 SHEET NO.: 102

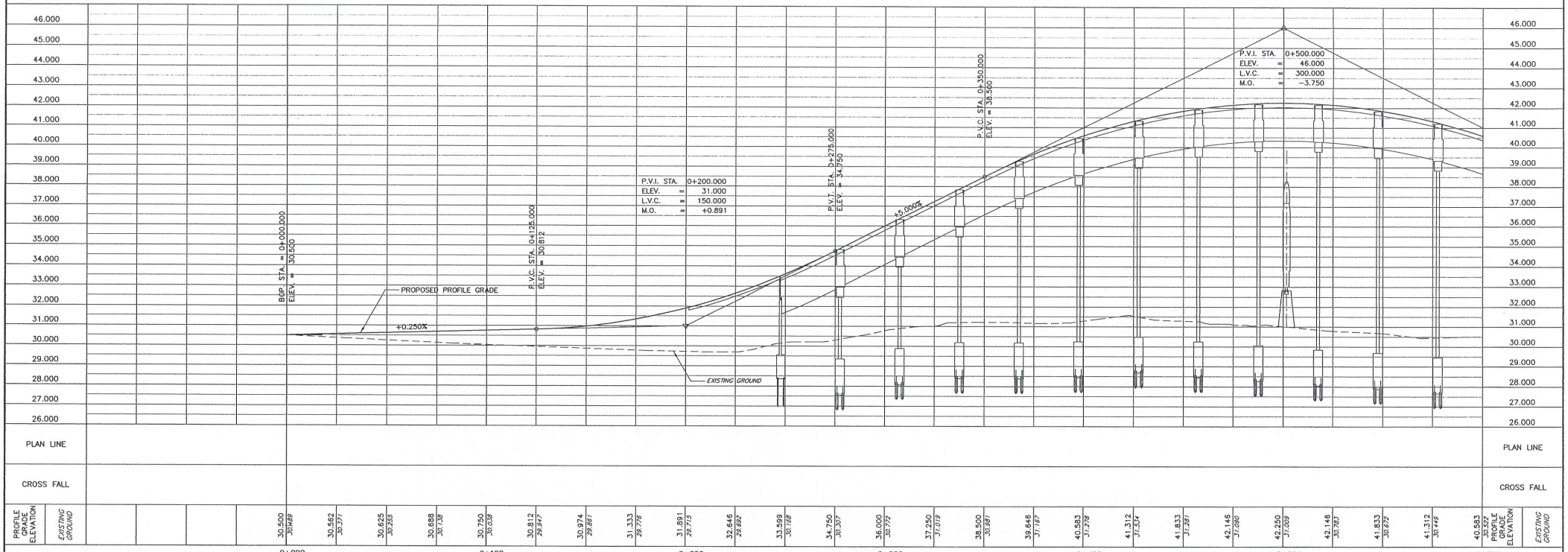


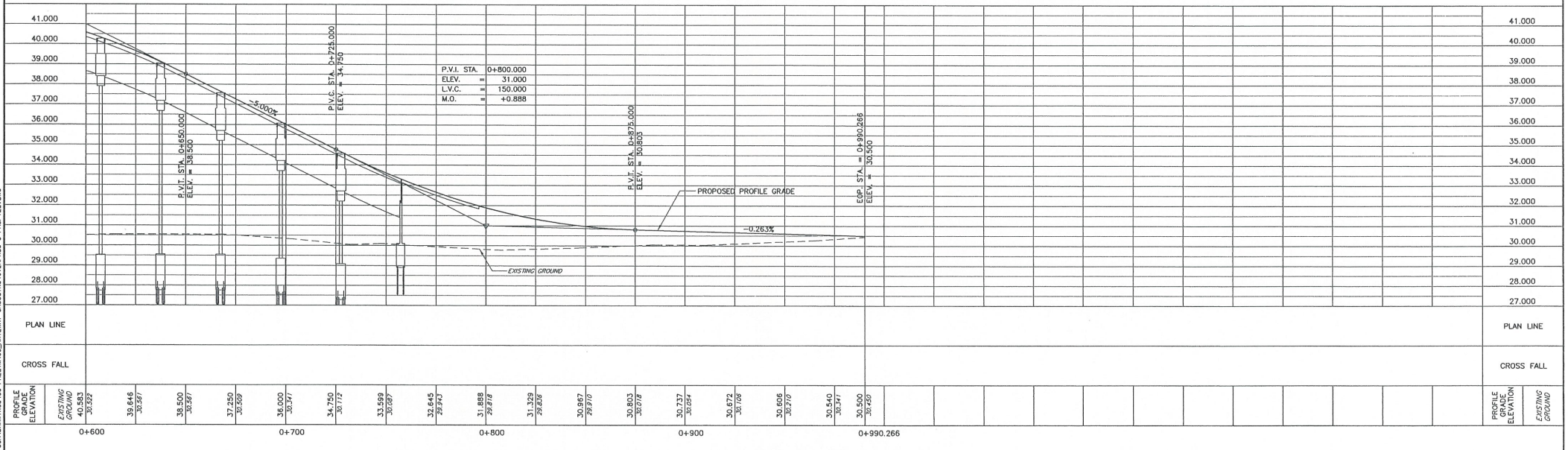
PLAN OF OVERPASS AT KM. 53+377.000

SCALE A1 = 1:1,000
A3 = 1:2,000

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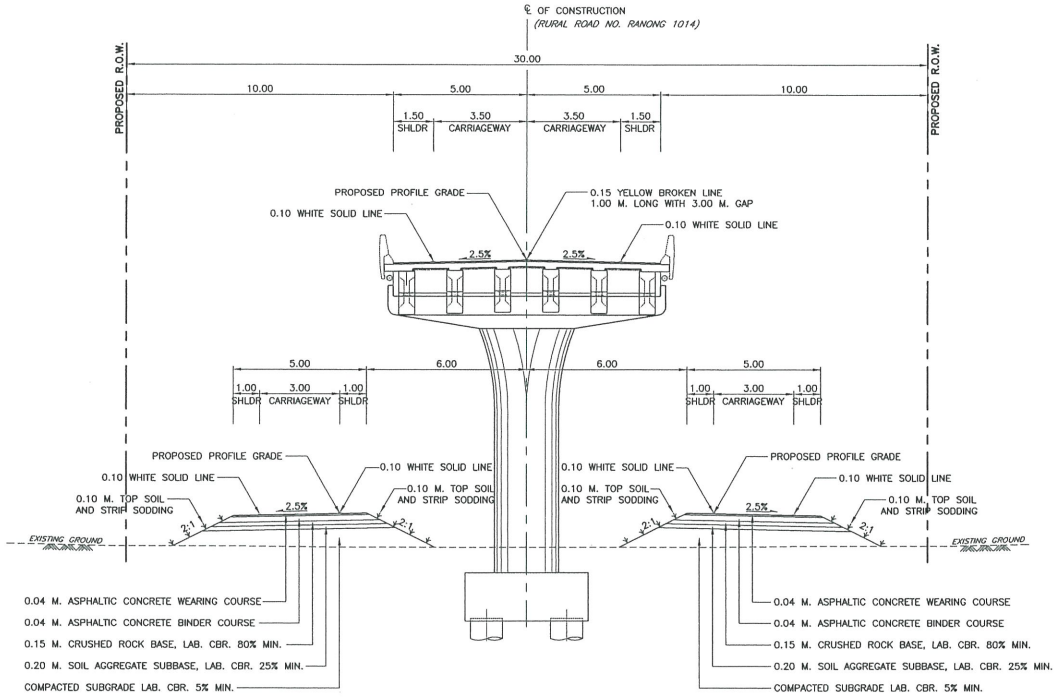
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE OVERPASS AT KM. 53+377.000 PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-017	SCALE: A3 1:2,000 SHEET NO.: 103





V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIMINDS_RAILWAY CROSSING\OVERPASS-5-PROFILE.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. 53+377.000 PROFILE	DATE: FEBRUARY 2018 DWG. NO.: SCR-C-018	SCALE: A3 H=1:2,000 V=1:200 SHEET NO.: 104

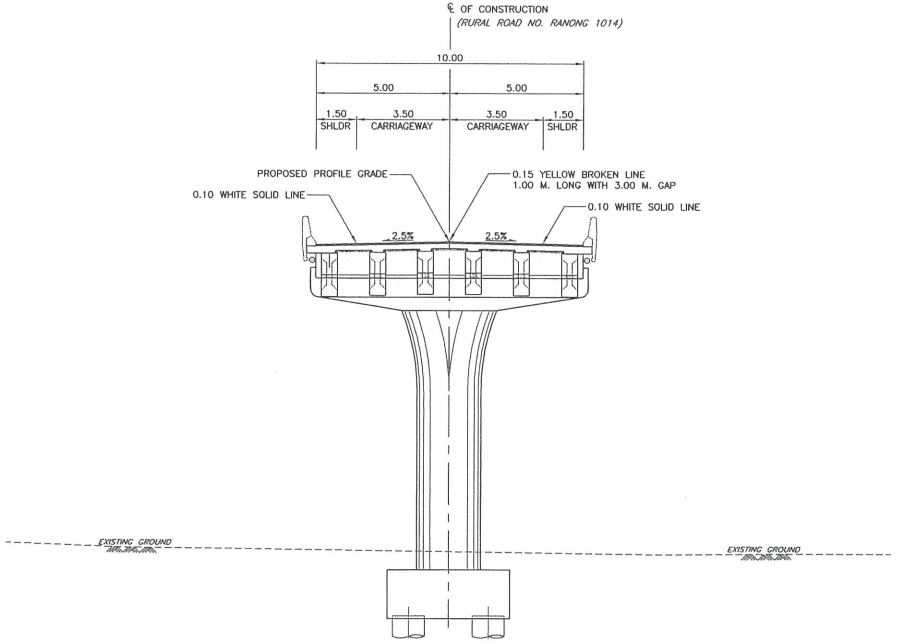


SECTION A–A

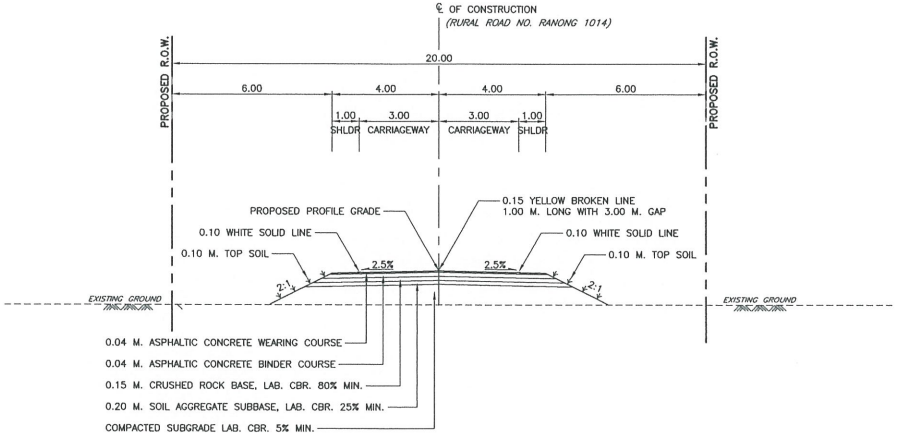
SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. KM. 53+377.000 SECTION – 1	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–019	SCALE: A3 1:200 SHEET NO.: 105



SECTION B–B
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A3 = 1:200

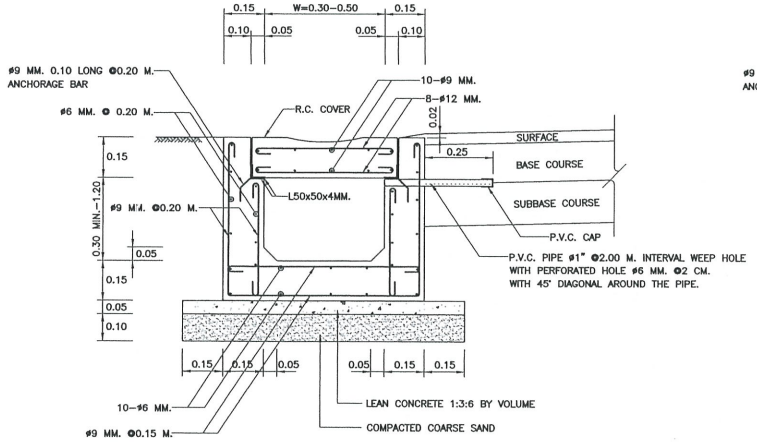


SECTION C–C
SCALE A1 = 1:100
A3 = 1:200

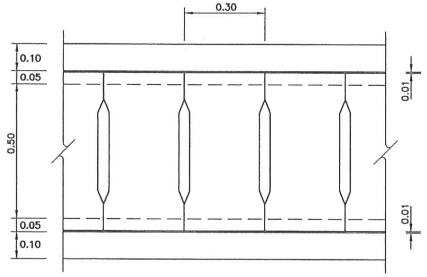
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE OVERPASS AT KM. KM. 53+377.000 SECTION – 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–C–020	SCALE: A3 1:200 SHEET NO.: 106

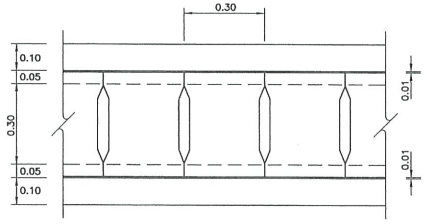
DRAINAGE FOR STRUCTURES



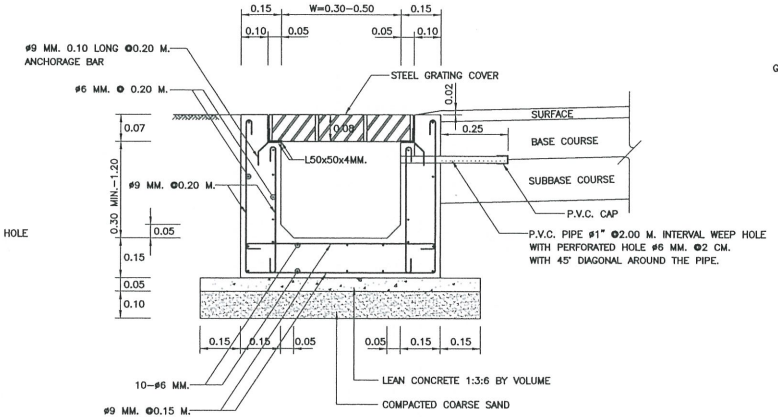
SECTION OF R.C. DITCH TYPE "1" (R.C. COVER)
SCALE A1 1:10 A3 1:20



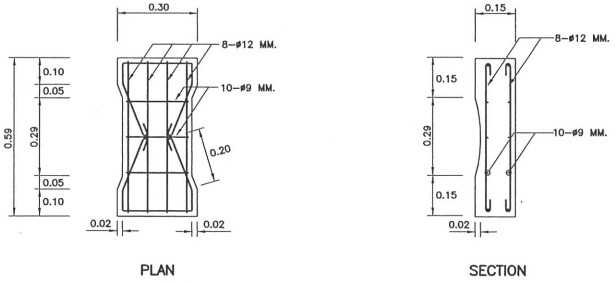
SECTION OF R.C. DITCH TYPE "1" (STEEL GRATING)
SCALE A1 1:10 A3 1:20



PLAN OF R.C. DITCH TYPE "1" WITH R.C. COVER (FOR W=0.30 M.)
SCALE A1 1:10 A3 1:20

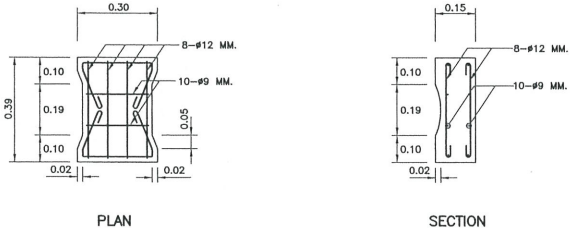


PLAN OF R.C. DITCH TYPE "1" WITH R.C. COVER (FOR W=0.50 M.)
SCALE A1 1:10 A3 1:20



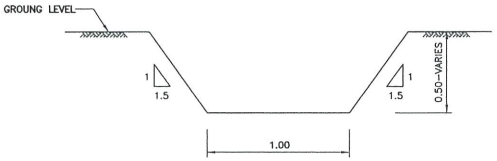
PLAN SECTION

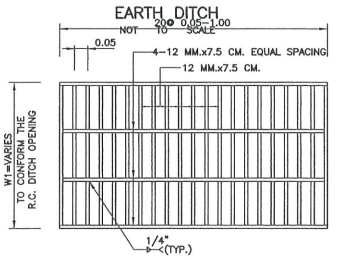
R.C. COVER OF R.C. DITCH TYPE "1" (FOR W=0.50 M.)
SCALE A1 1:10 A3 1:50



PLAN SECTION

R.C. COVER OF R.C. DITCH TYPE "1" (FOR W=0.30 M.)
SCALE A1 1:10 A3 1:20





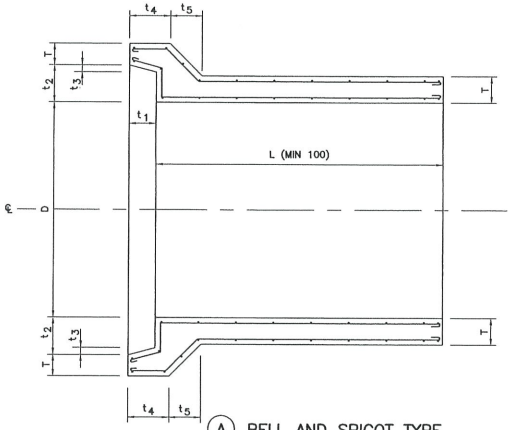
STEEL GRATING COVER DETAILS
SCALE A1 1:10 A3 1:20

NOTES :

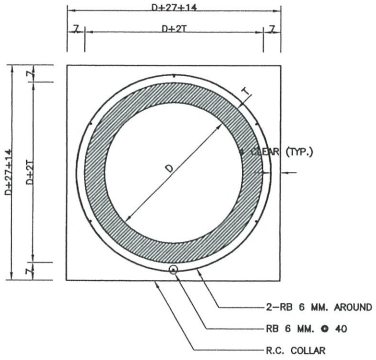
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR CYLINDER AT 28 DAYS.
3. REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR 24 AND TIS.24 GRADE SD 40.
4. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE Fe 30.
5. FLAT PLATE STEEL SHALL CONFORM TO TIS.55 GRADE SR 24.
6. STRUCTURAL STEEL AND FLAT PLATE STEEL SHALL BE PAINTED WITH RUST-OLEUM PAINT OR EQUIVALENT 2 LAYERS AND FINISHED WITH OIL PAINT 2 LAYERS.
7. CLEAR CONCRETE COVERING SHALL BE 4 CM.
8. UNLESS OTHERWISE SPECIFIED, THESE DRAWING SHALL BE USED WHERE THE ENGINEER SPECIFY.

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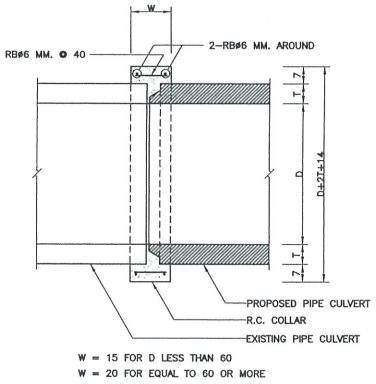
KINGDOM OF THAILAND MINISTRY OF TRANSPORT otp OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: DRAINAGE FOR STRUCTURES DETAIL OF R.C. DITCH , EARTH DITCH	DATE: FEBRUARY 2018 DWG. NO.: SCR-DR-001	SCALE: A3 1:20 SHEET NO.: 107



(A) BELL AND SPIGOT TYPE

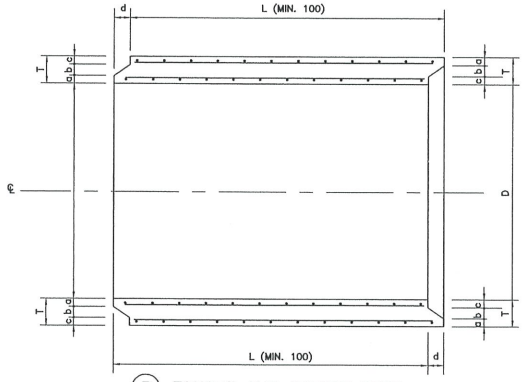


(A) TRANSVERSE SECTION



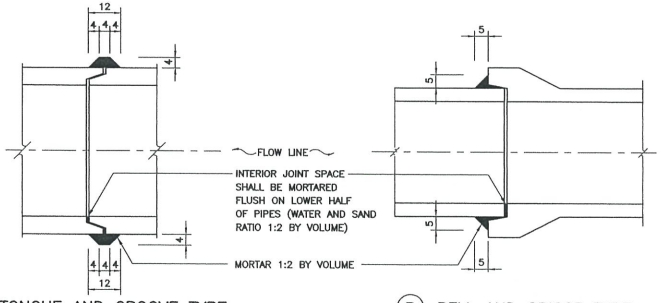
(B) LONGITUDINAL SECTION

PIPE EXTENSION
NOT TO SCALE



(B) TONGUE AND GROOVE TYPE

DETAIL OF R.C. PIPE CULVERT
NOT TO SCALE



(A) TONGUE AND GROOVE TYPE

(B) BELL AND SPIGOT TYPE

PIPE CONNECTION DETAILS
NOT TO SCALE

TABLE 1

R.C. CULVERT CLASS	INSIDE DIAMETER (D) (CM.)	WALL THICKNESS (T) (CM.)	MIN. CIRCULAR REINFORCEMENT (CM^2/M)		CRUSHING LOAD TO PRODUCE 0.03 CM. CRACK WIDTH AND 30 CM. CRACK LENGTH (KG./M.)	MAXIMUM CRUSHING LOAD (KG./M.)	ULTIMATE STRENGTH FOR 15x30 CM. CONCRETE CYLINDER AT 28 DAYS AGE ($KG./CM.^2$)	OVER FILL ON R.C. PIPE CULVERT NOT MORE THAN (METERS)
			INNER CAGE	OUTER CAGE				
2	30	5.0	1.5	–	3,060	4,590	280(350)	10.0
	40	6.0	2.5	–	4,080	6,120		
	50	7.0	3.8	–	5,100	7,650		
	60	7.5	5.7	–	6,120	9,180		
	80	9.5	5.8	4.1	8,160	12,240		
	100	11.0	7.0	5.2	10,200	15,300		
	120	12.5	8.9	6.8	12,240	18,360		
	150	15.0	12.5	9.5	15,300	22,950	350(440)	11.0
3	30	5.0	1.5	–	1,990	3,060	280(350)	8.0
	40	6.0	1.5	–	2,650	4,080		
	50	7.0	1.5	–	3,320	5,100		
	60	7.5	1.5	–	3,980	6,120		
	80	9.5	4.0	–	5,300	8,160		
	100	11.0	4.2	3.2	6,630	10,200		
	120	12.5	5.1	3.8	7,960	12,240		
	150	15.0	7.2	5.5	9,950	15,300		

FIGURES IN PARENTHESIS ARE ULTIMATE STRENGTH FOR 15X15X15 CM. CONCRETE CUBE AT 28 DAYS AGE.

TABLE 2

R.C. PIPE CULVERT CLASS	INSIDE DIAMETER (D) (CM.)	WALL THICKNESS (T) (CM.)	PIPE END DETAILS (CM.)								
			BELL & SPIGOT TYPE					TONGUE & GROOVE TYPE			
			t_1	t_2	t_3	t_4	t_5 (MIN.)	a	b	c	d
2 & 3	30	5.0	6.0	6.6	0.4	8.5	15.5	1.9	0.8	2.3	3.0
	40	6.0	6.7	7.6	0.4	9.7	18.0	2.3	1.0	2.7	3.0
	50	7.0	7.0	8.6	0.4	10.5	21.0	2.8	1.0	3.2	4.0
	60	7.5	7.6	9.1	0.4	11.4	22.5	2.8	1.5	3.2	4.0
	80	9.5	8.9	11.1	0.4	13.7	28.5	3.8	1.5	4.2	4.5
	100	11.0	9.5	12.6	0.4	15.0	33.0	4.3	2.0	4.7	4.5
	120	12.5	10.0	14.1	0.4	16.5	37.5	4.8	2.5	5.2	5.0
	150	15.0	10.0	16.6	0.4	17.7	45.0	5.7	3.0	6.3	6.0

NOTES :

1. ALL DIMENSIONS ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
2. REINFORCED CONCRETE PIPE CULVERT CLASSES 2 AND 3 SHALL CONFORM TO TIS 128.
3. CEMENT, STEEL REINFORCEMENT, AGGREGATES AND TEST METHODS USED FOR R.C. PIPE CULVERT SHALL CONFORM TO THE REQUIREMENT OF TIS. 128 OR TO THE DEPARTMENT OF HIGHWAYS STANDARDS.
   - 3.1 CEMENT CONTENT USED FOR CONCRETE MIX SHALL NOT BE LESS THAN 335 KILOGRAM PER CUBIC METER OF CONCRETE.
   - 3.2 CONCRETE COVER FOR SINGLE LAYER CIRCULAR REINFORCEMENT SHALL BE 0.35 TO 0.5 TIME OF WALL THICKNESS (MEASURED FROM INNER WALL).
   - 3.3 CONCRETE COVER FOR DOUBLE LAYERS CIRCULAR REINFORCREMENT SHALL BE 2.5 CM. IN AVERAGE BUT NOT LESS THAN 1.5 CM.
   - 3.4 LONGITUDINAL REINFORCEMENT SPACING FOR PIPE SIZE ø50 CM. OR SMALLER SHALL BE A MINIMUM OF 4–#4 MM. BARS OR 8–#4 MM. BARS FOR PIPE ø60 CM. OR LARGER.
   - 3.5 CIRCULAR REINFORCEMENT SPACING FOR PIPE SIZE ø30 CM. TO ø80 CM. SHALL BE 10 CM. OR LESS AND FOR PIPE SIZE ø100 CM. TO ø150 CM. SHALL BE 15 CM. OR LESS BUT NOT MORE THAN THEIR WALL THICKNESS.
4. THE CULVERT WHICH HAVING TRANSVERSE REINFORCEMENT IN ELLIPTICAL CAGE AS SPECIFIED IN THE TIS. 128 SHALL NOT BE USED .
5. PIPE MAY BE EITHER BELL AND SPIGOT TYPE OR TONGUE AND GROOVE TYPE AS DIRECT BY THE ENGINEER.
6. CULVERT JOINTS SHALL BE MORTARED AS SHOWN ON THE DRAWING WITH CEMENT MORTAR (1:2 BY VOLUME).
7. CULVERT LENGTH (L) SHALL BE 100 CM. UNLESS OTHERWISE SPECIFIED.
8. REINFORCED CONRETE PIPE CULVERT CLASS 2 SHALL BE USED UNDER PAVEMENT.
9. REINFORCED CONCRETE PIPE CLASS 3 SHALL BE USED UNDER SIDEWALK.

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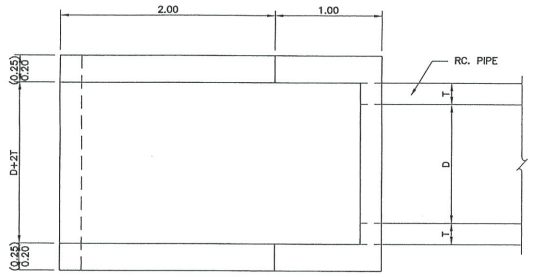
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: DRAINAGE FOR STRUCTURES
R.C. PIPE CUVERT

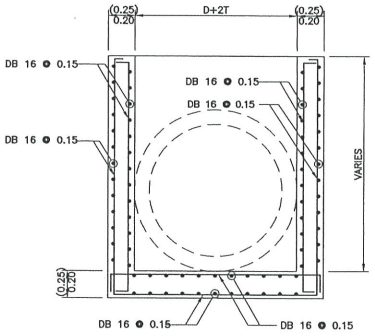
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DWG NO.: SCR-DR-002
SHEET NO.: 108



PLAN

END STRUCTURE

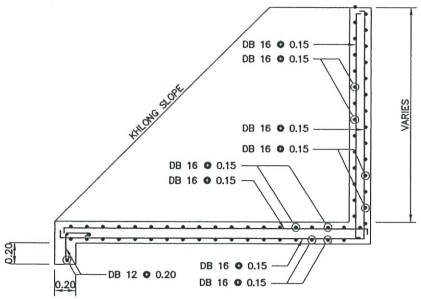
NOT TO SCALE



CROSS SECTION

END STRUCTURE REINFORCEMENT

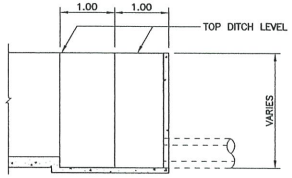
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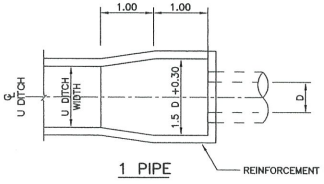
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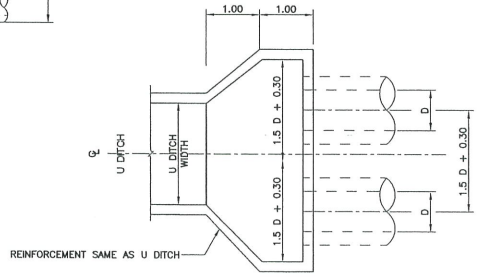
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LONGITUDINAL SECTION



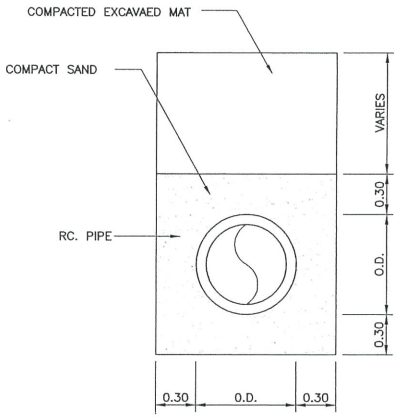
1 PIPE



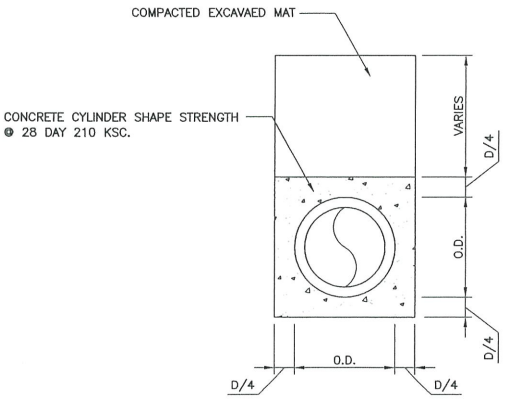
MULTIPLE PIPES

TYP. ENLARGEMENT U DITCH FOR RCP.

NOT TO SCALE



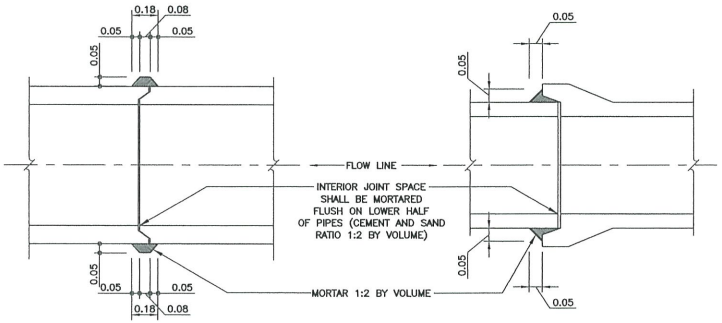
PIPE BEDDING TYP. DETAILS



PIPE BEDDING TYP. (UNDER ROAD) DETAILS

RC. PIPECONNECTION DETAILS

NOT TO SCALE

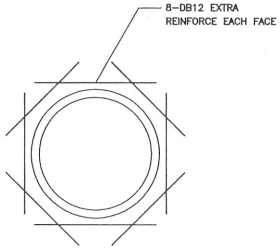


TONGUE AND GROOVE TYPE

BELL AND SPIGOT TYPE

RC.PIPE CONNECTION DETAILS

NOT TO SCALE



TYP. REINFORCEMENT FOR PIPE OPENING

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR CYLINDER SHAPE AT 28 DAYS.
3. REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR 24 AND TIS 24 SD 40
4. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE Fe 30
5. FLAT PLATE STEEL SHALL CONFORM TO TIS.55 GRADE SR 24
6. STRUCTURAL STEEL AND FLAT PLATE STEEL SHALL BE PAINTED WITH PRIMER RUST-OLEUM PAINT OR EQUIVALENT 2 LAYERS AND FINISHED WITH OIL PAINT 2 LAYERS
7. CLEAR CONCRETE COVERING SHALL BE 4 CM.
8. NOT SHOW 0.10 M. LEAN CONC. LAYER AND 0.15 M. COMPACTED SAND LATER, THES EIDER THAN END STRUCTURE 0.10 M. EITHER SIDE THESE LATERS BEARED DITCH AND STRUCTURE FOR CONSTUCTION PURPOSED.
9. REINFORCEMENT CONCRETE PIPE SHALL BE CONFORMED TO TIS 128 CLASS 2

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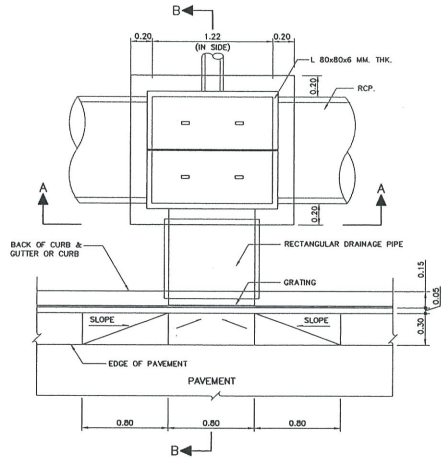
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

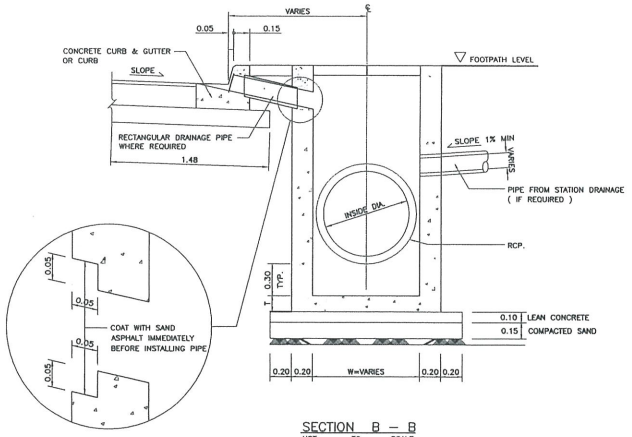
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: DRAINAGE FOR STRUCTURES
END STRUCTURE FOR R.C.P. & PIPE CONNECTION DETAILS

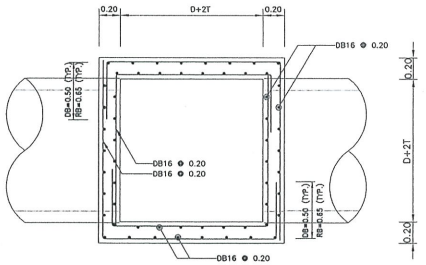
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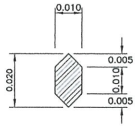
MANHOLE TYPE C PLAN
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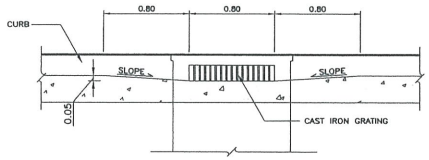


SECTION B – B
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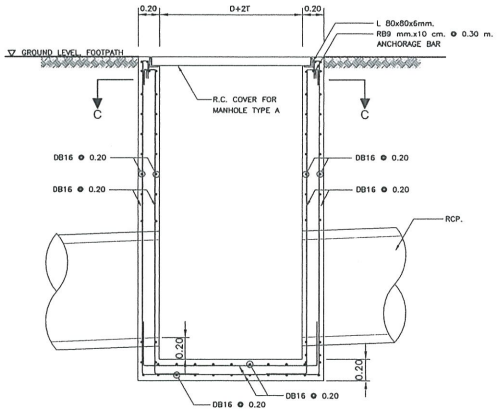


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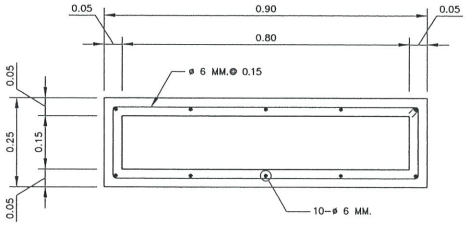




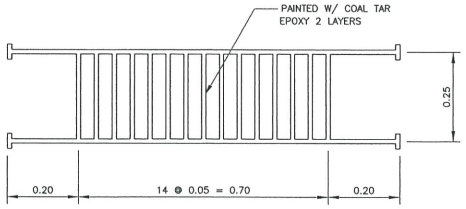
INLET FRONT VIEW
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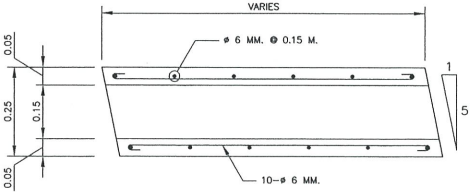
SECTION A – A
NOT TO SCALE



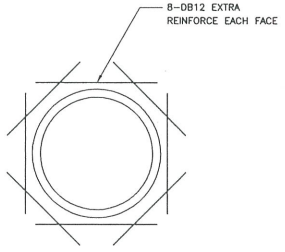
CROSS SECTION
NOT TO SCALE



CAST – IRON GRATING DETAILS
NOT TO SCALE



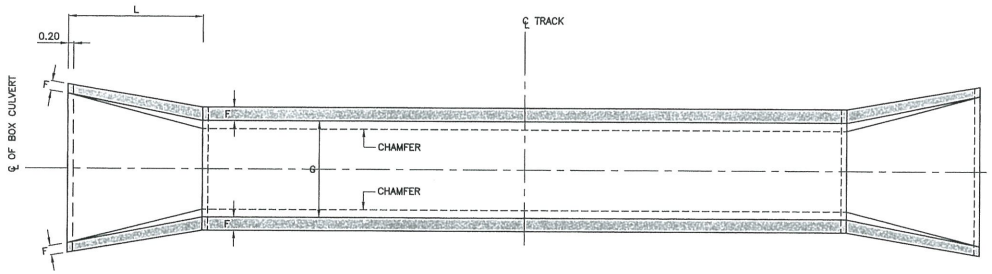
LONGITUDINAL SECTION
NOT TO SCALE



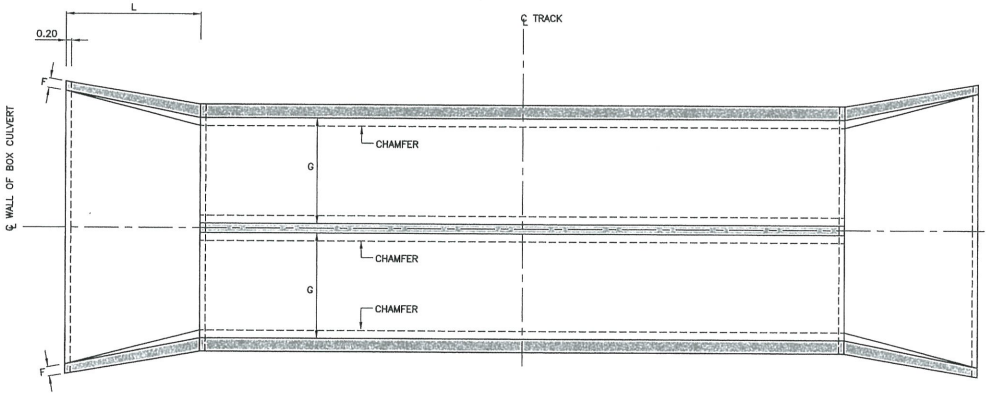
TYP. REINFORCEMENT FOR PIPE OPENING
NOT TO SCALE

NOTES :

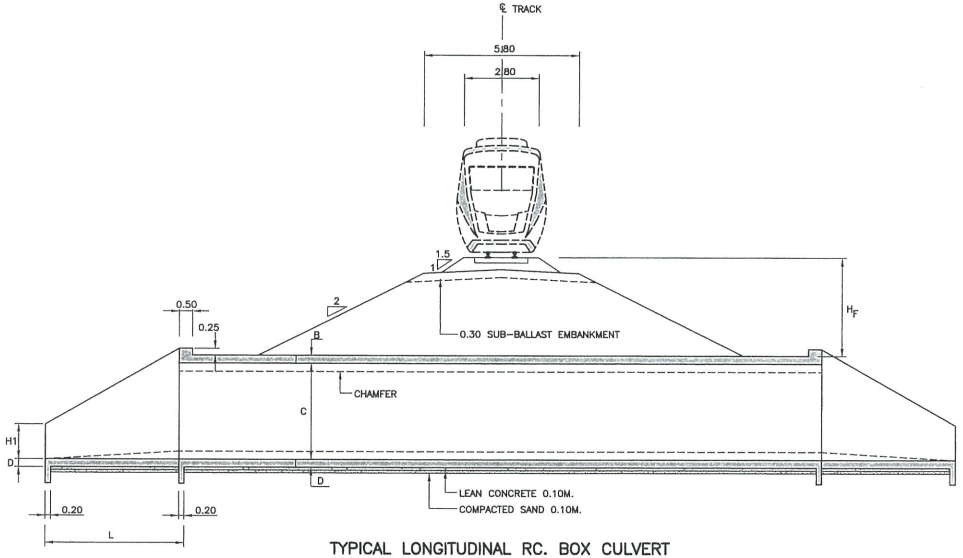
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR CYLINDER SHAPE AT 28 DAYS.
3. REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR 24 AND TIS 24 SD 40.
4. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE Fe 30.
5. FLAT PLATE STEEL SHALL CONFORM TO TIS.55 GRADE SR 24.
6. STRUCTURAL STEEL AND FLAT PLATE STEEL SHALL BE PAINTED WITH PRIMER RUST–OLEUM PAINT OR EQUIVALENT 2 LAYERS AND FINISHED WITH OIL PAINT 2 LAYERS.
7. CLEAR CONCRETE COVERING SHALL BE:
   4 CM. FOR WALL AND SLAB (STRUCTURE)
   2 CM. R.C. COVER
8. REQUIRED 0.05 M. LEAN CONC. LAYER AND 0.10 M. COMPACTED SAND LAYER, THESE WIDER THAN DITCH 0.10 M. EITHER SIDE, THESE LAYERS BEARED STRUCTURE FOR CONSTRUCTION PURPOSED WHICH NOT SHOWN ON THIS DWG.
9. MANHOLE COVER REINFORCEMENT SAME AS RC. COVER FOR MANHOLE TYPE A.
10. R.C. PIPE CULVERT SHALL CONFORM TO TIS 12B CLASS 2.



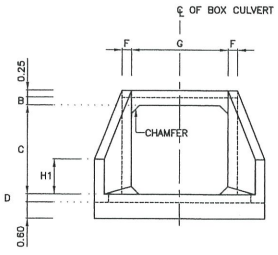
PLAN RC. SINGLE BOX CULVERT
SCALE 1 : 100



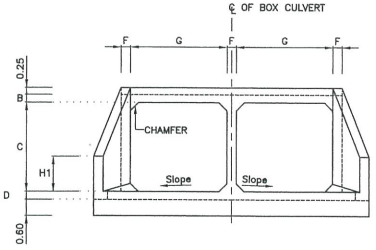
PLAN RC. MULTI BOX CULVERT
SCALE 1 : 100



TYPICAL LONGITUDINAL RC. BOX CULVERT
SCALE 1 : 100



SECTION RC. SINGLE BOX CULVERT
SCALE 1 : 100



SECTION RC. DOUBLE BOX CULVERT
SCALE 1 : 100

DIMENSION OF BOX CULVERT (M.)				
C	G	L	H1	H_F(min-max.)
1.50	1.50	1.80	0.50	0.50-3.00
1.80	1.80	2.10	0.60	0.50-3.00
2.10	2.10	2.50	0.70	0.50-3.00
2.40	2.40	2.80	0.80	0.50-3.00
3.00	3.00	3.60	1.00	0.50-3.00

NOTES:

1. CONCRETE GRADE fc'=350ksc
2. REINFORCING STEEL SHALL BE :
   - 2.1 DEFORMED BARS GRADE SD40
   - 2.2 ROUND BARS GRADE SR24
3. CLEAR CONCRETE COVER SHALL BE 0.05 M. EXCEPT THE BOTTOM OF SLABS OR WALLS AT WHITCH CLEAR COVER OF 0.075 M. SHALL BE PROVIDED.
4. SAFE LOAD OF SOIL BEARING CAPACITIES 90 KN/M.^{2}

V:\PROJECT\1485-SCR\DRAWINGS\03 PRELIM\06_DRAINAGE FOR STRUCTURES\SCR-DR-005.DWG

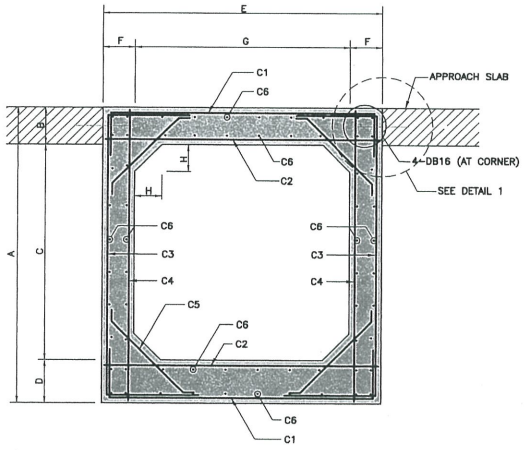
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

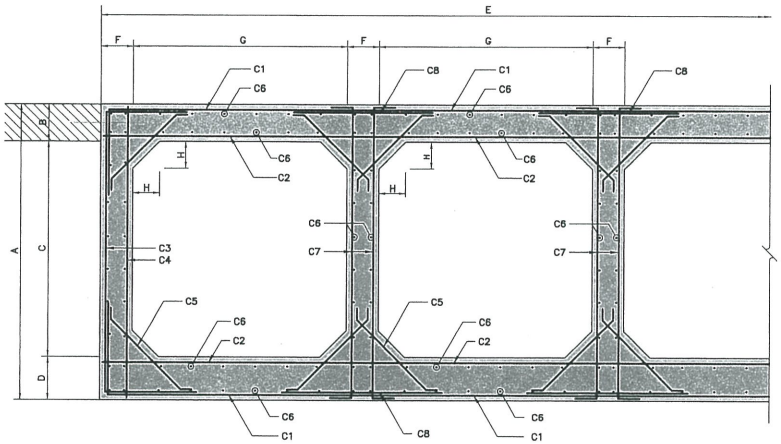
TITLE: DRAINAGE FOR STRUCTURES
BOX CULVERT
PLAN AND ELEVATION

DATE: FEBRUARY 2018
SCALE: A3 1:200
DWG. NO.: SCR-DR-005
SHEET NO.: 111



1 CELL BOX CULVERT

NOT TO SCALE

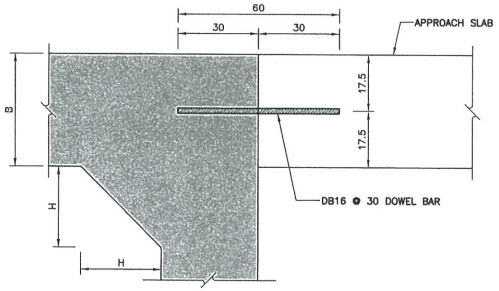


MULTI BOX CULVERT

NOT TO SCALE

CONCRETE DIMENSION DETAILS FOR BOX CULVERT

SIZE OF CULVERT OPENING HxW		CONCRETE DIMENSION (CM.)							
		A	B	C	D	E	F	G	H
1 CELL	1.80X1.80	245	30	180	35	240	30	180	30
	2.10X2.10	275	30	210	35	270	30	210	30
	2.80X2.80	365	40	280	45	360	40	280	30
M CELL	1.80X1.80	245	30	180	35	–	30	180	30
	2.10X2.10	275	30	210	35	–	30	210	30
	2.40X2.40	315	35	240	40	–	35	240	30
	3.00X3.00	385	40	300	45	–	45	300	40



DETAIL 1

NOT TO SCALE

BAR REINFORCEMENT DETAILS FOR BOX CULVERT

SIZE OF CULVERT OPENING HxW (m.)		SIZE BAR REINFORCEMENT							
		C1	C2	C3	C4	C5	C6	C7	C8
1 CELL	1.80X1.80	DB16@0.25	DB16@0.175	DB16@0.25	DB16@0.175	DB12@0.15	DB12@0.15	–	–
	2.10X2.10	DB16@0.25	DB20@0.20	DB16@0.25	DB16@0.15	DB12@0.15	DB12@0.15	–	–
	2.80X2.80	DB16@0.20	DB20@0.15	DB16@0.25	DB20@0.15	DB12@0.15	DB12@0.15	–	–
M CELL	1.80X1.80	DB16@0.25	DB16@0.25	DB16@0.30	DB16@0.20	DB12@0.15	DB12@0.15	DB16@0.30	DB12@0.25
	2.10X2.10	DB16@0.175	DB16@0.175	DB16@0.30	DB16@0.15	DB12@0.15	DB12@0.15	DB16@0.30	DB12@0.175
	2.40X2.40	DB16@0.15	DB16@0.15	DB16@0.30	DB20@0.15	DB12@0.15	DB12@0.15	DB16@0.30	DB12@0.15
	3.00X3.00	DB20@0.15	DB20@0.15	DB16@0.20	DB20@0.15	DB12@0.15	DB12@0.15	DB16@0.20	DB12@0.15

V:\PROJECT\1455-SCR\DRAWINGS\03_PRELIM\06_DRAINAGE FOR STRUCTURES\SCR-DR-006.DWG

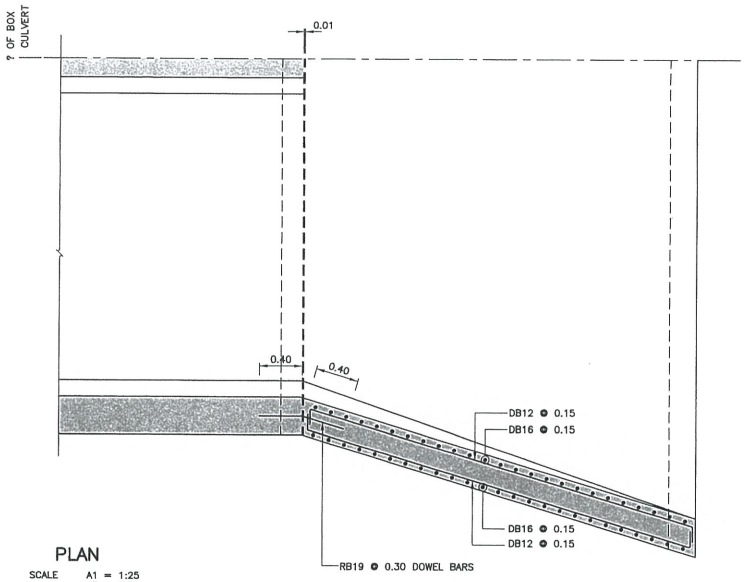
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

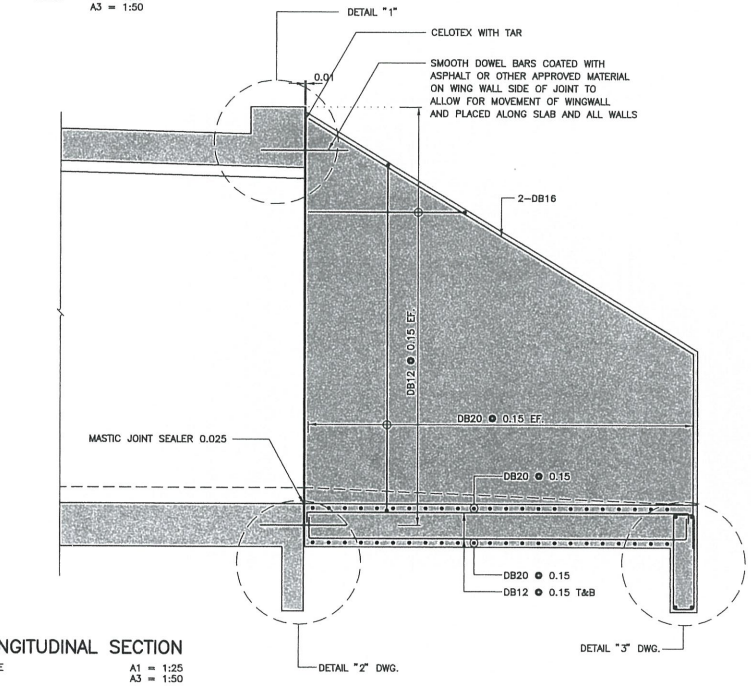
TITLE
DRAINAGE FOR STRUCTURES
BOX CULVERT
DIMENSION & REINFORCEMENT DETAILS

DATE: FEBRUARY 2018
SCALE: NOT TO SCALE
DWG. NO.: SCR-DR-006
SHEET NO.: 112



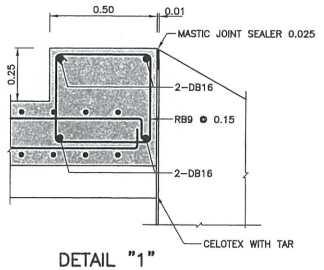
PLAN

SCALE A1 = 1:25
A3 = 1:50



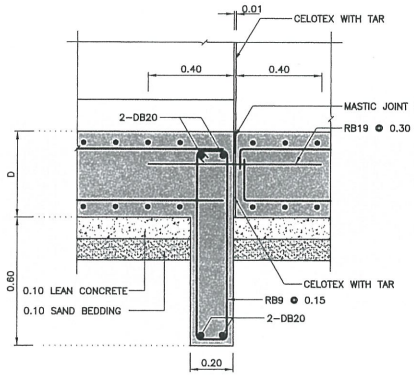
LONGITUDINAL SECTION

SCALE A1 = 1:25
A3 = 1:50



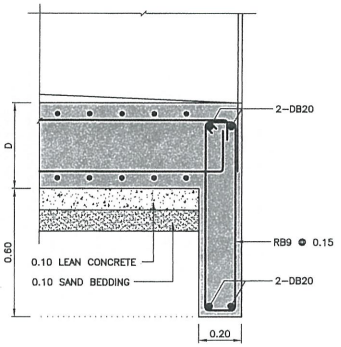
DETAIL "1"

SCALE A1 = 1:12.5
A3 = 1:25



DETAIL "2"

SCALE A1 = 1:12.5
A3 = 1:25



DETAIL "3"

SCALE A1 = 1:12.5
A3 = 1:25

NOTES:

1. CONCRETE GRADE fc'=350ksc
2. REINFORCING STEEL SHALL BE :
   2.1 DEFORMED BARS GRADE SD40
   2.2 ROUND BARS GRADE SR24
3. CLEAR CONCRETE COVER SHALL BE 0.05 M. EXCEPT THE BOTTOM OF SLABS OR WALLS AT WHITCH CLEAR COVER OF 0.075 M. SHALL BE PROVIDED.
4. SAFE LOAD OF SOIL BEARING CAPACITIES 90 KN/M.^{2}

V:\PROJECT\1455-SCR\DRAWINGS\03 PRELIMINAGE FOR STRUCTURES\SCR-DR-007.DWG

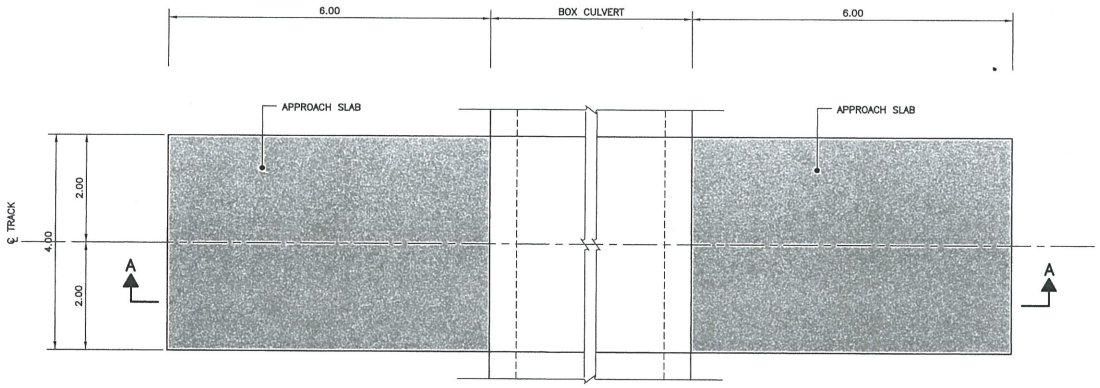
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

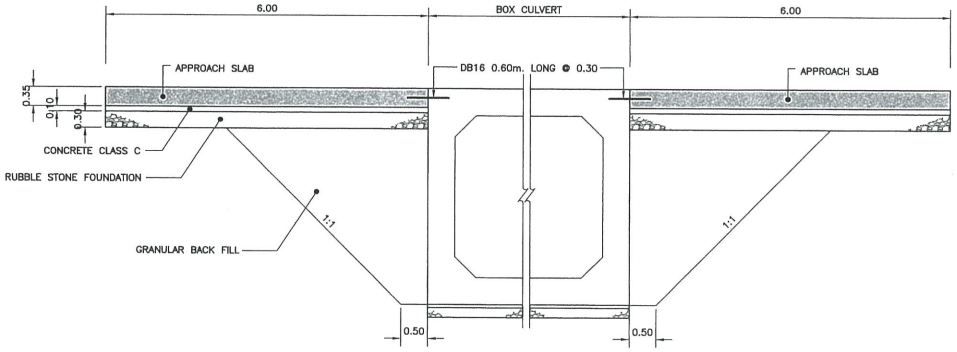
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
DRAINAGE FOR STRUCTURES
BOX CULVERT
HEADWALL REINFORCEMENT DETAILS

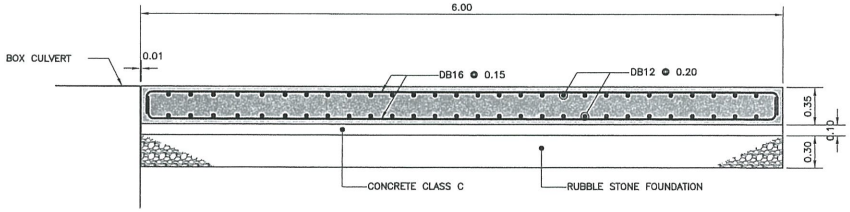
DATE:	SCALE:
FEBRUARY 2018	AS SHOWN
DWG. NO.: SCR-DR-007	SHEET NO.: 113



PLAN
SCALE 1:100



SECTION A–A
SCALE 1:100



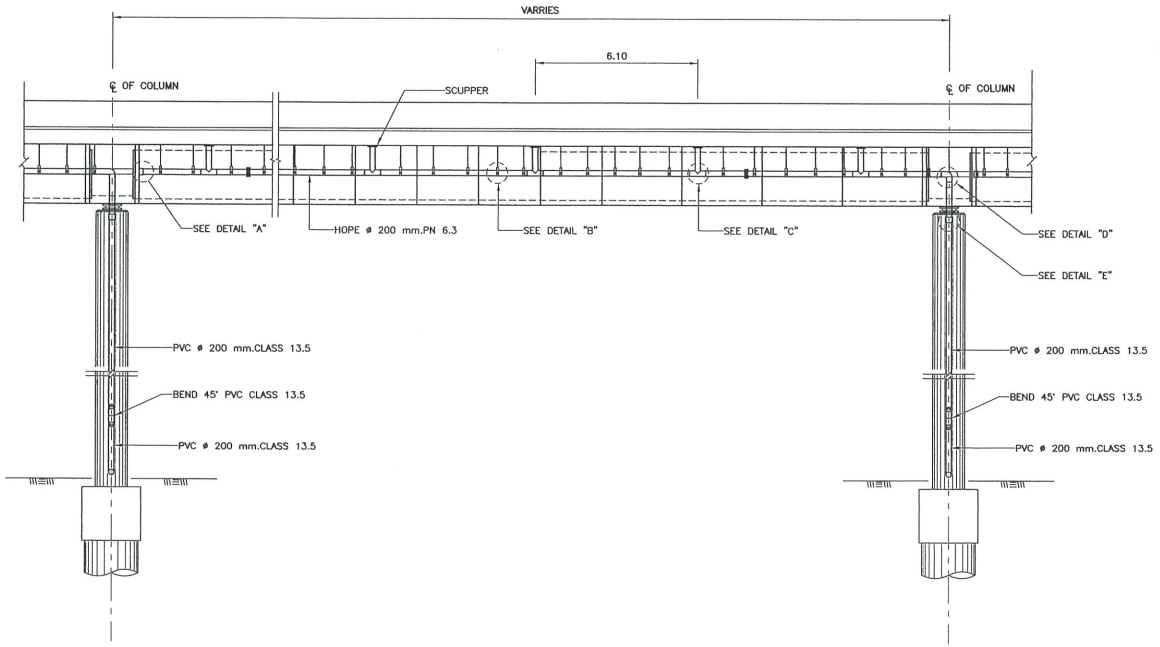
APPROACH SLAB REINFORCEMENT
SCALE 1:50

NOTES:

1. CONCRETE COVER = 50 mm.

V:\PROJECT\1455-SCR\DRAWINGS\03_PRELIM\OS_DRAINAGE FOR STRUCTURES\SCR-DR-008.DWG

KINGDOM OF THAILAND **MINISTRY OF TRANSPORT** **OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)**	**FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT**	*AEC Asian Engineering Consultants Corp., Ltd.* *Infra Plus Consultanting Co., Ltd.* *Enrich Consultants Co., Ltd.*	TITLE DRAINAGE FOR STRUCTURES BOX CULVERT APPROACH SLAB FOR BOX CULVERT	DATE: FEBRUARY 2018 DWG. NO.: SCR-DR-008	SCALE: AS SHOWN SHEET NO.: 114



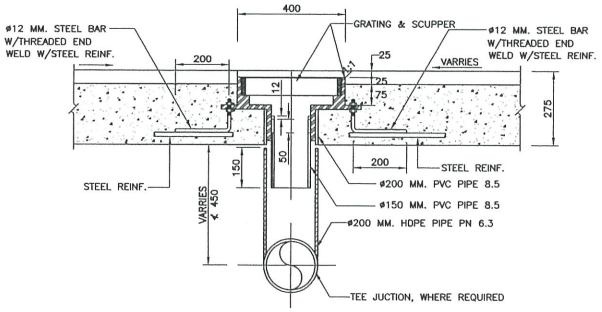
TYPICAL LONGITUDINAL DECK DRAINAGE

NOTES :

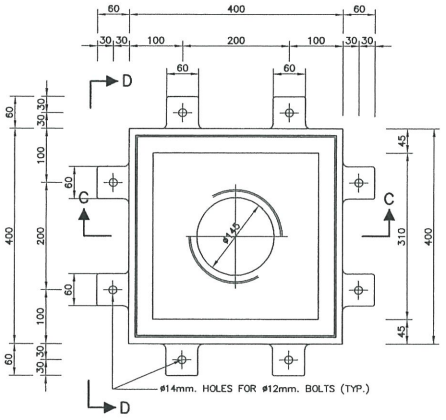
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISED NOTED.
2. HDPE PIPE SHALL BE IN ACCORDDANCE WITH TIS 982
3. LONGITUDINAL HORIZONTAL PIPE SLOPE FOR SPAN
   FOR SPAN < 30 SHALL BE 1% MIN
   FOR SPAN > 30 SHALL BE 2% MIN
4. DECK FOR TRANSITION STRUCTURE DRAINAGE SAME AS TYPICAL DECK DRAINAGE
5. FOR DETAILS SEE DWG. NO. R1-000-DR-9003-B TO R1-000-DR-9004-B.

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\06_DRAINAGE FOR STRUCTURES\SCR-DR-009.DWG

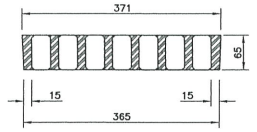
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE DRAINAGE FOR STRUCTURES TYPICAL LONGITUDINAL DECK DRAIN	DATE : FEBRUARY 2018 DWG. NO. : SCR-DR-009	SCALE : NOT TO SCALE SHEET NO. : 115



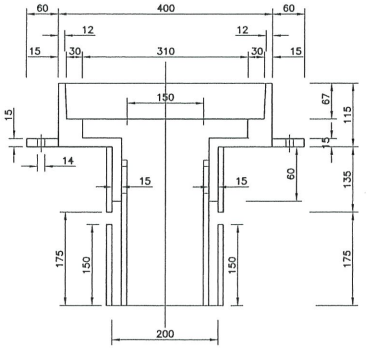
SCUPPER INSTALLATION (TYP.)
NOT TO SCALE



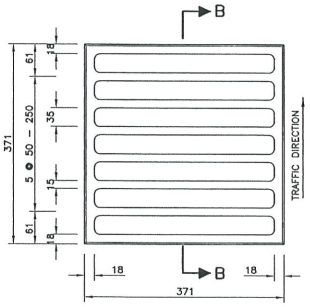
SCUPPER PLAN
NOT TO SCALE



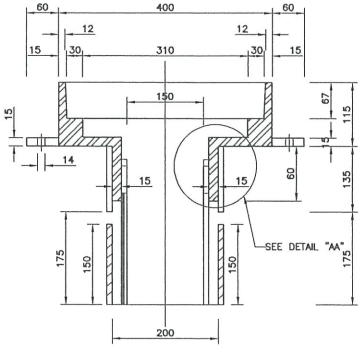
SECTION B – B
NOT TO SCALE



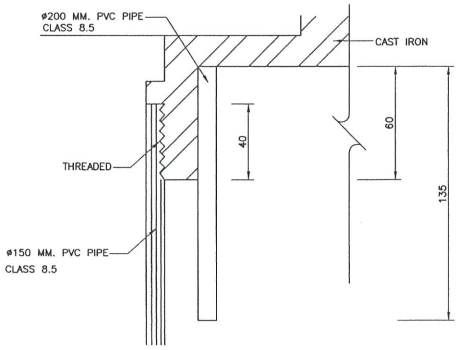
SECTION D – D
NOT TO SCALE



GRATING PLAN
NOT TO SCALE



SECTION C – C
NOT TO SCALE



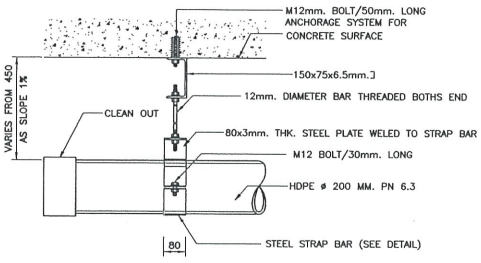
DETAIL "A"
NOT TO SCALE

NOTES:

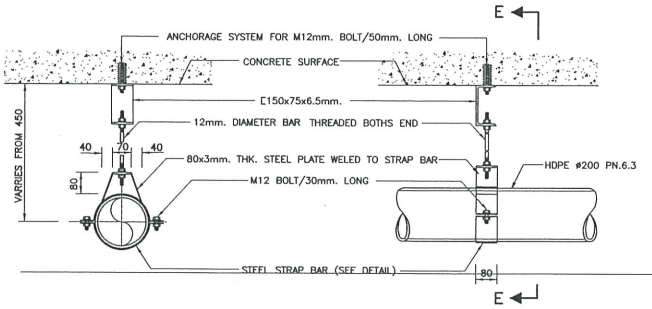
1. ALL DIMENSIONS SHOWN ARE IN MILLEMETRES UNLESS OTHERWISE INDICATED.
2. GRATING SHALL BE CAST IRON AND SHALL BE OF GOOD QUALITY, TOUGH, EVEN GRAINED, SMOOTH, FREE FROM SCALE, LUMPS, BLISTERS, HOLES DEFECTS OF ANY KIND WHICH RENDER THEM UNFIT FOR SERVICE.
3. THE CASTING SHALL BE GIVEN TWO COAT OF COAL TAR EPOXY.

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\06_DRAINAGE FOR STRUCTURES\SCR-DR-010.DWG

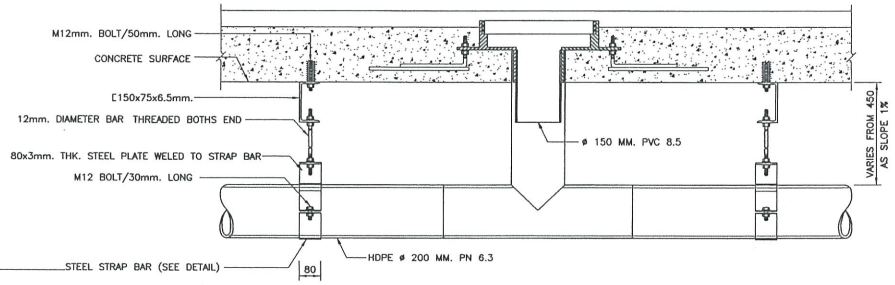
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE DRAINAGE FOR STRUCTURES SCUPPER AND GRATING DETAILS OF DECK DRAIN	DATE : FEBRUARY 2018 DWG. NO. : SCR–DR–010	SCALE : NOT TO SCALE SHEET NO. : 116



DETAIL "A"
NOT TO SCALE

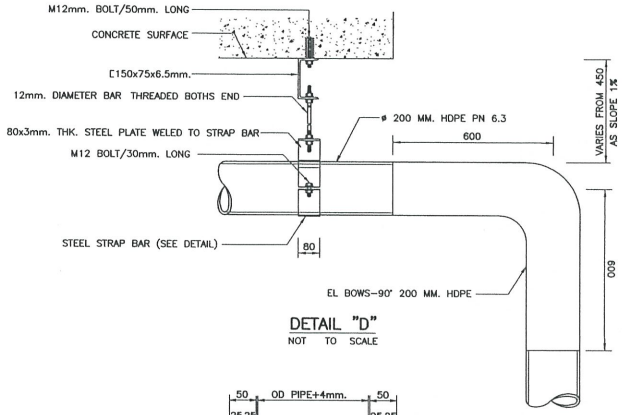


SECTION E – E

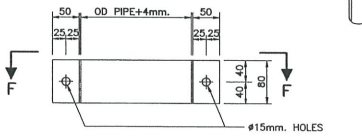


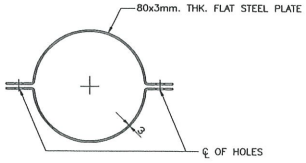
DETAIL "C"
NOT TO SCALE

DETAIL "B"
NOT TO SCALE



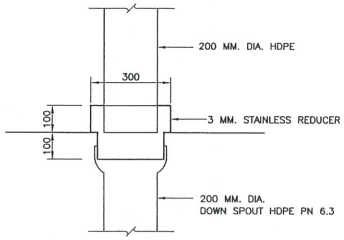
DETAIL "D"
NOT TO SCALE



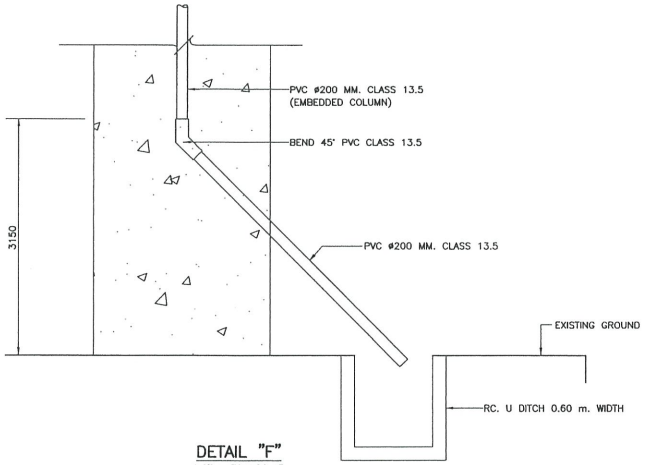


SECTION F – F

DETAIL OF STEEL STRAP BAR
NOT TO SCALE



DETAIL "E"
NOT TO SCALE



DETAIL "F"
NOT TO SCALE

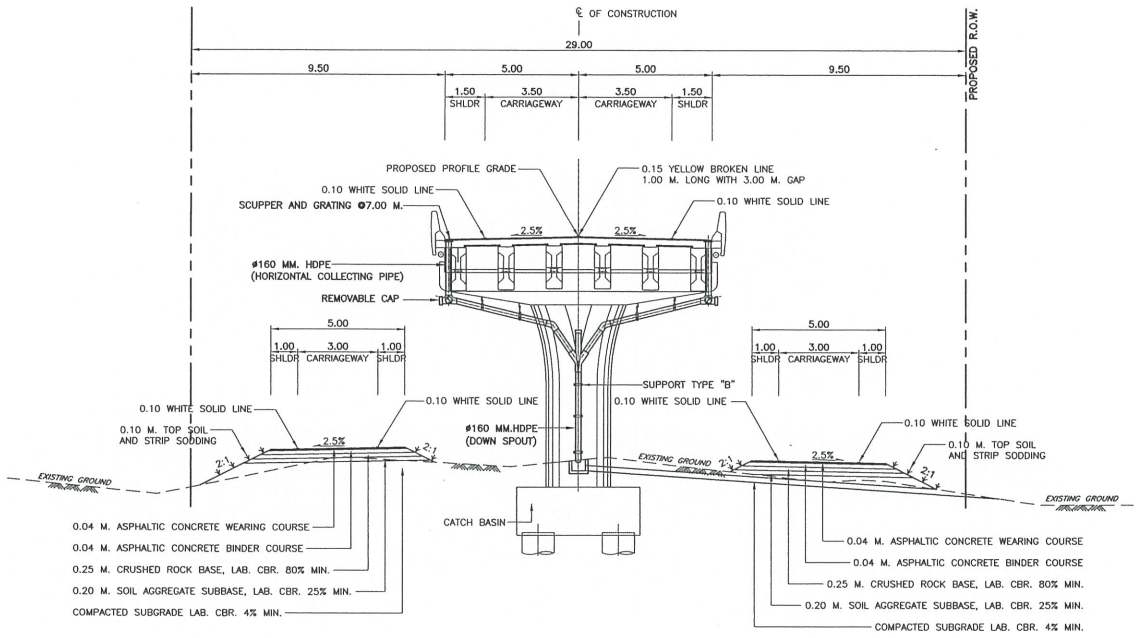
NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLEMETRES UNLESS OTHERWISE INDICATED.
2. ALL PARTS OF STEEL SUPPORT SHALL BE HOT DIP GALVANIZED.
3. PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) CLASS PN 6.3. AND PVC CLASS.
4. LONGITUDINAL PIPE SUPPORT SHALL BE CLOSED TO EVERY JOINT AND @ 1.20 M. MAX.

V:\PROJECT\1465-SCR\DRAWINGS\03 PRELIM\06_DRAWING FOR STRUCTURES\SCR-DR-011.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE DRAINAGE FOR STRUCTURES SUPPORT AND R.C. TROUGH DETAILS	DATE : FEBRUARY 2018 DWG. NO. : SCR-DR-011	SCALE : NOT TO SCALE SHEET NO. : 117

NO.	STATION (EXISTING TRACK)	EXISTING BOX CULVERT LENGTH (M.) CELL WXHXL	EXISTING BOX CULVERT LENGTH (M.) CELL WXHXL	INVERT (1)		SKEW ANGLE ℄ PIPE ↓ ℄ TRACK	TRACKS CENTER	RAIL LEVEL (2)	GROUND LEVEL (3)	INVERT (1)		TYPE OF CONSTRUCTURE	REMARKS
				RIGHT	LEFT					(2)−(3)	(2)−(1)		

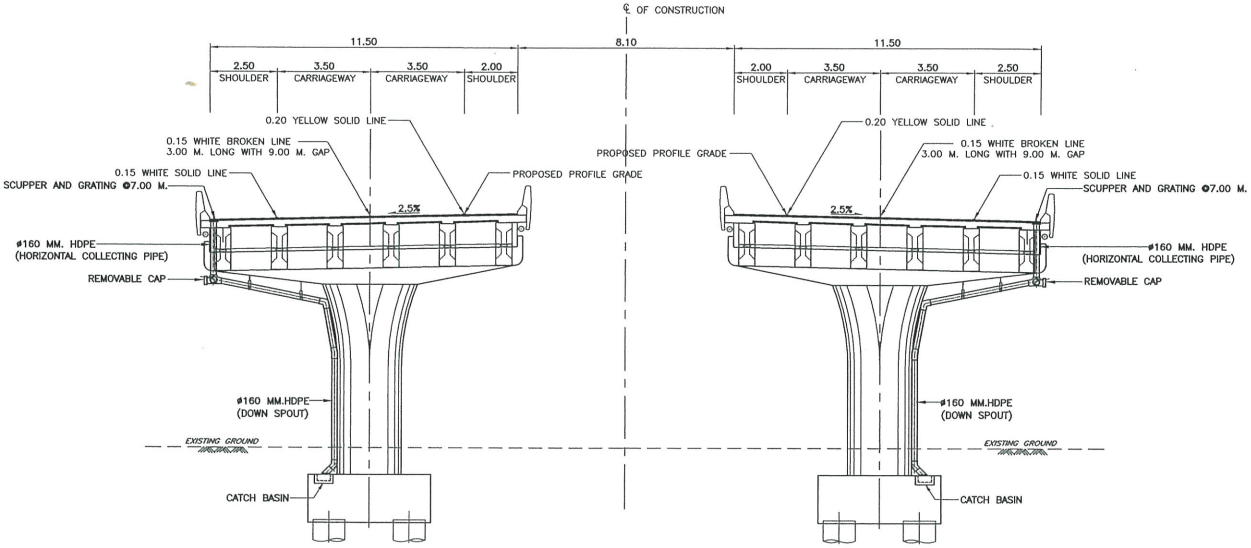


TYPICAL SECTION (1/2)

SCALE A1=1:100
A3=1:200

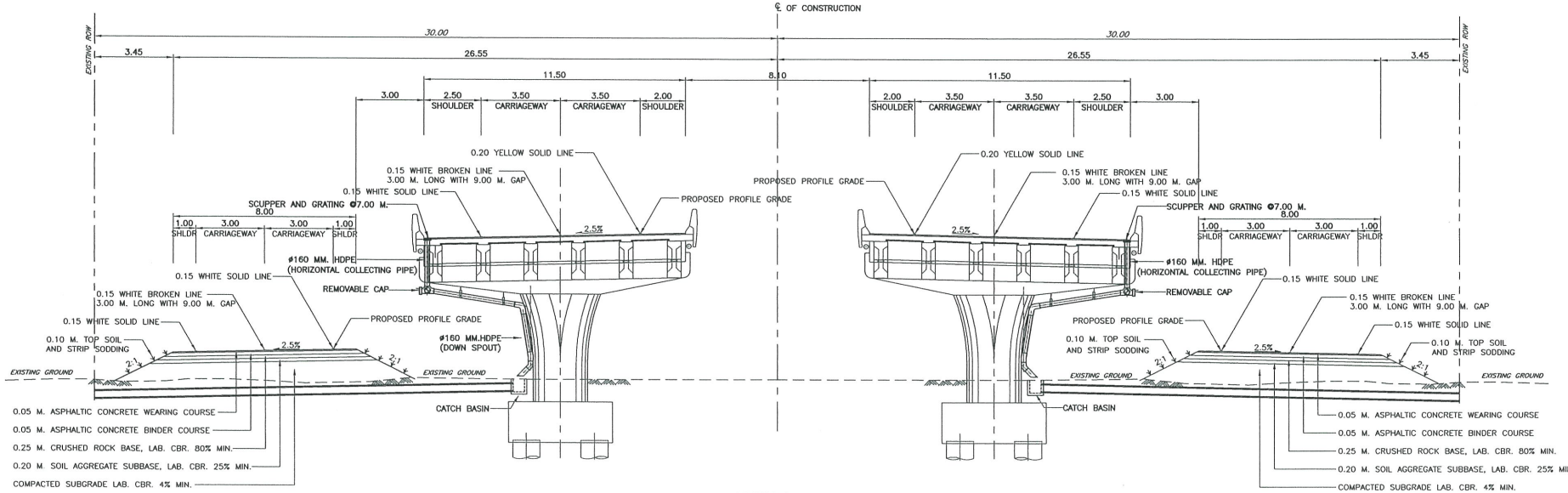
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE DRAINAGE FOR STRUCTURES TYPICAL SECTION (1/2)	DATE: FEBRUARY 2018 DWG NO.: SCR-DR-013	SCALE: A3 1:200 SHEET NO: 119



SECTION B–B

SCALE A1 = 1:100
A3 = 1:200



SECTION A–A

SCALE A1 = 1:100
A3 = 1:200

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE DRAINAGE FOR STRUCTURES TYPICAL SECTION (2/2)	DATE: FEBRUARY 2018 DWG. NO.: SCR-DR-014	SCALE: A3 1:200 SHEET NO.: 120

STRUCTURE WORK

RAILWAY BRIDGES

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON-RANONG RAILWAY PROJECTS

LIST OF DRAWINGS

DRAWING TITLE	DRAWING NO.	SHEET NO.
LIST OF DRAWINGS FOR ELEVATED RAILWAY BRIDGES SHEET 1/2	SCR-RB-GN-001	1
LIST OF DRAWINGS FOR ELEVATED RAILWAY BRIDGES SHEET 2/2	SCR-RB-GN-002	2
GENERAL NOTES FOR ELEVATED RAILWAY BRIDGES SHEET 1/3	SCR-RB-GN-003	3
GENERAL NOTES FOR ELEVATED RAILWAY BRIDGES SHEET 2/3	SCR-RB-GN-004	4
GENERAL NOTES FOR ELEVATED RAILWAY BRIDGES SHEET 3/3	SCR-RB-GN-005	5
RAILWAY BRIDGE		
RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+117 TO 2+327	SCR-RB-LA-001	6
RAILWAY BRIDGE PLAN AND ELEVATION KM. 6+490 TO 7+190 SHEET 1/2	SCR-RB-LA-002/1	7
RAILWAY BRIDGE PLAN AND ELEVATION KM. 6+490 TO 7+190 SHEET 2/2	SCR-RB-LA-002/2	8
RAILWAY BRIDGE PLAN AND ELEVATION KM. 9+135 TO 10+010 SHEET 1/2	SCR-RB-LA-003/1	9
RAILWAY BRIDGE PLAN AND ELEVATION KM. 9+135 TO 10+010 SHEET 2/2	SCR-RB-LA-003/2	10
RAILWAY BRIDGE PLAN AND ELEVATION KM. 11+650 TO 12+280 SHEET 1/2	SCR-RB-LA-004/1	11
RAILWAY BRIDGE PLAN AND ELEVATION KM. 11+650 TO 12+280 SHEET 2/2	SCR-RB-LA-004/2	12
RAILWAY BRIDGE PLAN AND ELEVATION KM. 15+205 TO 15+415	SCR-RB-LA-005	13
RAILWAY BRIDGE PLAN AND ELEVATION KM. 17+430 TO 17+675	SCR-RB-LA-006	14
RAILWAY BRIDGE PLAN AND ELEVATION KM. 19+430 TO 20+060 SHEET 1/2	SCR-RB-LA-007/1	15
RAILWAY BRIDGE PLAN AND ELEVATION KM. 19+430 TO 20+060 SHEET 2/2	SCR-RB-LA-007/2	16
RAILWAY BRIDGE PLAN AND ELEVATION KM. 20+910 TO 21+190	SCR-RB-LA-008	17
RAILWAY BRIDGE PLAN AND ELEVATION KM. 21+540 TO 21+645	SCR-RB-LA-009	18
RAILWAY BRIDGE PLAN AND ELEVATION KM. 24+830 TO 25+390	SCR-RB-LA-010	19
RAILWAY BRIDGE PLAN AND ELEVATION KM. 25+685 TO 25+860	SCR-RB-LA-011	20
RAILWAY BRIDGE PLAN AND ELEVATION KM. 27+145 TO 27+250	SCR-RB-LA-012	21
RAILWAY BRIDGE PLAN AND ELEVATION KM. 27+650 TO 28+105	SCR-RB-LA-013	22
RAILWAY BRIDGE PLAN AND ELEVATION KM. 28+770 TO 28+910	SCR-RB-LA-014	23
RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 1/3	SCR-RB-LA-015/1	24
RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 2/3	SCR-RB-LA-015/2	25
RAILWAY BRIDGE PLAN AND ELEVATION KM. 32+595 TO 33+750 SHEET 3/3	SCR-RB-LA-015/3	26
RAILWAY BRIDGE PLAN AND ELEVATION KM. 34+020 TO 34+545	SCR-RB-LA-016	27
RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+210 TO 35+455	SCR-RB-LA-017	28
RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 1/3	SCR-RB-LA-018/1	29
RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 2/3	SCR-RB-LA-018/2	30
RAILWAY BRIDGE PLAN AND ELEVATION KM. 35+765 TO 36+955 SHEET 3/3	SCR-RB-LA-018/3	31
RAILWAY BRIDGE PLAN AND ELEVATION KM. 38+145 TO 38+320	SCR-RB-LA-019	32
RAILWAY BRIDGE PLAN AND ELEVATION KM. 39+722 TO 39+897	SCR-RB-LA-020	33
RAILWAY BRIDGE PLAN AND ELEVATION KM. 41+850 TO 42+200	SCR-RB-LA-021	34
RAILWAY BRIDGE PLAN AND ELEVATION KM. 44+030 TO 44+345	SCR-RB-LA-022	35
RAILWAY BRIDGE PLAN AND ELEVATION KM. 45+190 TO 45+505	SCR-RB-LA-023	36
RAILWAY BRIDGE PLAN AND ELEVATION KM. 45+735 TO 45+875	SCR-RB-LA-024	37
RAILWAY BRIDGE PLAN AND ELEVATION KM. 46+625 TO 46+905	SCR-RB-LA-025	38
RAILWAY BRIDGE PLAN AND ELEVATION KM. 47+765 TO 48+430 SHEET 1/2	SCR-RB-LA-026/1	39
RAILWAY BRIDGE PLAN AND ELEVATION KM. 47+765 TO 48+430 SHEET 2/2	SCR-RB-LA-026/2	40

DRAWING TITLE	DRAWING NO.	SHEET NO.
RAILWAY BRIDGE		
RAILWAY BRIDGE PLAN AND ELEVATION KM. 49+050 TO 49+330	SCR-RB-LA-027	41
RAILWAY BRIDGE PLAN AND ELEVATION KM. 50+485 TO 50+695	SCR-RB-LA-028	42
RAILWAY BRIDGE PLAN AND ELEVATION KM. 51+400 TO 51+540	SCR-RB-LA-029	43
RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 1/3	SCR-RB-LA-030/1	44
RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 2/3	SCR-RB-LA-030/2	45
RAILWAY BRIDGE PLAN AND ELEVATION KM. 53+440 TO 54+700 SHEET 3/3	SCR-RB-LA-030/3	46
RAILWAY BRIDGE PLAN AND ELEVATION KM. 55+540 TO 55+785	SCR-RB-LA-031	47
RAILWAY BRIDGE PLAN AND ELEVATION KM. 56+730 TO 56+940	SCR-RB-LA-032	48
RAILWAY BRIDGE PLAN AND ELEVATION KM. 58+520 TO 58+765	SCR-RB-LA-033	49
RAILWAY BRIDGE PLAN AND ELEVATION KM. 60+185 TO 60+675	SCR-RB-LA-034	50
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 1/8	SCR-RB-LA-035/1	51
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 2/8	SCR-RB-LA-035/2	52
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 3/8	SCR-RB-LA-035/3	53
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 4/8	SCR-RB-LA-035/4	54
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 5/8	SCR-RB-LA-035/5	55
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 6/8	SCR-RB-LA-035/6	56
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 7/8	SCR-RB-LA-035/7	57
RAILWAY BRIDGE PLAN AND ELEVATION KM. 61+855 TO 65+600 SHEET 8/8	SCR-RB-LA-035/8	58
RAILWAY BRIDGE PLAN AND ELEVATION KM. 66+145 TO 66+705	SCR-RB-LA-036	59
RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+125 TO 67+755 SHEET 1/2	SCR-RB-LA-037/1	60
RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+125 TO 67+755 SHEET 2/2	SCR-RB-LA-037/2	61
RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 1/3	SCR-RB-LA-038/1	62
RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 2/3	SCR-RB-LA-038/2	63
RAILWAY BRIDGE PLAN AND ELEVATION KM. 67+995 TO 69+220 SHEET 3/3	SCR-RB-LA-038/3	64
RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 1/4	SCR-RB-LA-039/1	65
RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 2/4	SCR-RB-LA-039/2	66
RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 3/4	SCR-RB-LA-039/3	67
RAILWAY BRIDGE PLAN AND ELEVATION KM. 71+155 TO 72+940 SHEET 4/4	SCR-RB-LA-039/4	68
RAILWAY BRIDGE PLAN AND ELEVATION KM. 74+590 TO 75+430 SHEET 1/2	SCR-RB-LA-040/1	69
RAILWAY BRIDGE PLAN AND ELEVATION KM. 74+590 TO 75+430 SHEET 2/2	SCR-RB-LA-040/2	70
RAILWAY BRIDGE PLAN AND ELEVATION KM. 75+715 TO 75+925	SCR-RB-LA-041	71
RAILWAY BRIDGE PLAN AND ELEVATION KM. 77+645 TO 78+590 SHEET 1/2	SCR-RB-LA-042/1	72
RAILWAY BRIDGE PLAN AND ELEVATION KM. 77+645 TO 78+590 SHEET 2/2	SCR-RB-LA-042/2	73
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 1/8	SCR-RB-LA-043/1	74
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 2/8	SCR-RB-LA-043/2	75
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 3/8	SCR-RB-LA-043/3	76
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 4/8	SCR-RB-LA-043/4	77
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 5/8	SCR-RB-LA-043/5	78
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 6/8	SCR-RB-LA-043/6	79
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 7/8	SCR-RB-LA-043/7	80
RAILWAY BRIDGE PLAN AND ELEVATION KM. 79+935 TO 83+400 SHEET 8/8	SCR-RB-LA-043/8	81
RAILWAY BRIDGE PLAN AND ELEVATION KM. 85+985 TO 86+265	SCR-RB-LA-044	82
RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 1/3	SCR-RB-LA-045/1	83
RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 2/3	SCR-RB-LA-045/2	84
RAILWAY BRIDGE PLAN AND ELEVATION KM. 87+910 TO 89+380 SHEET 3/3	SCR-RB-LA-045/3	85

S:\WORKING_CAD\1452-SCR\4_SUBMITTED\2_DRAFT FINAL DRAWINGS\20180220\20180220 SUBMITTAL DOCUMENT, REVISED MAIN LINE RAILWAY BRIDGES\CAD\SCR-GN-001 TO 005.DWG

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: LIST OF DRAWINGS FOR ELEVATED RAILWAY BRIDGES SHEET 1/2

DATE: Feb-18
SCALE: NOT TO SCALE
DWG. NO.: SCR-RB-GN-001
SHEET NO.: 1

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON-RANONG RAILWAY PROJECTS

LIST OF DRAWINGS

DRAWING TITLE	DRAWING NO.	SHEET NO.
RAILWAY BRIDGE		
RAILWAY BRIDGE PLAN AND ELEVATION KM. 89+700 TO 90+330 SHEET 1/2	SCR-RB-LA-046/1	86
RAILWAY BRIDGE PLAN AND ELEVATION KM. 89+700 TO 90+330 SHEET 2/2	SCR-RB-LA-046/2	87
RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 1/3	SCR-RB-LA-047/1	88
RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 2/3	SCR-RB-LA-047/2	89
RAILWAY BRIDGE PLAN AND ELEVATION KM. 92+300 TO 93+455 SHEET 3/3	SCR-RB-LA-047/3	90
RAILWAY BRIDGE PLAN AND ELEVATION KM. 95+770 TO 96+435 SHEET 1/2	SCR-RB-LA-048/1	91
RAILWAY BRIDGE PLAN AND ELEVATION KM. 95+770 TO 96+435 SHEET 2/2	SCR-RB-LA-048/2	92
RAILWAY BRIDGE PLAN AND ELEVATION KM. 97+405 TO 97+790	SCR-RB-LA-049	93
RAILWAY BRIDGE PLAN AND ELEVATION KM. 98+380 TO 98+695	SCR-RB-LA-050	94
RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+500 TO 3+270 SHEET 1/2	SCR-RB-LA-051/1	95
RAILWAY BRIDGE PLAN AND ELEVATION KM. 2+500 TO 3+270 SHEET 2/2	SCR-RB-LA-051/2	96
RAILWAY BRIDGE PLAN AND ELEVATION KM. 3+720 TO 4+280 SHEET 1/2	SCR-RB-LA-052/1	97
RAILWAY BRIDGE PLAN AND ELEVATION KM. 3+720 TO 4+280 SHEET 2/2	SCR-RB-LA-052/2	98
SEGMENTAL BOX GIRDER (BG02)		
SUPERSTRUCTURES AND SUB-STRUCTURES		
SPAN ASSEMBLY	SCR-RB-ST-401	99
TYPICAL DETAILS OF SEGMENTAL BOX GIRDER	SCR-RB-ST-501	100
TYPICAL DETAILS OF PIER TYPE "VD3"	SCR-RB-ST-601	101
TYPICAL DETAILS OF PIER TYPE "VD3E"	SCR-RB-ST-602	102
TYPICAL DETAILS OF ABUTMENT TYPE "BG01"	SCR-RB-ST-701	103
MISCELLANEOUS		
TYPICAL DETAILS OF DRAIN PIPES AND GRATINGS	SCR-RB-MI-011	104
TYPICAL DETAILS OF HANDRAIL	SCR-RB-MI-012	105
TYPICAL DETAILS OF PARAPET AT NOISE BARRIER	SCR-RB-MI-013	106
TYPICAL DETAILS OF CABLE TROUGH AND OCS BASE	SCR-RB-MI-014	107

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: LIST OF DRAWINGS FOR ELEVATED RAILWAY BRIDGES SHEET 2/2	DATE: Feb-18 DWG. NO.: SCR-RB-GN-002	SCALE: NOT TO SCALE SHEET NO.: 2

A. SPECIFICATIONS

A1. DESIGN STANDARDS

STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST EN 1991-2 FOR LOAD ACTIONS ON STRUCTURES AND WITH APPLICABLE PARTS OF RELEVANT INTERNATIONAL CODES AS DEEMED APPROPRIATE.

B. LOADINGS

B1. DEAD LOADS (D)

DEAD LOADS ARE THE VERTICAL LOADS FROM THE WEIGHT OF THE ENTIRE STRUCTURES INCLUDING ALL PERMANENTLY INSTALLED ELEMENTS SUCH AS WALLS, TRACK, BALLAST, CONDUITS AND OTHER FIXED SERVICE EQUIPMENTS.

B1.1 SELF WEIGHT (SW)

THE FOLLOWING UNIT WEIGHTS SHALL BE USED:

STEEL	76.9	kN/M^3
CAST IRON	70.6	kN/M^3
PLAIN CONCRETE	23.5	kN/M^3
REINFORCED CONCRETE	24.5	kN/M^3
BALLAST	18.0	kN/M^3

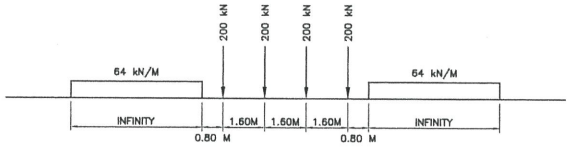
B1.2 SUPERIMPOSED DEAD LOADS (SDL)

SUPERIMPOSED DEAD LOADS ARE THE WEIGHTS OF ALL PERMANENT ELEMENTS NOT BEING PARTS OF THE TRACK SUPPORTING STRUCTURES SUCH AS PARAPET, TRACK SLAB, RAILS AND FASTENERS, SIGNALING AND CABLES, DRAINAGE SYSTEM, ETC. AND ARE SUMMARIZED BELOW.

SINGLE TRACK MAIN LINE	100	kN/M
DOUBLE TRACK MAIN LINE	130	kN/M

B2. LIVE LOADS (L)

THE TRACK SUPPORTING STRUCTURES SHALL BE DESIGNED TO CARRY THE STANDARD TRAIN LOADS PLACED IN POSITIONS TO PRODUCE MAXIMUM STESSES IN THE BRIDGE COMPONENTS.



U20-THAI RAIL

B3. LURCHING

LURCHING RESULTS FROM THE TEMPORARY TRANSFER OF PART OF THE LIVE LOADING FROM ONE RAIL TO ANOTHER. THE 56% AND 44% OF THE TRAIN LOAD SHALL BE APPLIED AND THIS WILL CORRESPOND TO A MOMENT AT RAIL EQUAL TO 6% OF THE TRAIN LOAD MULTIPLIED BY THE DISTANCE BETWEEN THE TWO RAILS.

B4. IMPACT FACTOR (I)

THE FORCES AND MOMENTS CALCULATED FROM THE SPECIFIED STATIC TRAIN LOADS SHALL BE MULTIPLIED BY AN APPROPRIATE FACTOR GIVEN BY TRACK WITH STANDARD MAINTENANCE FOR PERMITTED REAL TRAIN SPEED SHALL BE USED.

B5. HUNTING FORCES

THE HUNTING OR NOSING FORCES ARE CAUSED BY THE LATERAL INTERACTION BETWEEN TRAIN AND RAIL, A SINGLE NOMINAL LOAD OF 100kN ACTING HORIZONTALLY TO THE TRACK AND AT SUCH A POINT IN THE SPAN SHALL BE USED.

B6. CENTRIFUGAL FORCE (CF)

WHERE THE TRACK IS ON HORIZONTAL CURVES, THE CENTRIFUGAL FORCE ACTING THROUGH THE CENTER OF GRAVITY OF THE TRAIN AT A HEIGHT OF 1.80M. ABOVE TOP OF LOWER RAIL SHALL BE CALCULATED FROM THE FOLLOWING FORMULA :

CF = $L(v)^2 / (127)$

v = MAXIMUM TRAIN SPEED IN CURVE, KM/HR.

R = CURVE RADIUS, M.

L = TRAIN LOAD WITHOUT IMPACT, KN

B7. LONGITUDINAL FORCE (LF)

PROVISION SHALL BE MADE FOR THE NOMINAL LOADS DUE TO TRACTION AND BRAKING OF THE TRAIN, THE LOAD OF 10KN/M.(800 KN.MAX) SHALL ACT AT RAIL LEVEL IN A DIRECTION PARALLEL TO THE TRACKS AND WITHOUT IMPACT.

B8. WIND LOAD (WL)

B8.1 WIND LOAD ON VIADUCT STRUCTURE (WS)

A WIND LOAD OF 2.4 kN/M^2 SHALL BE APPLIED HORIZONTALLY AT RIGHT ANGLES TO THE LONGITUDINAL AXIS OF THE STRUCTURE, THE TOTAL WIND LOAD SHALL NOT BE LESS THAN 4.4 kN/m.

B8.2 WIND LOAD ON TRAIN LIVE LOAD (WT)

A WIND LOAD OF 2.4 kN/M^2 SHALL BE APPLIED HORIZONTALLY AT RIGHT ANGLES TO THE TRAIN HEIGHT OF 4.0 M. AND ACTS AT 1.8 M. ABOVE THE RAIL.

B9. TEMPERATURE EFFECT (T)

THE FORCE EFFECTS AND THE MOVEMENT OF THE STRUCTURE DUE TO CHANGES IN THE OVERALL TEMPERATURE SHALL BE CONSIDERED AS SPECIFIED IN THE THE CODE.

B10. CREEP AND SHRINKAGE (CR & SH)

THE LONG TERM STRAIN EFFECTS OF CONCRETE FROM CREEP AND SHRINKAGE SHALL BE COMPUTED IN ACCORDANCE WITH CEB-FIP MODEL CODE OF CONCRETE STRUCTURES, USING RELATIVE HUMIDITY OF 80%.

B11. COLLISION FORCE (CL)

ADJACENT PIERS SHALL BE DESIGNED TO WITHSTAND THE FORCE FROM VEHICULAR COLLISION UNLESS PROTECTED BY SUITABLE BARRIERS.

TYPE	NORMAL	PARALLEL	POINT OF APPLICATION
FORCE FROM AUTOMOBILE BUMPER	150	50	0.75 M. ABOVE THE ROADWAY
RESIDUAL FORCE FROM AUTOMOBILE BUMPER	1000	1000	1.0-3.0 M. ABOVE THE ROADWAY

B12. DERAILMENT LOAD (DR)

THE VIADUCT STRUCTURES SHALL BE DESIGNED TO REMAIN STABLE AND NOT SUFFER EXCESSIVE DAMAGES IN THE EVENT OF A DERAILMENT AS SPECIFIED IN B5, SECTION 8.5.2.

B13. ERECTION LOAD

LOADS ON STRUCTURE FOR EACH STAGE OF CONSTRUCTION SHALL BE EVALUATED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

B14. EARTHQUAKE LOAD

SEISMIC LOADS SHALL BE CONSIDERED IN THE DESIGN OF STRUCTURES IN THIS REGION. THE SEISMIC IMPACTS FOR CHUMPON AND RANONG PROVINCES ARE EXPECTED TO BE MODERATE AS TABULATED.

PROVINCE	SPECIAL RESPONSE ACCELERATION (g)	
	Sa	S1
CHUMPON	0.081-0.093	0.075-0.093
RANONG	0.098-0.105	0.089-0.112

THE EQUIVALENT STATIC FORCE METHOD IN ACCORDANCE WITH DPT 1302-52 SHALL BE ADOPTED FOR COMPUTING THE SEISMIC LOADS.

B15. DIFFERENTIAL SETTLEMENT (DS)

DESIGN DIFFERENTIAL SETTLEMENT BETWEEN ADJACENT PIERS SHALL BE NOT GREATER THAN 20 MM FOR ALL PILES EXCEPT PILES SUPPORTING SIMPLE SPAN STRUCTURES, IN THIS CASE THE DIFFERENT SETTLEMENT WILL HAVE LITTLE OR NO STRUCTURAL IMPACT. THE LOAD SHALL BE CONSIDERED A LONG-TERM EFFECT THAT DEVELOPS GRADUALLY AND MAY BE MITIGATED BY CONCRETE CREEP CALCULATED IN ACCORDANCE WITH CEB-FIP 1990.

B16. EARTH PRESSURE (E)

STRUCTURES WHICH RETAIN FILLS SHALL BE PROPORTIONED TO WITHSTAND PRESSURE AS GIVEN BY COULOMB'S EQUATION AND THEY SHALL BE DESIGNED NOT LESS THAN AN EQUIVALENT FLUID WEIGHT OF 4.8 kN/M^3. A LIVE LOAD SURCHARGE PRESSURE NOT LESS THAN 0.60 M OF EARTH HEIGHT SHALL BE APPLIED

B17. BOUYANCY (B)

THE FORCES SHALL BE APPLIED TO ALL STRUCTURES INCLUDING PILES.

B18. STREAM FLOW FORCE (SF)

THE EFFECT OF FLOWING WATER ACTING ON PIERS SHALL BE CALCULATED BY THE FOLLOWING FORMULA :

$P = 515\ K(v)^2$

WHERE

P = AVERAGE PRESSURE IN $N/M.^2$

v = AVERAGE FLOW RATE / FLOW AREA IN M/S

K = 1.40 FOR SQUARE-ENDED PIERS,
0.70 FOR CIRCULAR PIERS

B19. LOAD COMBINATIONS

B19.1 SERVICE LOAD COMBINATIONS

THE SERVICE LOAD COMBINATIOS TO BE APPLIED IN THE DESIGN ARE TABULATED BELOW :

LOAD COMPONENT	LOAD COMBINATIONS				
	S1	S2	S3	S4	S5
DEAD LOAD(D) : CONCRETE	1.00	1.00	1.00	1.00	1.00
SUPERIMPOSED DEAD LOAD (SDL)	1.00	1.00	1.00	1.00	1.00
WIND : DURING ERECTION		1.00			
WITH D + SDL		1.00			
WITH D + SDL + L		1.00			
TEMP : RESTRAINT DUE TO MOVEMENT			1.00		
FRICTIONAL RESTRAINT					1.00
TEMPERATURE DIFFERENCE			0.80		
DIFFERENTIAL SETTLEMENT (DS)			1.00		
EARTH PRESSURE/LIVE LOAD SUR (E)	1.00	1.00	1.00	1.00	1.00
CREEP AND SHRINKAGE (CR&SH)	1.00	1.00	1.00	1.00	1.00
STANDARD REAL TRAIN LIVE LOAD	1.00	1.00	1.00		
CENTRIFUGAL(CF) OR HUNTING (HF)	1.10	1.00	1.00	1.00	
LONGITUDINAL FORCE (LF)	1.10	1.00	1.00		
COLLISION LOAD (CL)				1.00	

B19.2 ULTIMATE LOAD COMBINATIONS

THE ULTIMATE LOAD COMBINATIOS TO BE APPLIED IN THE DESIGN ARE TABULATED BELOW :

LOAD COMPONENT	LOAD COMBINATIONS				
	U1	U2	U3	U4	U5
DEAD LOAD(D) : CONCRETE	1.00	1.00	1.00	1.00	1.00
SUPERIMPOSED DEAD LOAD (SDL)	1.20	1.20	1.20	1.20	1.20
WIND : DURING ERECTION		1.10			
WITH D + SDL		1.40			
WITH D + SDL + L		1.10			
TEMP : RESTRAINT DUE TO MOVEMENT			1.30		
FRICTIONAL RESTRAINT					1.30
TEMPERATURE DIFFERENCE			1.00		
DIFFERENTIAL SETTLEMENT (DS)	1.00	1.00	1.00	1.00	1.00
EARTH PRESSURE/LIVE LOAD SUR (E)	1.50	1.50	1.50	1.50	1.50
CREEP AND SHRINKAGE (CR&SH)	1.00	1.00	1.00	1.00	1.00
STANDARD REAL TRAIN LIVE LOAD	1.40	1.20	1.20		
CENTRIFUGAL(CF) OR HUNTING (HF)	1.40	1.20	1.20	1.50	
LONGITUDINAL FORCE (LF)	1.40	1.20	1.20		
COLLISION LOAD (CL)				1.25	

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C. MATERIALS

C1. CONCRETE

C1.1 CONCRETE STRENGTH
UNLESS OTHERWISE SHOWN ON THE DRAWINGS, THE COMPRESSIVE CYLINDER STRENGTH AT 28 DAYS SHALL BE AS FOLLOWS :

TYPICAL USE	f'c(N/mm.^{2})
BORED PILE	30
SPUN PILE	50
FOUNDATION, ABUTMENT AND PIER	35
PRECAST BOX GIRDER AND BEAM	45
CAST-IN-SITU SEGMENTAL DECK, TRANSITION STRUCTURE DECK AND WALL	45
LEAN CONCRETE	20
OTHERS	35

C1.2 ALL CONSTRUCTION JOINTS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS OR AS APPROVED BY THE ENGINEER.

C1.3 UNLESS OTHERWISE INDICATED ON THE DRAWINGS , ALL EXTERNAL CORNERS ARE TO HAVE 20 x 20 mm. CHAMFERS FORMED BY HARDWOOD OR STEEL FILLETS FIXED TO THE FORMWORK.

C1.4 CONCRETE COVER
UNLESS NOTED ON THE DRAWINGS , THE FOLLOWING MINIMUM CONCRETE COVERS (FROM FACE OF CONCRETE TO FACE OF OUTER BAR) SHALL BE PROVIDED :

TYPICAL USE	MIN.COVER (mm.)
IN-SITU PILES	75
PRECAST SPUN PILES	45
UNDERSIDE OF PILE CAPS	100
PILE CAPS (OTHER THAN UNDERSIDE)	75
COLUMNS AND TRANSITION STRUCTURE WALL	50
SUPERSTRUCTURE (EXTERNAL FACE) AND TRANSITION STRUCTURE DECK	40
SUPERSTRUCTURE (INTERNAL FACE)	30
TOP BARS IN DECK (COVERED WITH SURFACING)	30
PARAPETS	30
COVER TO TENDON DUCTS SHALL BE ONE-HALF THE INSIDE DIAMETER OF THE DUCT, BUT NOT LESS THAN SPECIFIED FOR REBARS.	

C2. PRESTRESSING

C2.1 THE PRESTRESSING SYSTEM SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
PRESTRESSING STRAND PROPERTIES SHALL BE AS FOLLOWS:

PROPERTIES OF PRESTRESSING STRANDS		
NOMINAL DIA., mm.	15.24	12.7
NOMINAL MASS, Kg/m.	1.102	0.775
NOMINAL AREA, mm.^{2}	140	98.71
BREAKING STRENGTH, kN	260.7	183.7
RELAXATION		
- 70% UTS	2.5%	2.5%
- 80% UTS	3.5%	3.5%
Es, N/mm.^{2}	195,000	195,000

C2.2 PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270, 7 WIRES STRANDS, LOW RELAXATION.

C2.3 PRESTRESSING BARS SHALL CONFORM TO ASTM A722 GRADE 150 AND SHALL HAVE TENSILE STRENGTH AT LEAST 1030 MPa.

C2.4 TENDON PROFILES ARE SPECIFIED TO THE CENTER OF SHEATHING/DUCTING.

C2.5 DUCTS FOR INTERNAL TENDONS SHALL BE RIGIDLY SUPPORTED AT NOT MORE THAN 1000 mm. CENTERS AND SHALL BE SET OUT TO PROVIDE A SMOOTH PROFILE THROUGHOUT.

C2.6 DUCTS FOR EXTERNAL TENDONS SHALL BE CONTINUOUS BETWEEN ANCHORAGES WITH MINIMUM RADIUS OF 2000 mm. AT DEVIATORS AND SHALL BE FORMED BY SMOOTH, RIGID AND HIGH DENSITY POLYETHYLENE TO ASTM D 3350.

C2.7 GROUT VENTS OR INLETS SHALL BE PROVIDED AT :

A. ALL ANCHORAGES
B. ALL LOW POINTS
C. ALL HIGH POINTS
D. ALL DEVIATORS

C2.8 THE FOLLOWING MINIMUM DUCT DIAMETERS ARE REQUIRED :

TENDON SIZE	SIZE OF EXTERNAL DUCT (mm)	SIZE OF INTERNAL DUCT (mm)
5-D15 TO 7-D15	65 ID.	60 ID.
8-D15 TO 12-D15	85 ID.	80 ID.
13-D15 TO 19-D15	100 ID.	95 ID.
22-D15 TO 25-D15	115 ID.	110 ID.
3-D15, 4-D15	NOT APPLICABLE	75 x 25

TENDON SIZE 5-D15 MEANS 5 NUMBERS OF STRANDS OF STRANDS WITH DIAMETER OF 15.24 mm.
ID = INSIDE DUCT DIAMETER

C3. STRUCTURAL STEEL

C3.1 ALL STRUCTURAL STEEL SHAPES AND PLATES, UNLESS SPECIFIED ON THE DRAWINGS, SHALL BE OF STRUCTURAL STEEL GRADE CONFORMING TO THE REQUIREMENTS STATED IN THE SPECIFICATIONS, WITH A MINIMUM YIELD STRENGTH OF 235 MPa.

C3.2 ALL STRUCTURAL STEEL PREFABRICATED WORKS INCLUDING THEIR FASTENERS SHALL BE GALVANIZED AS MENTIONED IN THE SPECIFICATIONS. THE WEIGHT OF ZINC COATING SHALL NOT BE LESS THAN 1100 GRAMS/m.^{2}

C3.3 ALL ANCHOR BOLTS SHALL BE GALVANIZED ONLY AT THE EXPOSED PORTIONS.

C3.4 ALL WELDING SYMBOLS ARE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS).

C3.5 SIZE, INCREMENT LENGTH AND PITCH OF WELD SHOWN ARE IN MILLIMETERS.

C3.6 STEEL SHALL BE CUT BY FRICTION SAWING, COLD SAWING, BAND SAWING OR MECHANICALLY GUIDED FLAME AND PLASMA CUTTING.
FLAME CUTTING BY HAND MAY ONLY BE USED WITH THE PERMISSION OF THE ENGINEER.

C4. REINFORCING STEEL

C4.1 MILD STEEL ROUND BARS GRADE SR 24 ACCORDING TO TIS 20 DENOTED BY "R" SHALL BE USED FOR BARS WITH DIAMETER 6 AND 9 mm. UNLESS NOTED OTHERWISE.

C4.2 HIGH YIELD DEFORMED BARS GRADE SD 40 ACCORDING TO TIS 24 DENOTED BY "D" SHALL BE USED FOR BARS WITH DIAMETER 12, 16, 20, 25 AND 28 mm. UNLESS NOTED OTHERWISE.

C4.3 HIGH YIELD DEFORMED BARS GRADE SD 50 ACCORDING TO TIS 24 DENOTED BY "D" SHALL BE USED FOR BARS WITH DIAMETER 32 mm OR GREATER UNLESS NOTED OTHERWISE.

C4.4 CLEAR DISTANCE SHALL BE NOT LESS THAN 1.5 TIMES OF THE MAXIMUM SIZE OF COARSE AGGREGATE OR NOT LESS THAN 38 mm. AND NOT LESS THAN 1.5 TIMES OF THE BIGGER BAR DIAMETER UNLESS NOTED OTHERWISE.

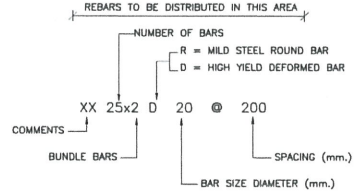
C4.5 REINFORCING BARS SHALL BE SPLICED BY LAPS :
- LAP LENGTH SHALL BE EQUAL TO 40 TIMES OF DIAMETERS OF SMALLER BAR FOR SD 40 BARS AND 50 TIMES FOR SD 50 BARS UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- SPLICING OF BARS NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED BY THE ENGINEER.
- BARS DRAWN IN FULL LENGTH (ALSO CALLED CONTINUOUS BARS) SHALL HAVE AS FEW SPLICES AS POSSIBLE.
- NO MORE THAN 1 BAR IN 2 SHALL BE SPLICED AT THE SAME LOCATION, EXCEPT WHERE SHOWN ON THE DRAWINGS.
- THE ANCHORAGE LENGTH OF STRAIGHT DEFORMED BARS SHALL BE AT LEAST 40 TIMES OF BAR DIAMETERS, UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

C4.6 LAP SPLICES SHALL BE INCREASED BY 20 AND 30 PERCENT FOR THREE AND FOUR BAR BUNDLES RESPECTIVELY.

C4.7 THE CONTRACTOR SHALL PROVIDE BAR SUPPORTS, SPACERS AND ACCESSORIES AS RECOMMENDED IN THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS, LATEST EDITION.

C4.8 MECHANICAL SPLICES AND WELDINGS ARE NOT ALLOWED, UNLESS OTHERWISE PERMITTED BY THE ENGINEER.

C4.9 THE SYSTEM OF REINFORCEMENT MARKING IS AS SHOWN BELOW :



BAR SPACING INDICATED ON THE DRAWING SHALL BE MEASURED PERPENDICULAR TO BARS, UNLESS INDICATED OTHERWISE.

ABBREVIATIONS :

T	TOP
B	BOTTOM
BS	BOTH SIDES
EF	EACH FACE
FF	FAR FACE
NF	NEAR FACE
IF	INSIDE FACE
OF	OUTSIDE FACE
EW	EACH WAY
STIR	STIRRUP BAR
EXTRA	EXTRA BAR
VAR	VARIED LENGTH (BAR OF VARYING DIMENSIONS)
km	KILOMETER
m	METER
cm	CENTIMETER
mm	MILLIMETER
MIN	MINIMUM
MAX	MAXIMUM
DIA	DIAMETER OF CIRCULAR

D. PRECAST SEGMENTAL BOX GIRDERS

D1. SEGMENT CASTING DIMENSIONS:
FOR SPAN-BY-SPAN CONSTRUCTION, AND BALANCED CANTILEVER CONSTRUCTION, CAMBER DIAGRAMS SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL.

D2. ALL PRECAST SEGMENTAL BOX GIRDERS SHALL BE MATCH-CAST WITH TYPE B JOINTS (DRY JOINTS).

D3. SHOP DRAWINGS :
THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL SEGMENTS, SHOWING COMPLETE DETAILS OF PRESTRESSING, REINFORCING, CONCRETE DIMENSIONS, BLOCK OUTS, RECESSES, OPENINGS, INSERTS, SCAFFOLDINGS AND ETC. FOR THE APPROVAL OF THE ENGINEER.
SHOP DRAWINGS FOR SEGMENTS SHALL SHOW PROPOSED ERECTION METHOD AND SEQUENCES.
DETAILED CALCULATIONS SHALL BE SUBMITTED WITH THE SHOP DRAWINGS.

D4. THE CYLINDER COMPRESSIVE STRENGTH AT TIME OF TRANSFER OF PRESTRESSED CONCRETE STRUCTURE SHALL BE AT LEAST 0.8 OF CYLINDRICAL COMPRESSIVE STRENGTH AT 28 DAYS.

D5. BUCKLING OF PRECAST MEMBERS DURING HANDLING, TRANSPORTATION, AND ERECTION SHALL BE INVESTIGATED. ADDITIONAL REINFORCEMENT MAY BE REQUIRED FOR HANDLING OF THE SEGMENTS DEPENDING UPON THE METHOD USED BY THE CONTRACTOR.

D6. LONGITUDINAL STRESSINGS SHALL BE PERFORMED ONLY AFTER FULL STRESSING OF TRANSVERSE TENDONS ARE COMPLETED.

E. BEARING & EXPANSION JOINT

E1. POT BEARING, ELASTOMERIC BEARING AND EXPANSION JOINT FOR STRUCTURES SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH REQUIREMENTS OF BS.5400, AND ACCOMMODATING ALL THE LOADS, TRANSLATIONS AND ROTATIONS AS SHOWN ON THE DRAWINGS.

E2. THE CONTRACTOR SHALL SUBMIT THE CERTIFIED DOCUMENTS CONFIRMING THE 15-YEAR WARRANTY OF ALL BEARINGS AND EXPANSION JOINTS TO THE ENGINEER.

E3. THE CONTRACTOR SHALL SHOW THE DETAILS OF REINFORCEMENT TO BE USED AT BEARINGS AND EXPANSION JOINTS FOR THE ENGINEER'S APPROVAL.

F. TRACKWORKS

F1. DETAILS OF DOWEL BARS REQUIRED FOR THE CONNECTION OF THE TRACKWORK PLINTHS TO THE DECK SHALL REFER TO THE M&E DRAWINGS.

F2. THE CIVIL CONTRACTOR SHALL COORDINATE WITH M&E CONTRACTOR TO ENSURE THAT THE SPECIFIED LOCATION OF THE DOWEL BARS SHALL NOT INTERFERE WITH THE PRESTRESSING DUCTS.

G. EARTHING, BONDING AND STRAY CURRENT CONTROL SYSTEMS

G1. DETAILS OF ITEMS, EARTHING, BONDING AND STRAY CURRENT CONTROLS, TO BE CAST-IN THE STRUCTURES SHALL REFER TO THE RELEVANT M&E DRAWINGS.

H. OTHER REQUIREMENTS

H1. UNDERGROUND UTILITIES SHALL BE PRECISELY LOCATED , AND IF NECESSARY, THE STRUCTURES SHALL BE MODIFIED BY THE CONTRACTOR WITH THE APPROVAL OF THE ENGINEER

H2. EXISTING STRUCTURES SHALL BE PRECISELY LOCATED AND VERIFIED.

H3. IN GENERAL, TOP OF FOOTING SHALL BE 0.5 m (MIN) BELOW THE FINISHED GRADE, WHERE FOOTING LOCATED NEAR THE ROADWAY OR IN THE KHLONG, TOP OF FOOTING SHALL BE 1.5 m (MIN) BELOW THE FINISHED GRADE AND 0.5 m (MIN) BELOW THE KHLONG BED.

H4. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE ADJUSTED OR CORRECTED AND SUBJECTED TO THE ENGINEER'S APPROVAL.

H5. EXISTING FOUNDATIONS FOUND INTERFERING WITH THE CONSTRUCTION OF THE PROPOSED STRUCTURES SHALL BE DEMOLISHED TO THE LINE AND LEVEL INSTRUCTED BY THE ENGINEER.

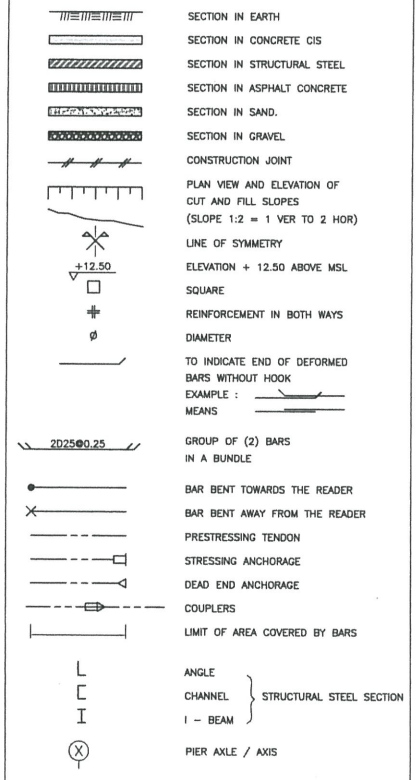
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I. GENERAL NOTES ON DRAWINGS

I1. IN GENERAL TOP OF FOOTING SHALL BE 1.0 M. (MIN.) BELOW THE FINISHED GRADE, WHERE FOOTING LOCATED NEAR OR BENEAT THE ROAD AND IN THE KHLONG, TOP OF FOOTING SHALL BE 1.5 M. (MIN.) BELOW THE FINISHED GRADE AND 0.5 M. (MIN.) BELOW THE KHLONG BED RESPECTIVELY. UNLESS OTHERWISE SHOWN ON THE DRAWING.

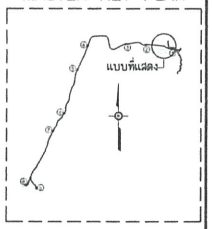
I2. ANY TECHNICALLY OBVIOUS DISCREPANCIES ON THE DRAWING SHALL BE ADJUSTED OR CORRECTED AND SUBJECT TO THE ENGINEER'S APPROVAL.

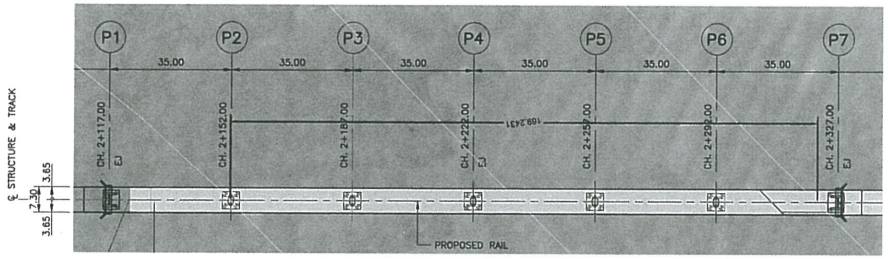
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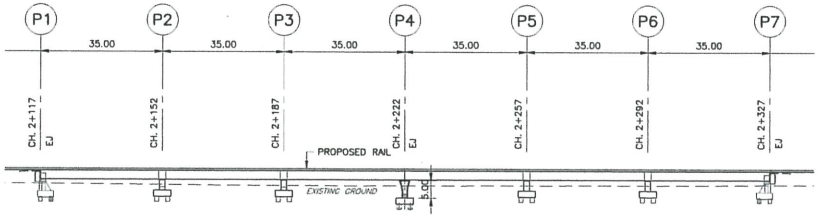
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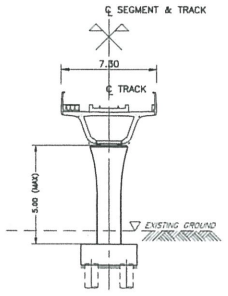




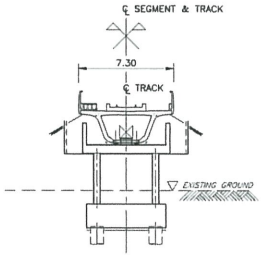
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ELELVATION
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SECTION BRIDGE
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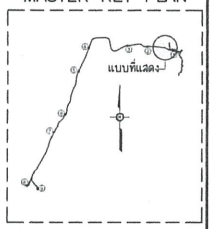


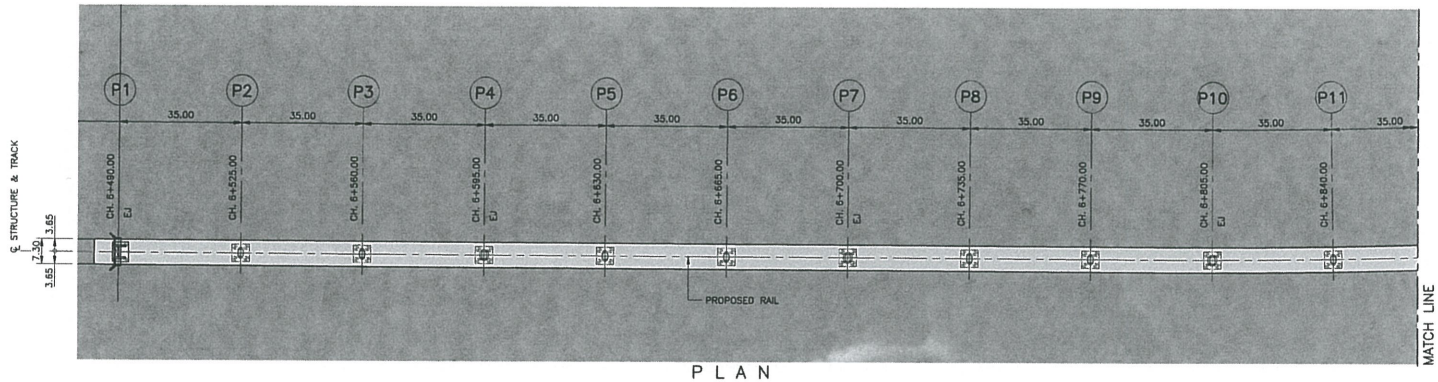
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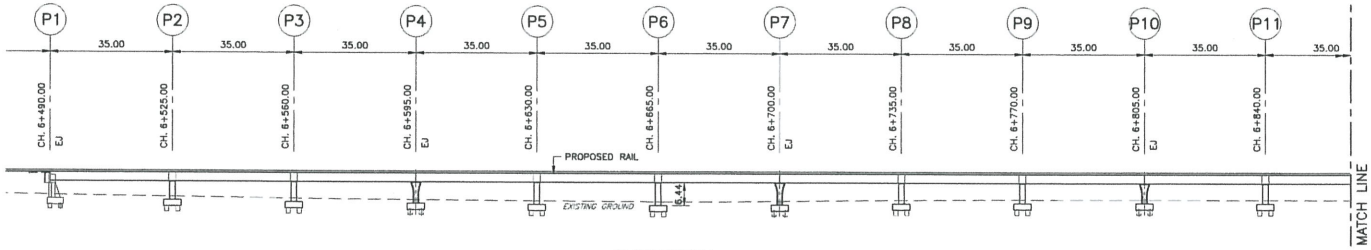
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 2+117 TO 2+327	DATE: Feb-18 DWG. NO.: SCR-RB-LA-001	SCALE: AS SHOWN SHEET NO.: 6

MASTER KEY PLAN

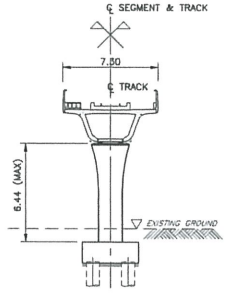




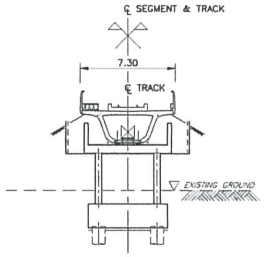
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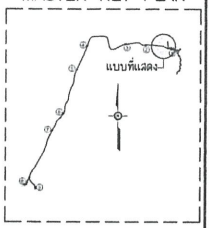


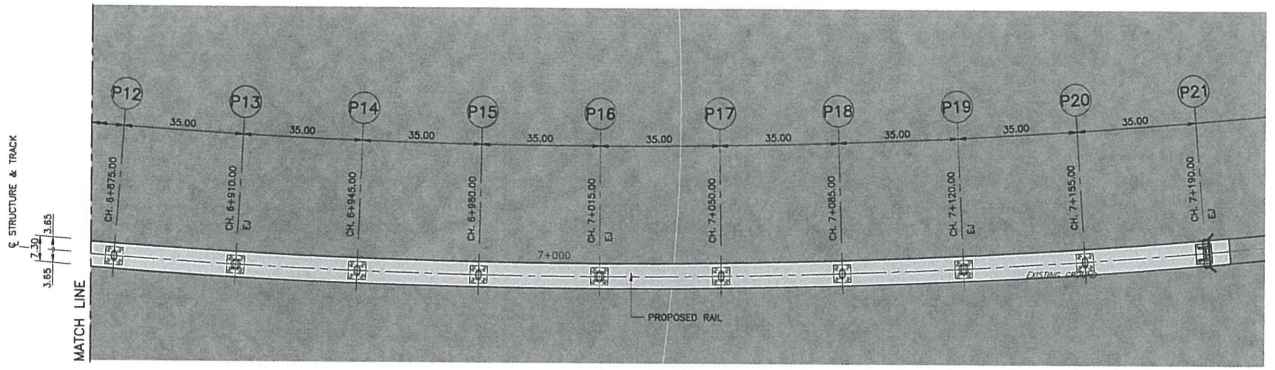
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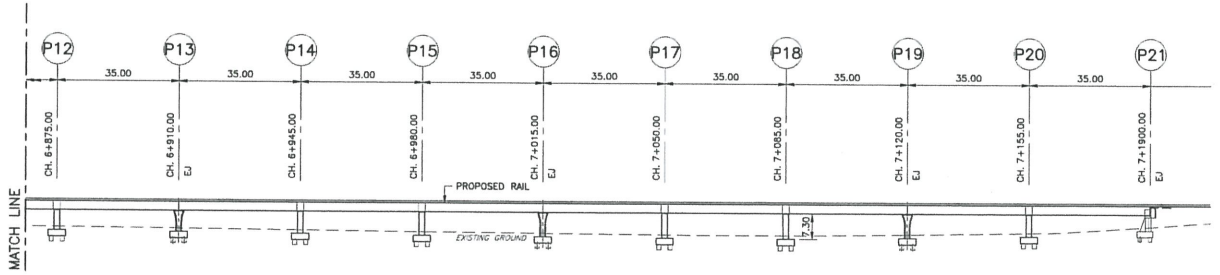
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MASTER KEY PLAN

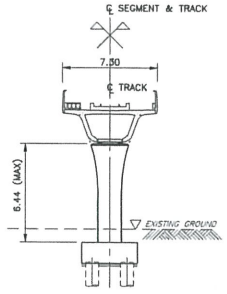




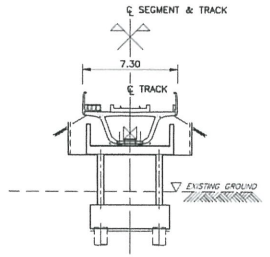
PLAN
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ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
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A3=1:400

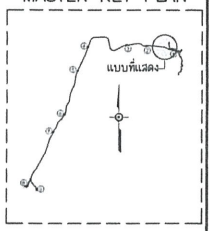


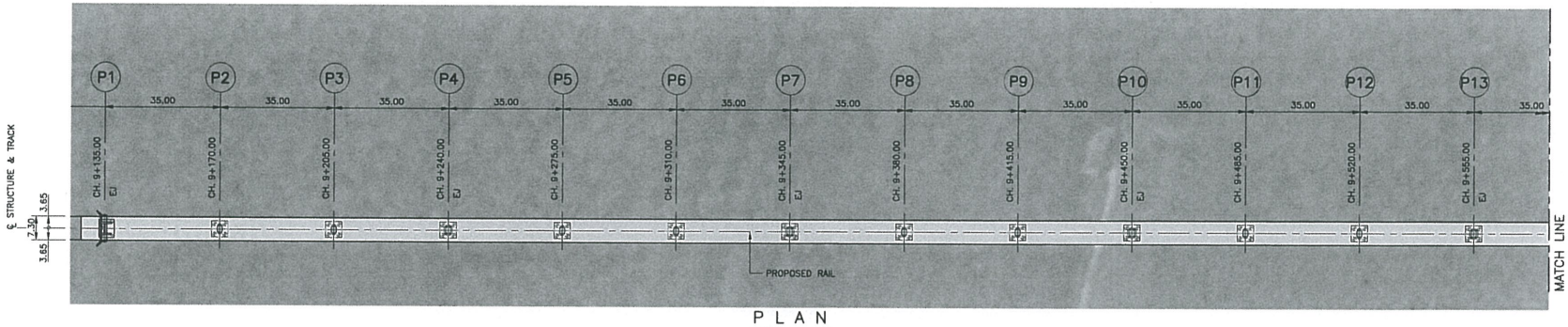
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 6+490 TO 7+190 SHEET 2/2	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-002/2 / SHEET NO.: 8

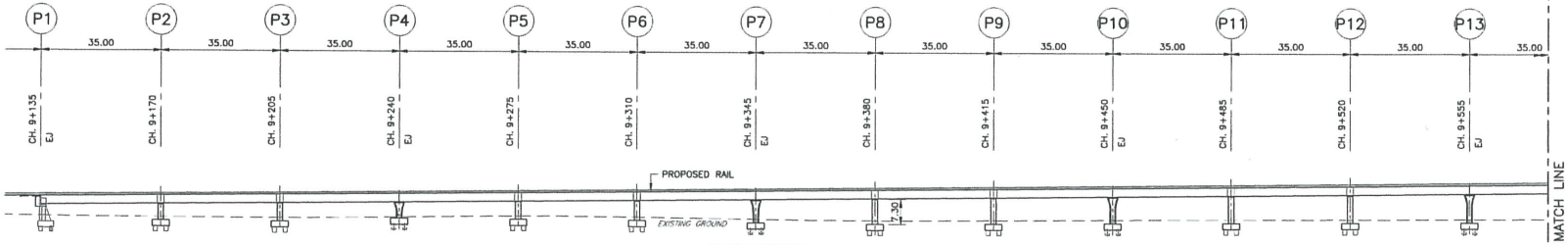
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MASTER KEY PLAN

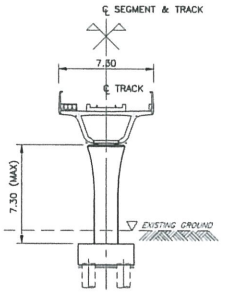




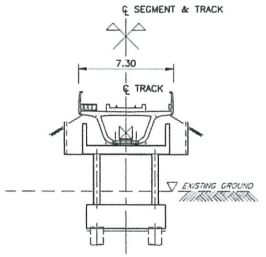
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

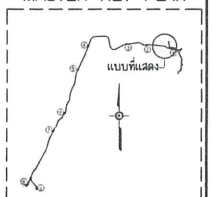


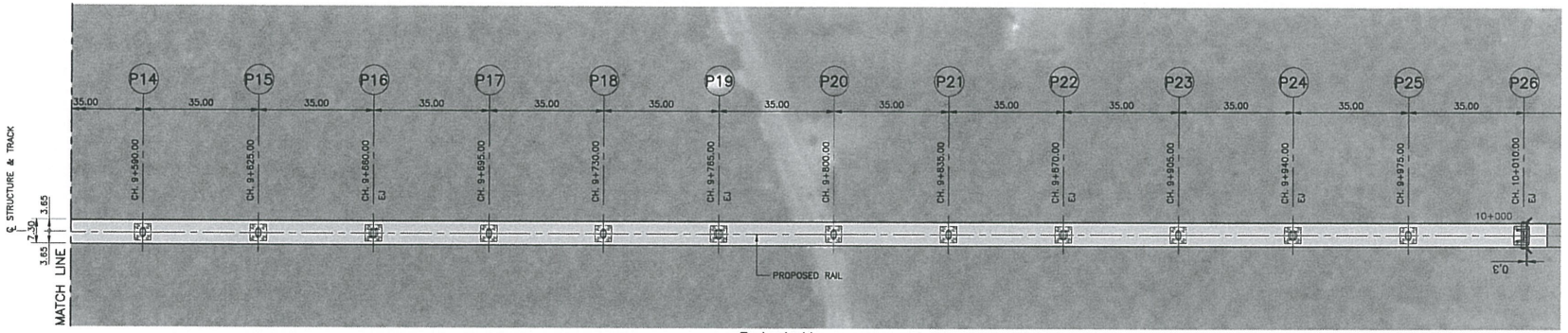
SECTION ABUTMENT
SCALE A1=1:200
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 9+135 TO 10+010 SHEET 1/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-003/1	SCALE : AS SHOWN SHEET NO. : 9

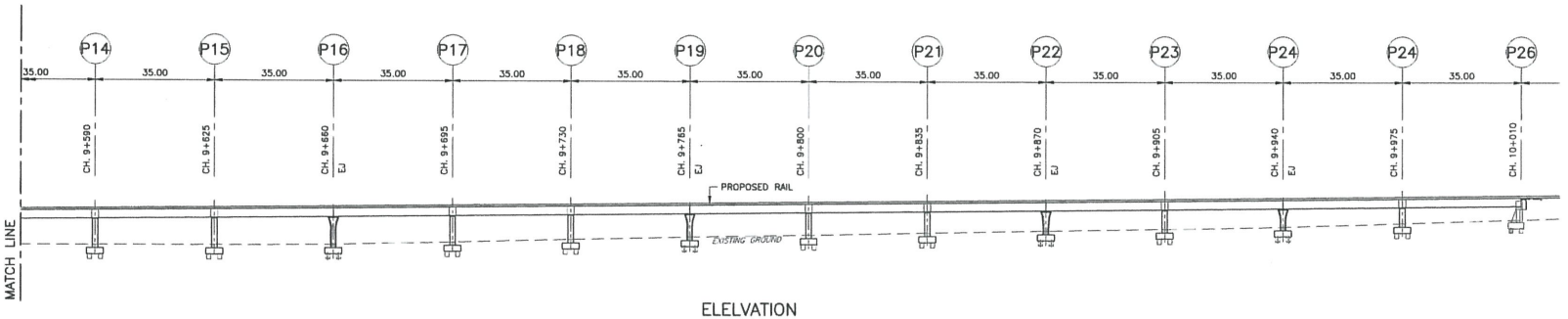
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MASTER KEY PLAN

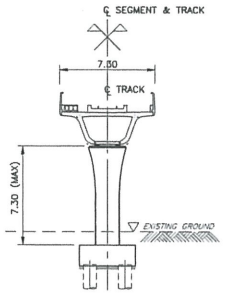




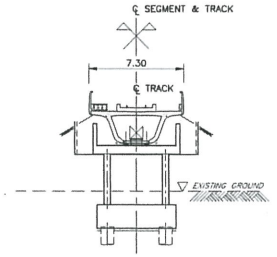
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

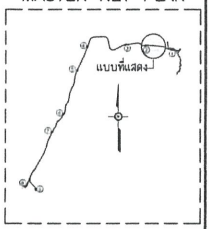


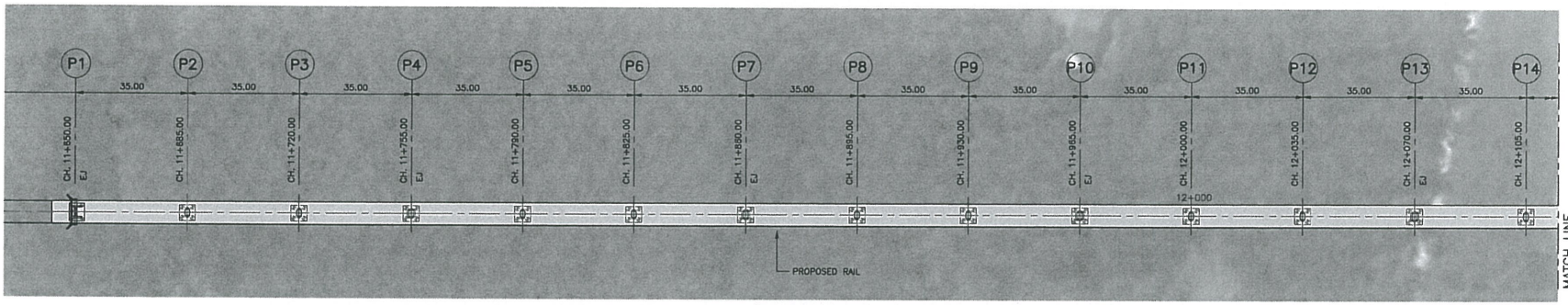
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 9+135 TO 10+010 SHEET 2/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-003/2	SCALE : AS SHOWN SHEET NO. : 10

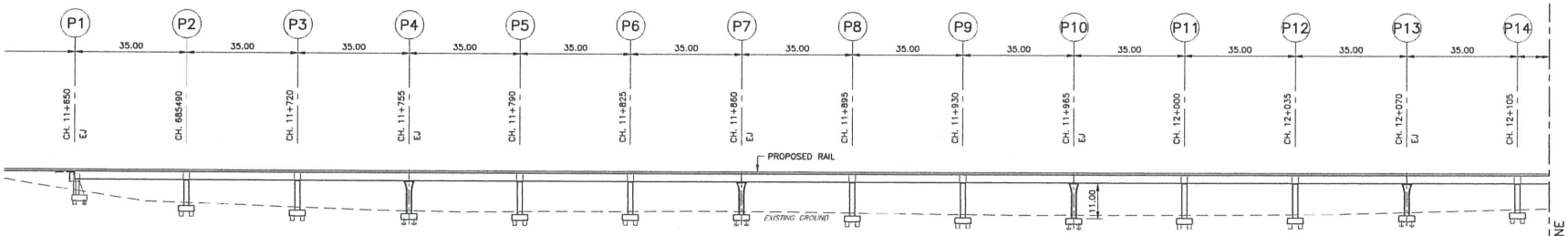
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MASTER KEY PLAN

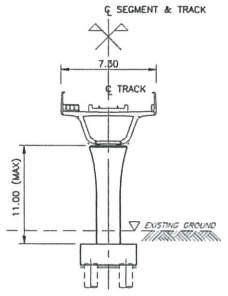




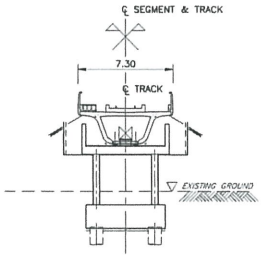
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

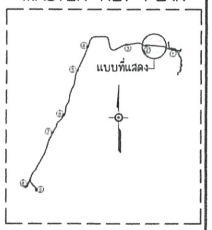


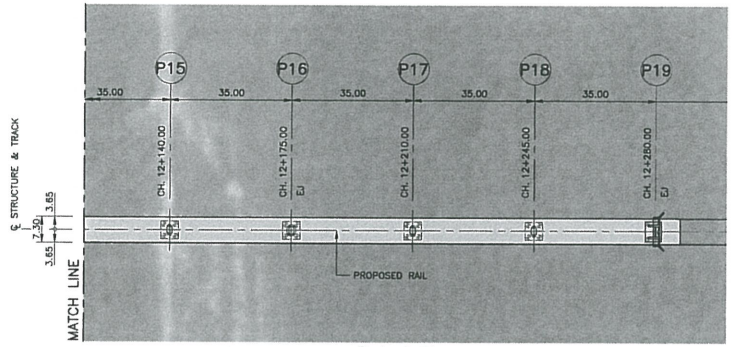
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.11+650 TO 12+250 SHEET 1/2	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-004/1 / SHEET NO.: 11

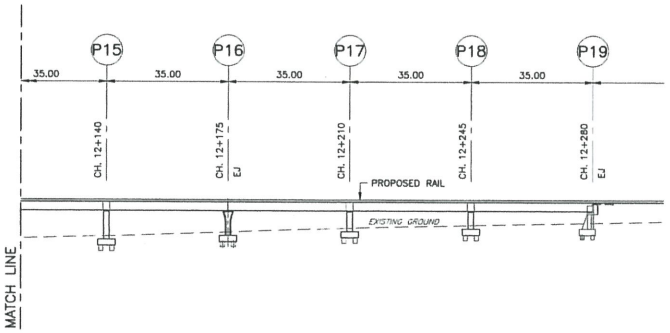
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MASTER KEY PLAN

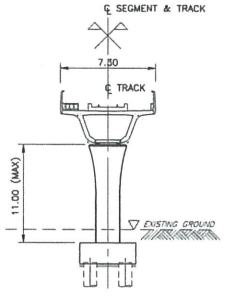




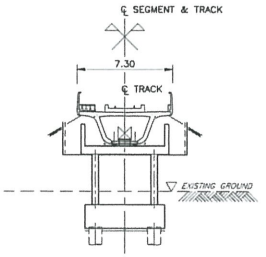
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

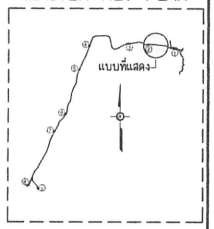


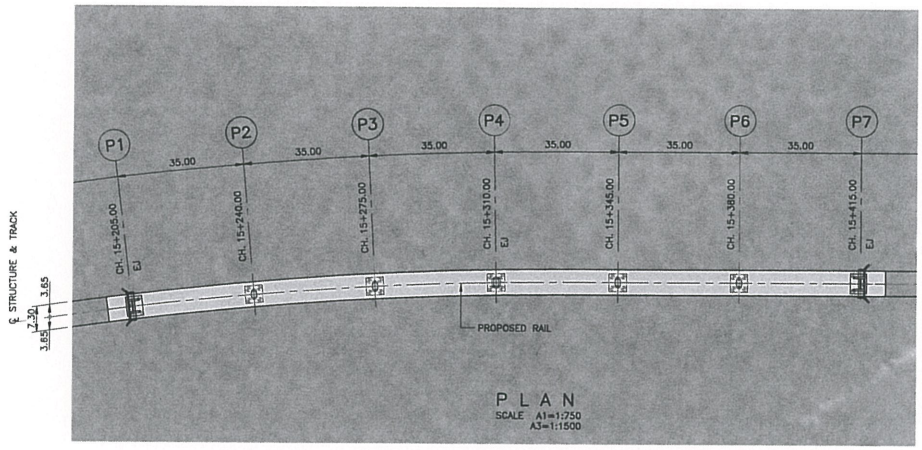
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.11+650 TO 12+250 SHEET 2/2	DATE: Feb-18 SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-004/2 SHEET NO.: 12

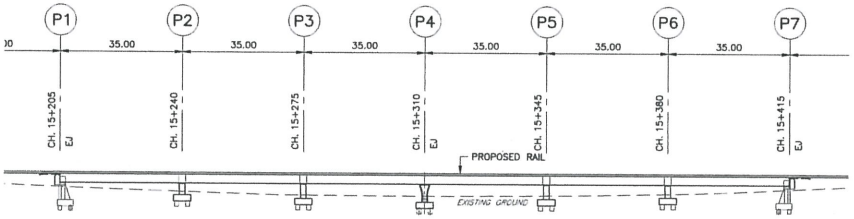
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MASTER KEY PLAN

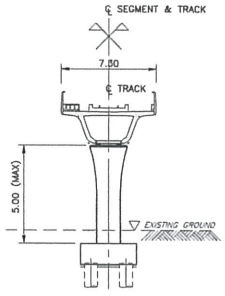




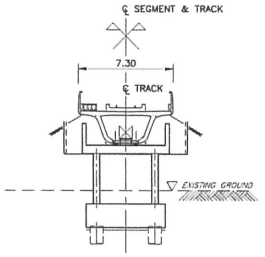
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

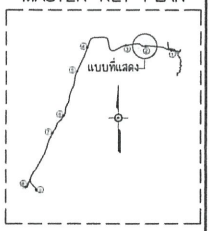


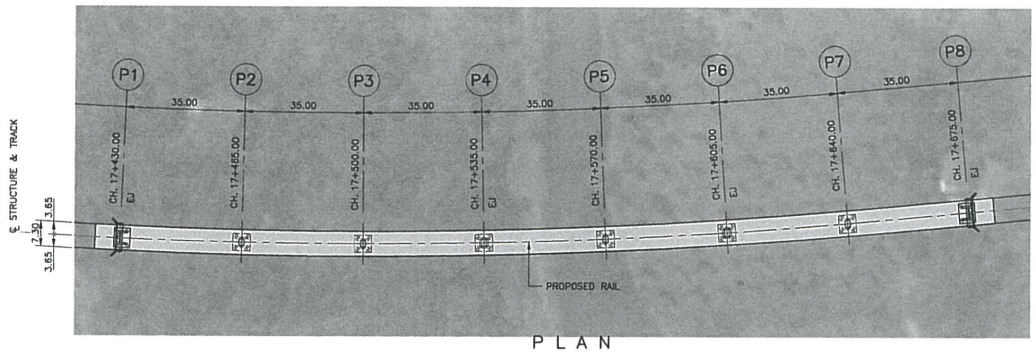
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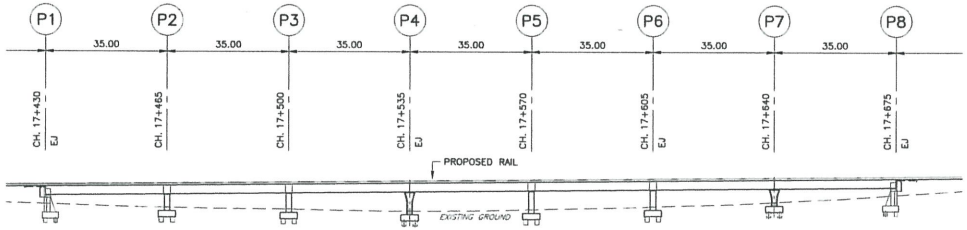
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.15+205 TO 15+415 SHEET 2/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-005	SCALE : AS SHOWN SHEET NO. : 13

MASTER KEY PLAN

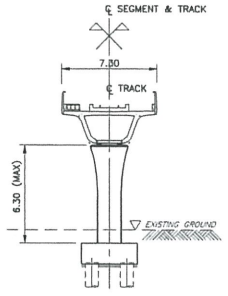




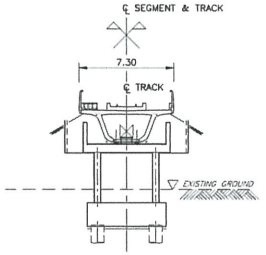
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



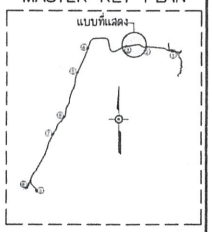
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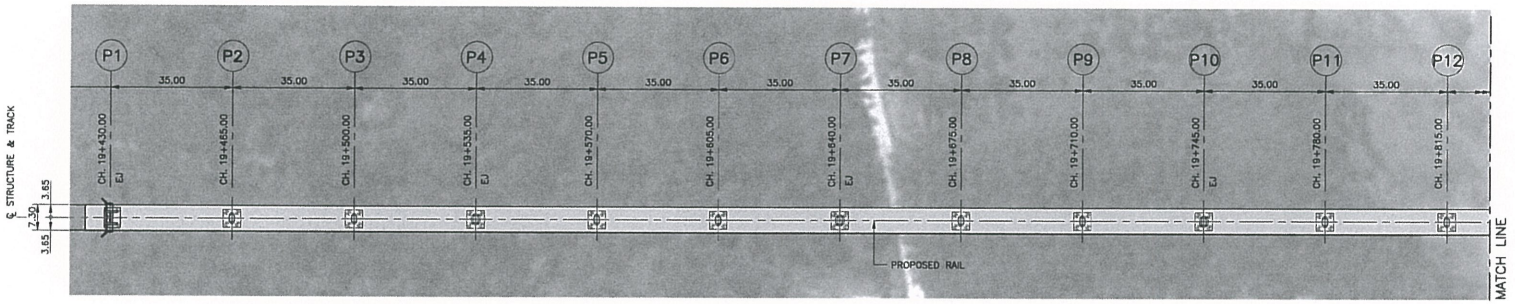
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.17+430 TO 17+675	DATE: Feb-18 DWG. NO.: SCR-RB-LA-006	SCALE: AS SHOWN SHEET NO.: 14

MASTER KEY PLAN

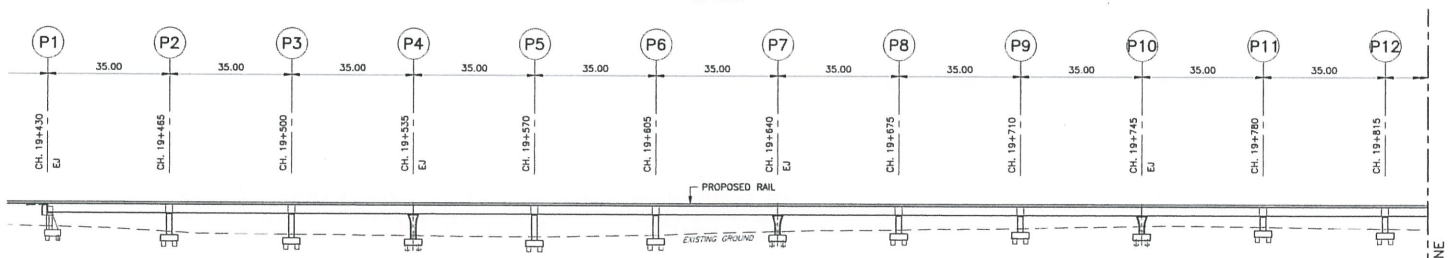
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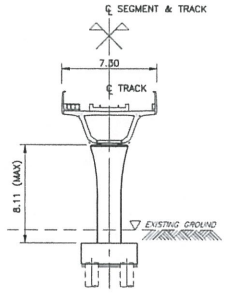
P L A N

SCALE A1=1:750
A3=1:1500



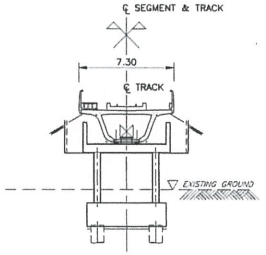
ELELVATION

SCALE A1=1:750
A3=1:1500



SECTION BRIDGE

SCALE A1=1:200
A3=1:400



SECTION ABUTMENT

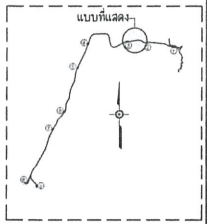
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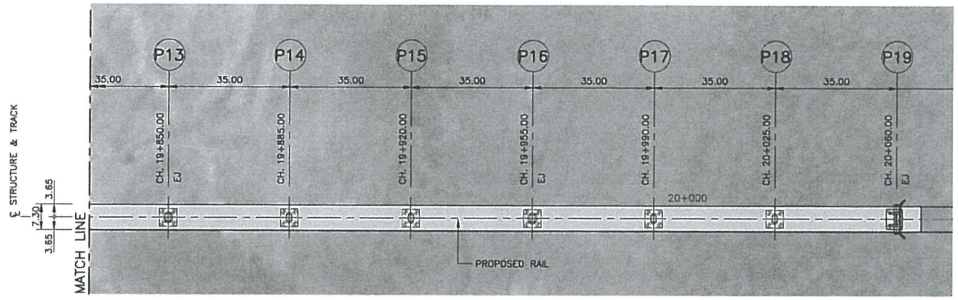
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.19+430 TO 20+060 SHEET 1/2	DATE: Feb-18 DWG. NO.: SCR-RB-LA-007/1	SCALE: AS SHOWN SHEET NO.: 15

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MASTER KEY PLAN

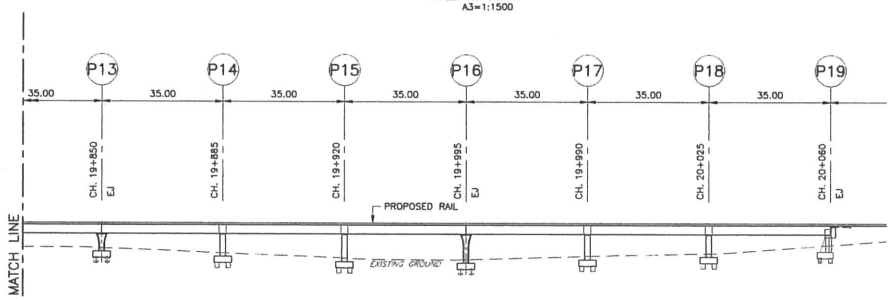
แบบที่แสดง





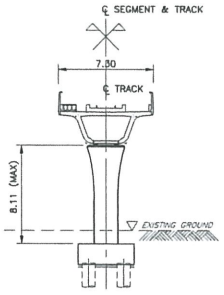
P L A N

SCALE A1=1:750
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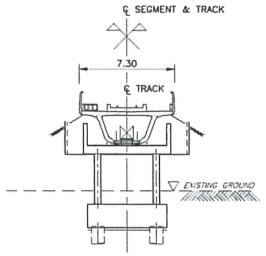
ELELVATION

SCALE A1=1:750
A3=1:1500



SECTION BRIDGE

SCALE A1=1:200
A3=1:400



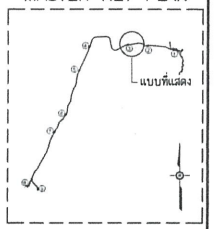
SECTION ABUTMENT

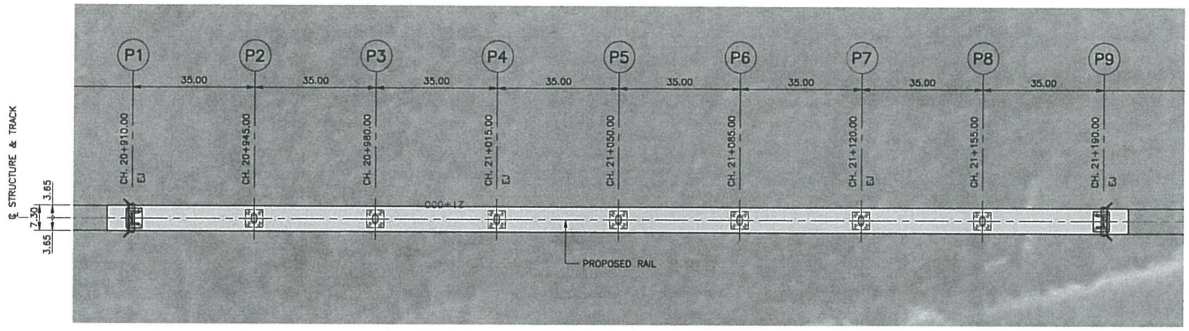
SCALE A1=1:200
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA.19+430 TO 20+060 SHEET 2/2	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-007/2 / SHEET NO.: 16

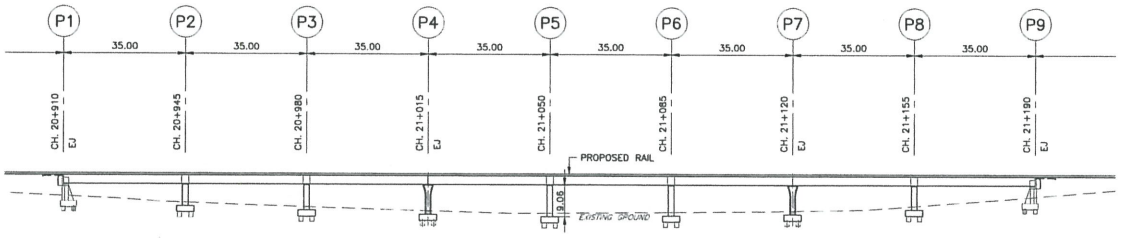
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MASTER KEY PLAN

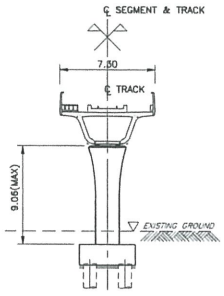




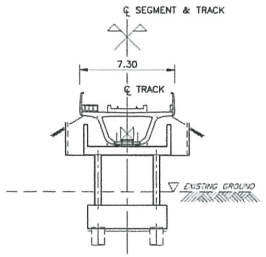
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

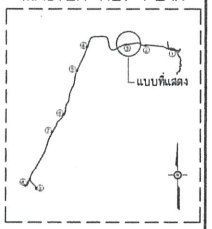


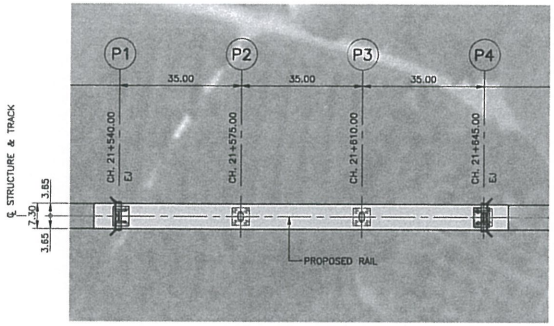
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 20+910 TO 21+190	DATE: Feb-18 DWG. NO.: SCR-RB-LA-008	SCALE: AS SHOWN SHEET NO.: 17

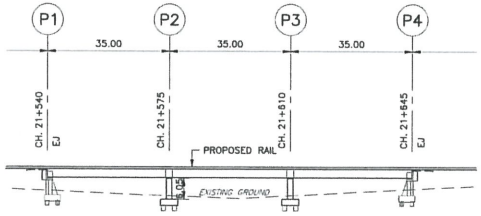
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MASTER KEY PLAN

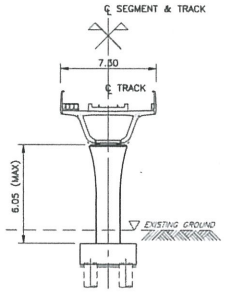




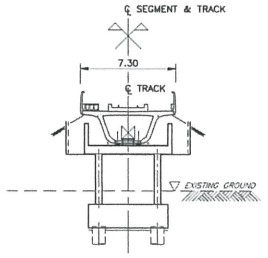
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

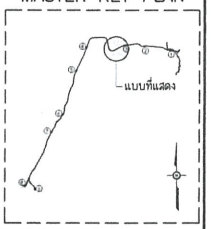


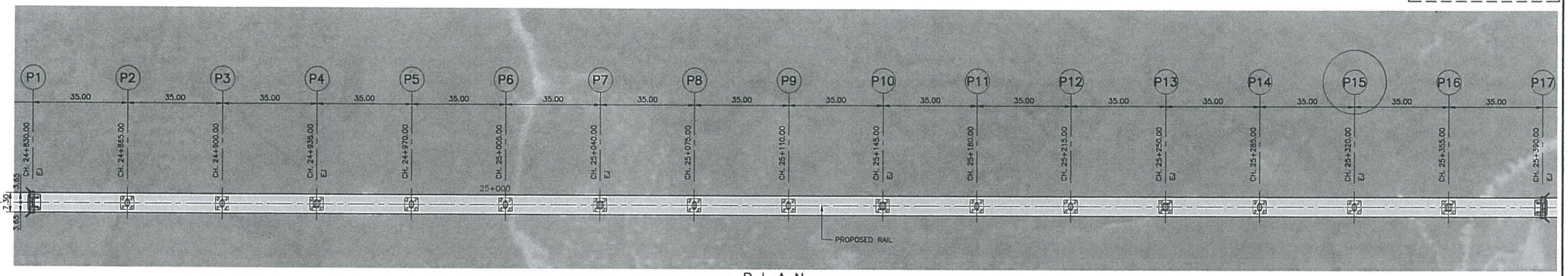
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 21+540 TO 21+645	DATE : Feb-18 SCALE : AS SHOWN DWG. NO. : SCR-RB-LA-009 SHEET NO. : 18

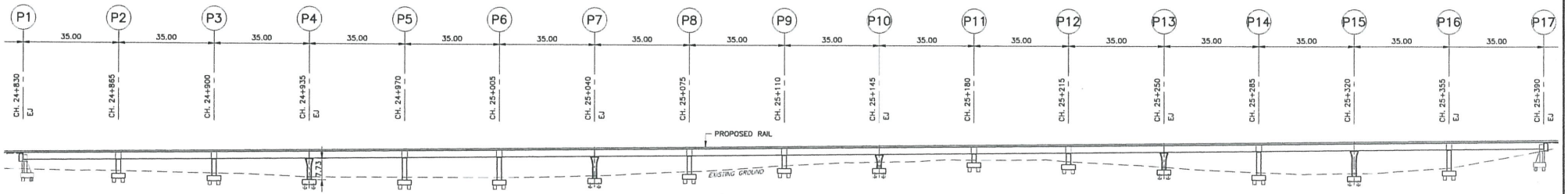
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MASTER KEY PLAN

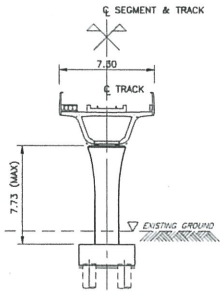




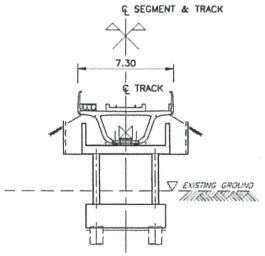
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

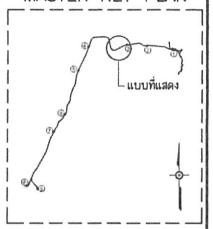


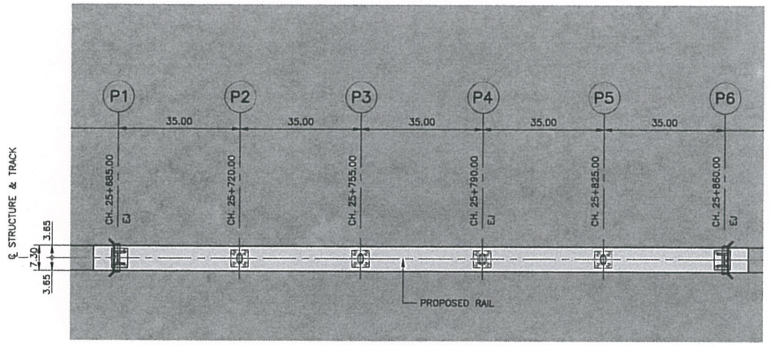
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 24+830 TO 25+390	DATE : Feb-18 DWG. NO. : SCR-RB-LA-010	SCALE : AS SHOWN SHEET NO. : 19

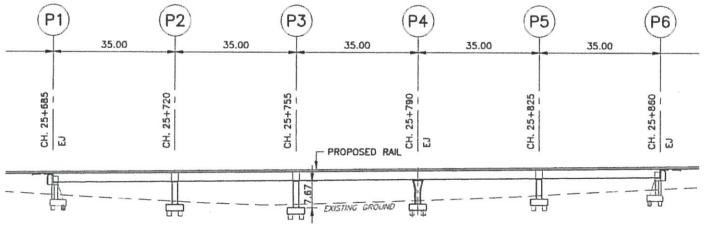
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MASTER KEY PLAN

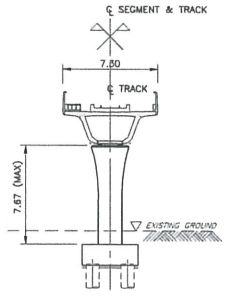




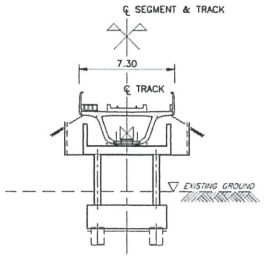
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

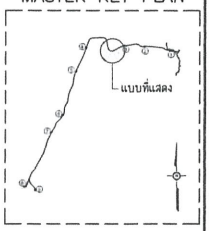


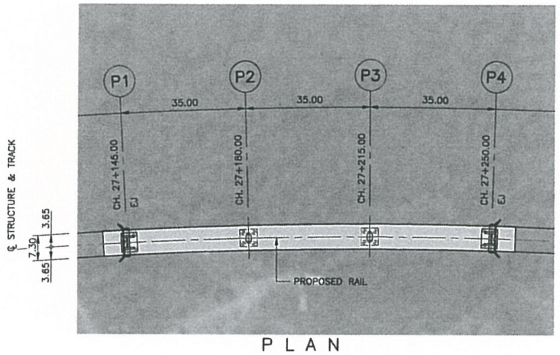
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 25+685 TO 25+860	DATE : Feb-18 / SCALE : AS SHOWN DWG. NO. SCR-RB-LA-011 / SHEET NO. : 20

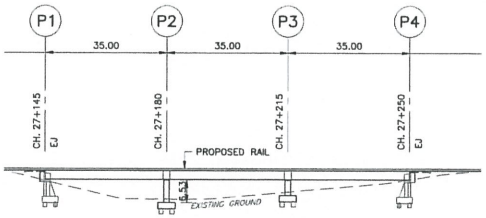
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MASTER KEY PLAN

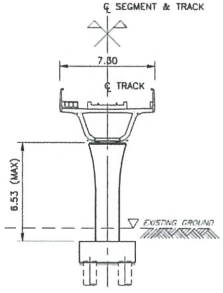




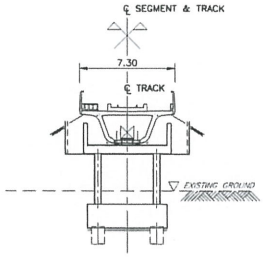
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

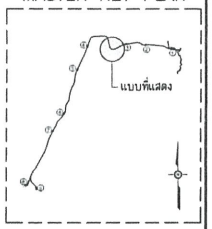


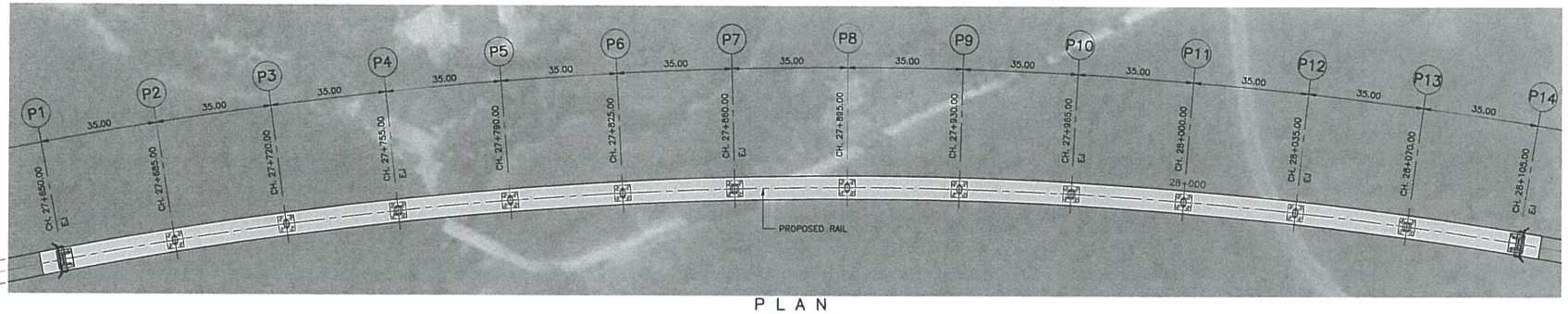
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 27+145 TO 27+250	DATE : Feb-18 DWG. NO. : SCR-RB-LA-012	SCALE : AS SHOWN SHEET NO. : 21

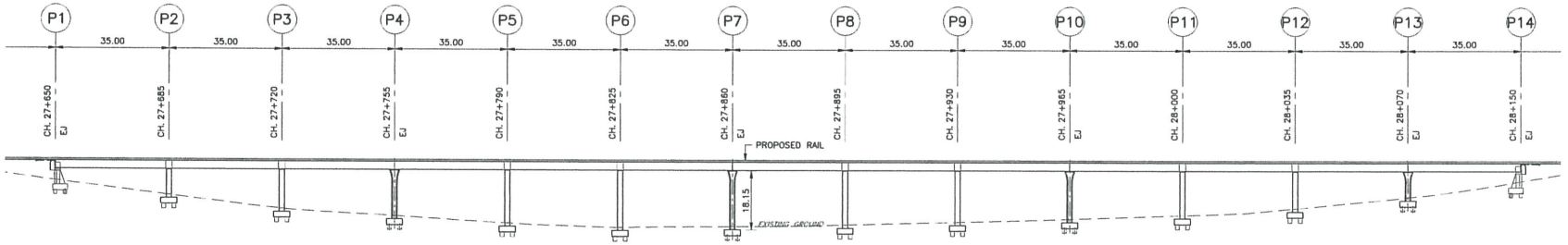
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MASTER KEY PLAN

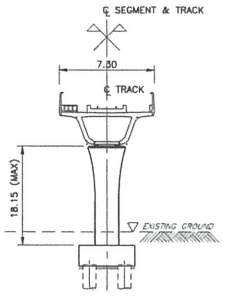




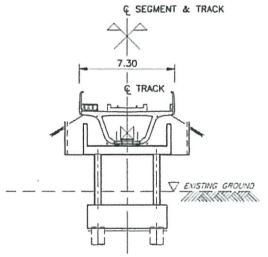
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

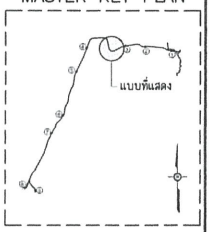


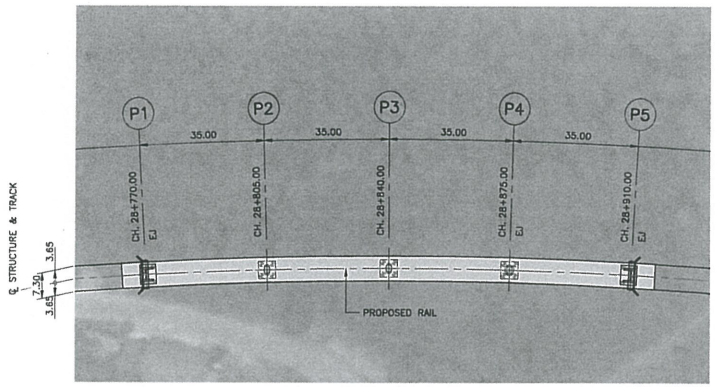
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 27+650 TO 28+105	DATE : Feb-18 DWG.NO. : SCR-RB-LA-013	SCALE : AS SHOWN SHEET NO. : 22

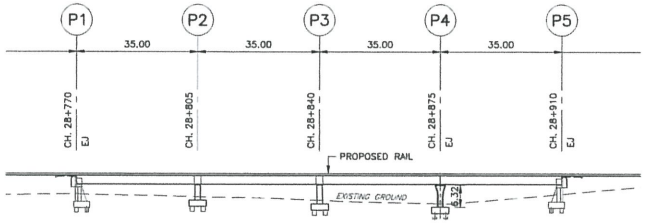
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MASTER KEY PLAN

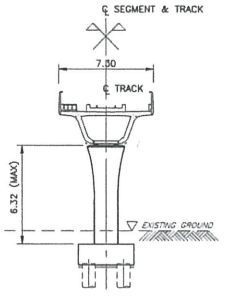




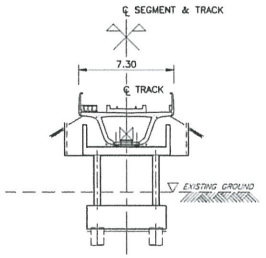
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

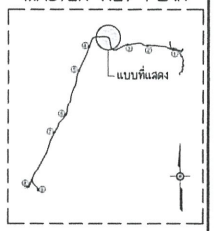


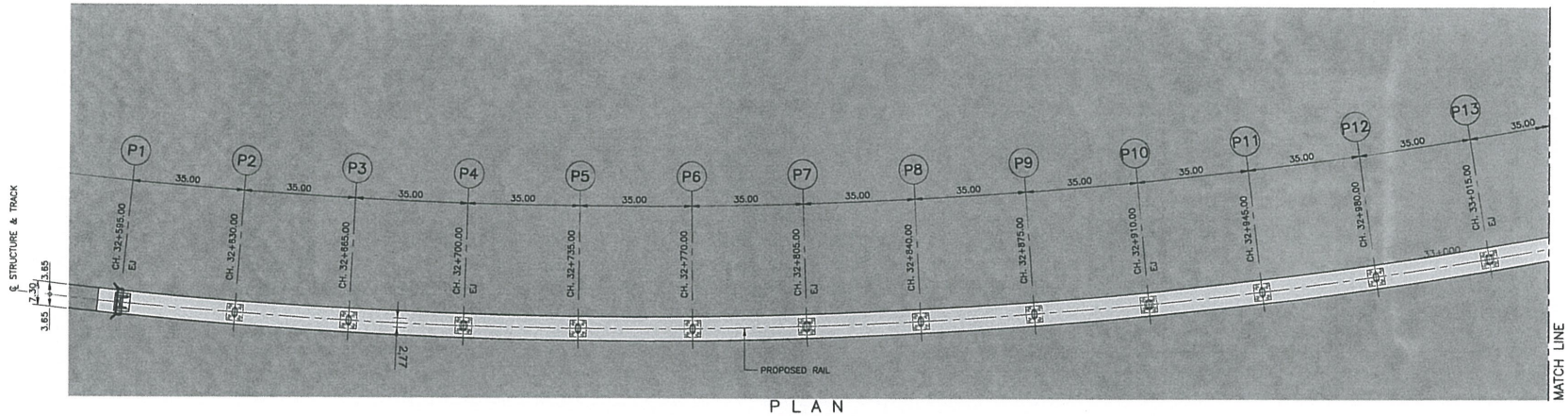
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 28+770 TO 28+910	DATE: Feb-18 SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-014 SHEET NO.: 23

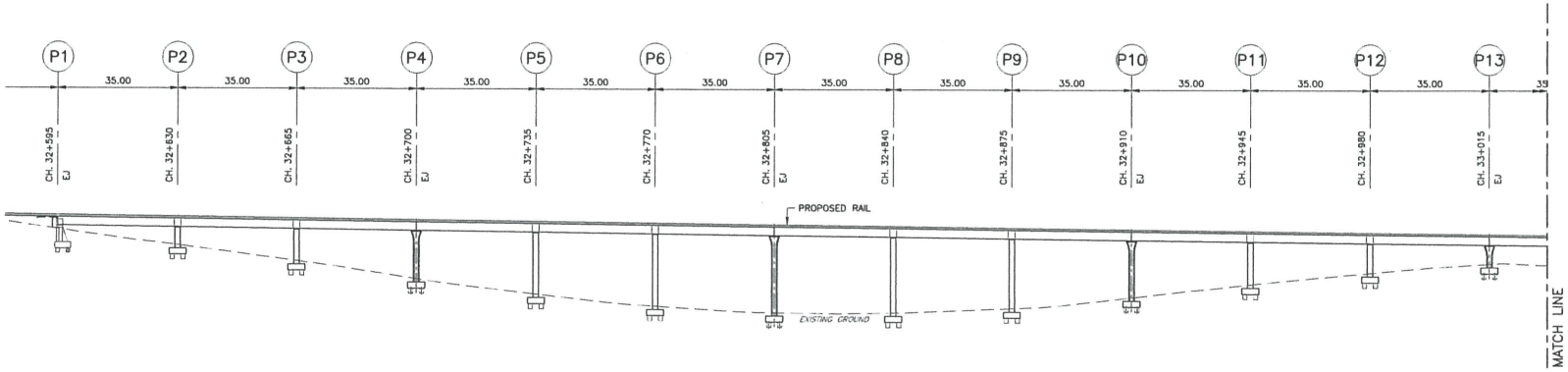
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MASTER KEY PLAN

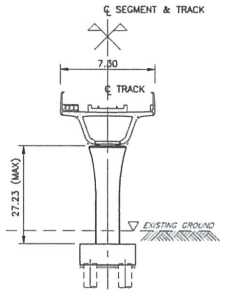




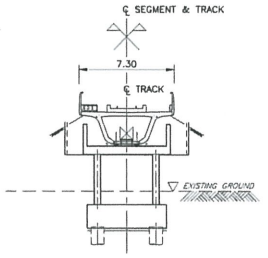
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A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
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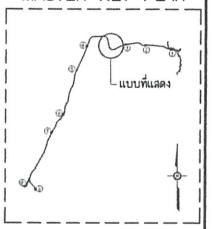


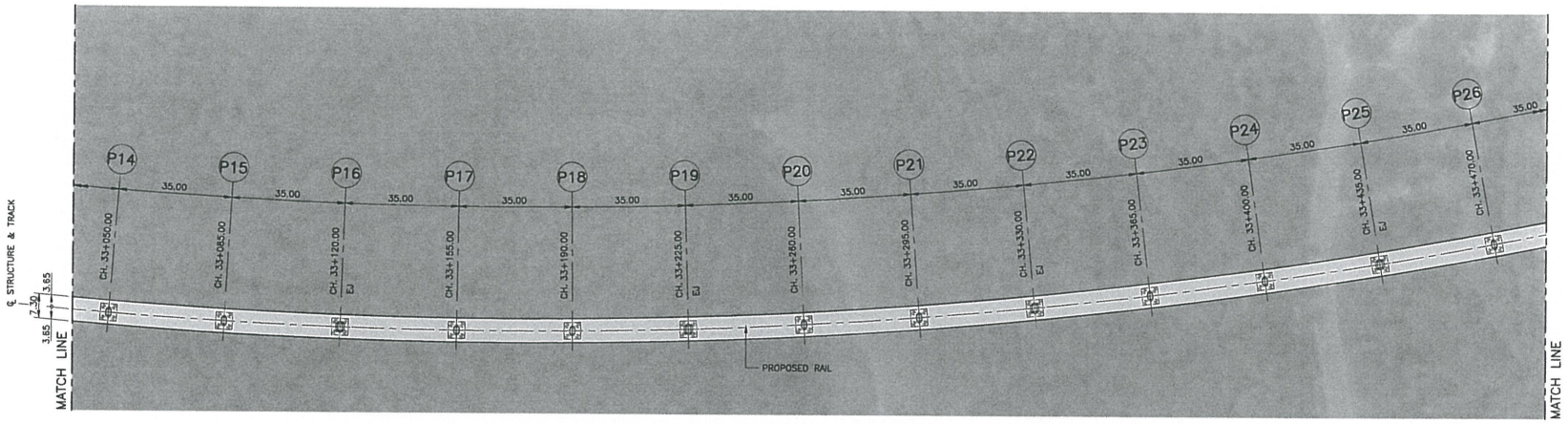
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SCALE A1=1:200
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 32+595 TO 33+750 SHEET 1/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-015/1	SCALE: AS SHOWN SHEET NO.: 24

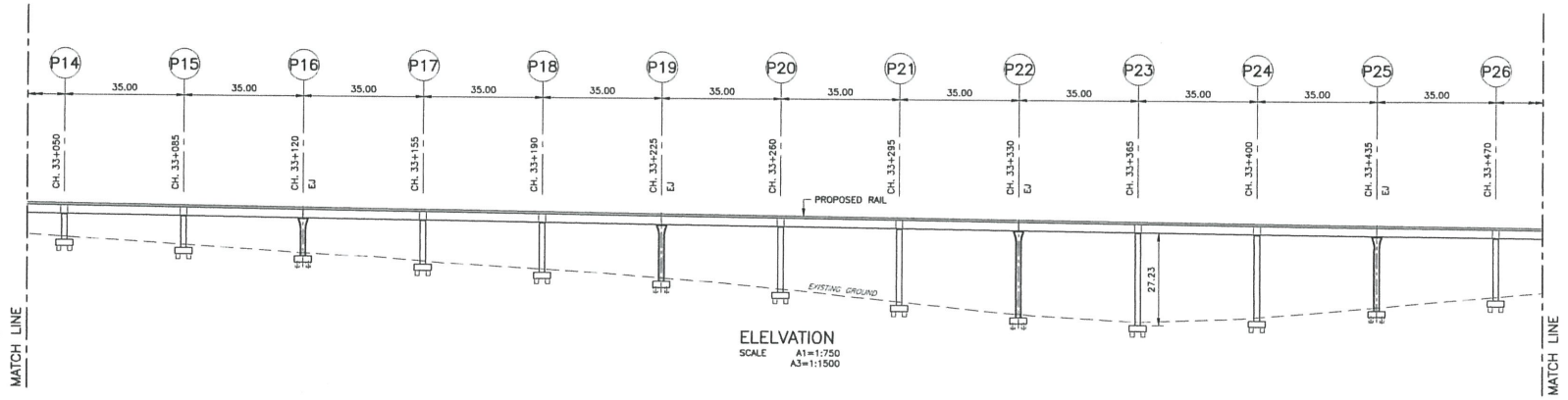
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MASTER KEY PLAN

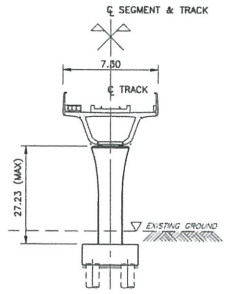




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

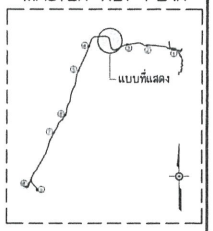


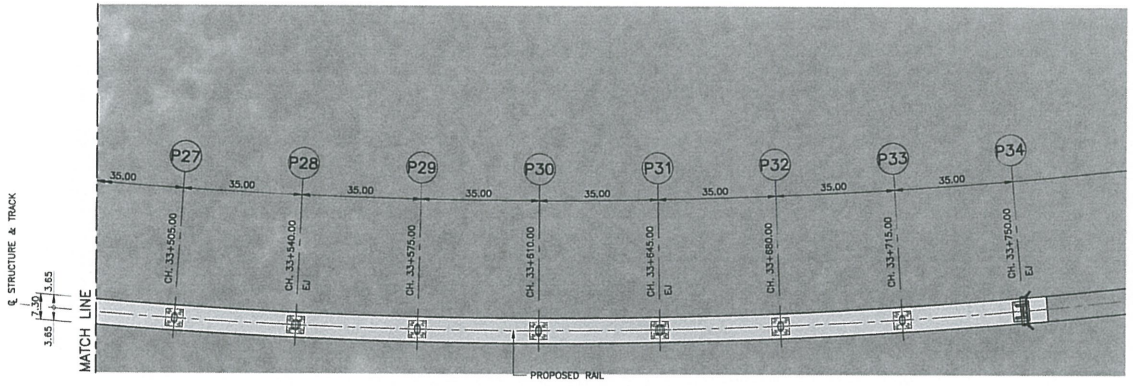
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 32+595 TO 33+750 SHEET 2/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-015/2	SCALE : AS SHOWN SHEET NO. : 25

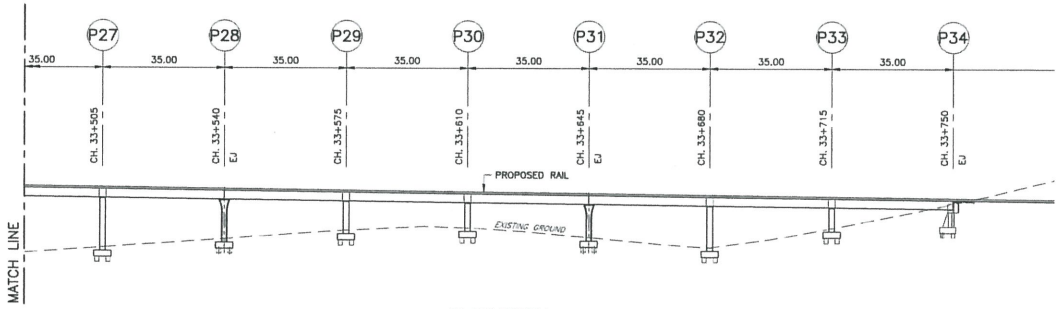
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MASTER KEY PLAN

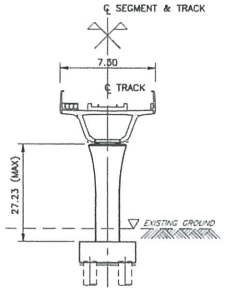




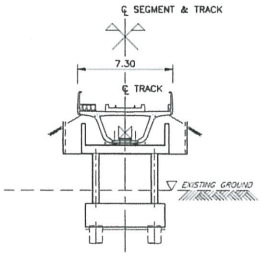
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

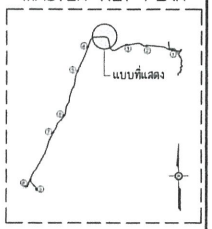


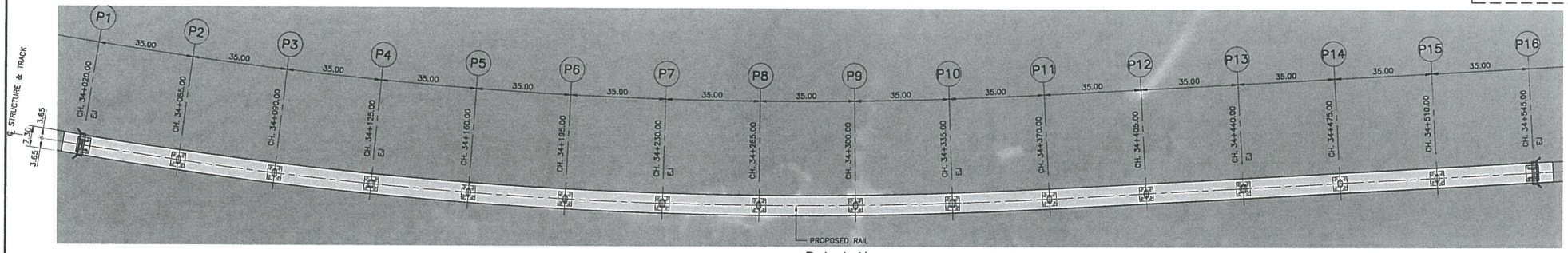
SECTION ABUTMENT
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 32+595 TO 33+750 SHEET 3/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-015/3	SCALE: AS SHOWN SHEET NO.: 26

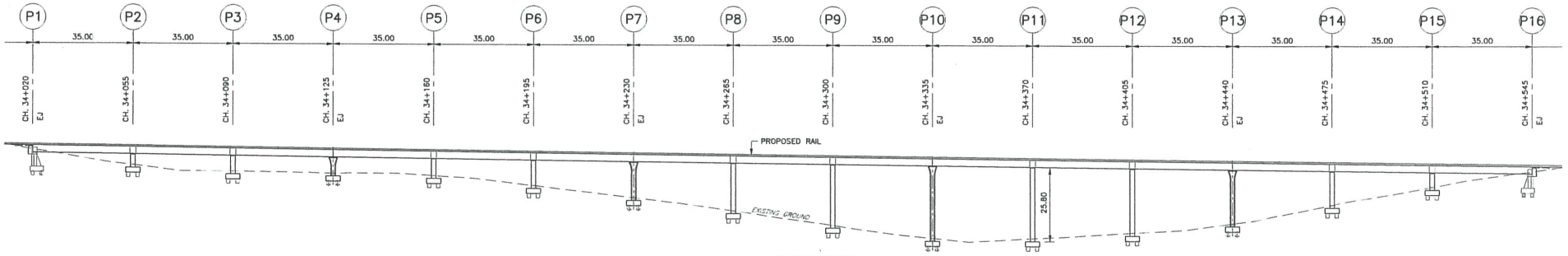
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MASTER KEY PLAN

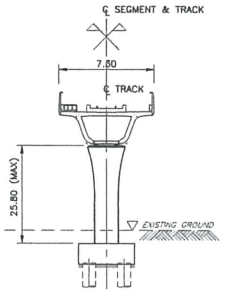




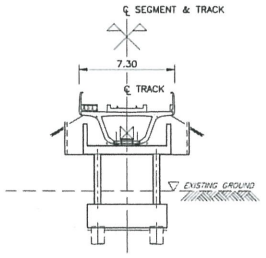
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200

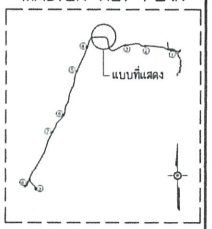


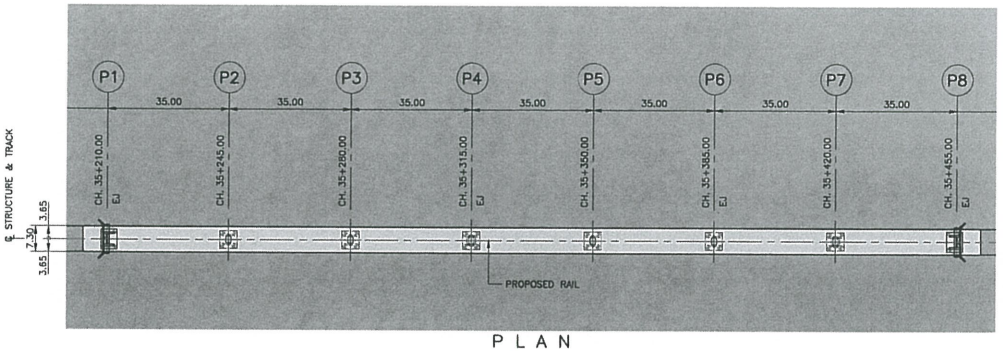
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 34+020 TO 34+545	DATE: Feb-18 DWG. NO.: SCR-RB-LA-016	SCALE: AS SHOWN SHEET NO.: 27

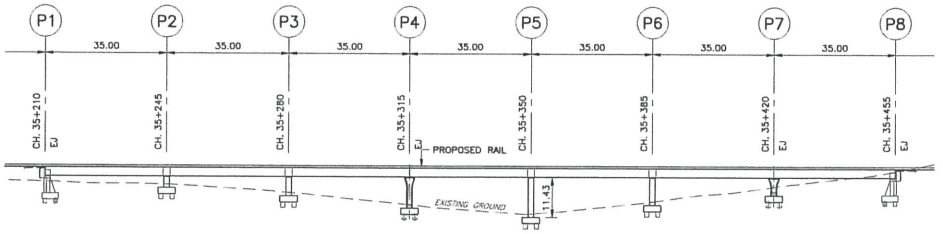
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MASTER KEY PLAN

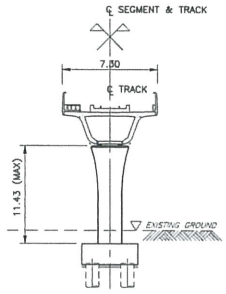




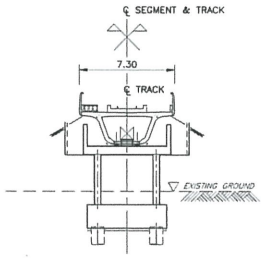
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

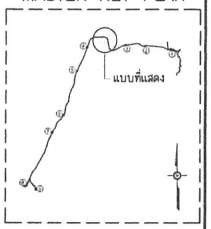


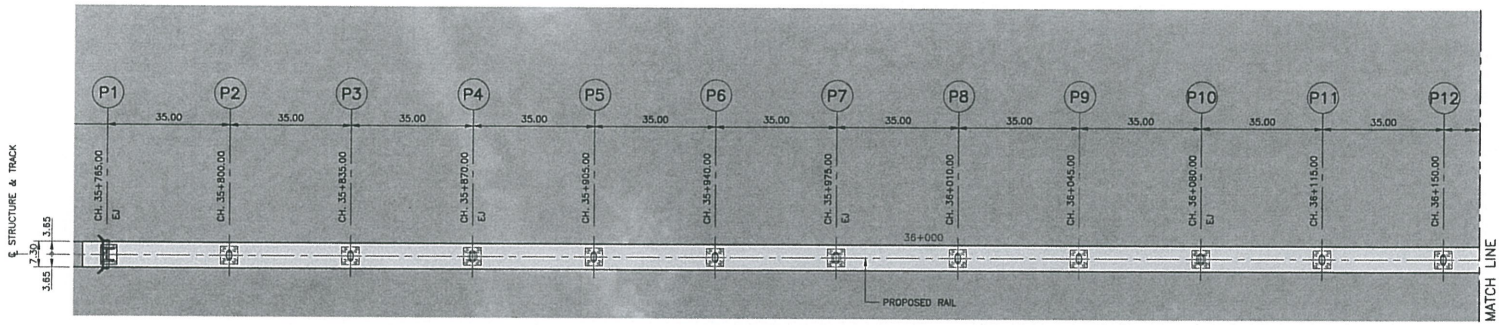
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 35+210 TO 35+455	DATE : Feb-18 DWG. NO. : SCR-RB-LA-017	SCALE : AS SHOWN SHEET NO. : 28

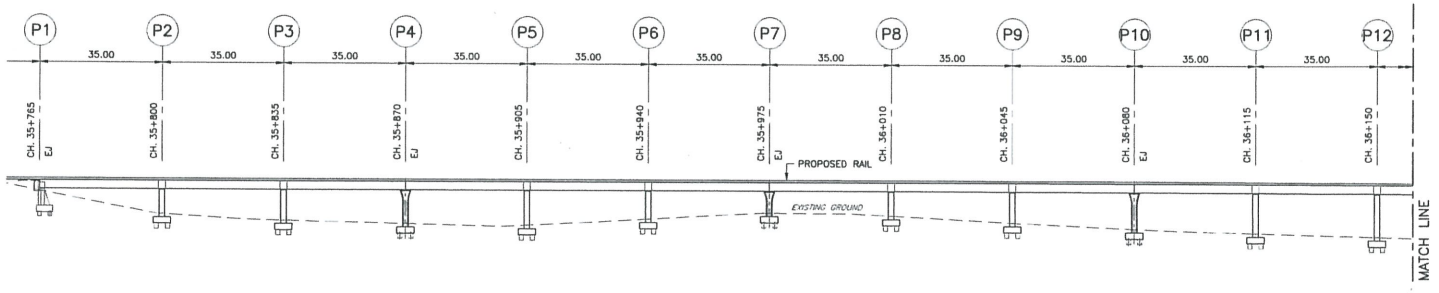
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MASTER KEY PLAN

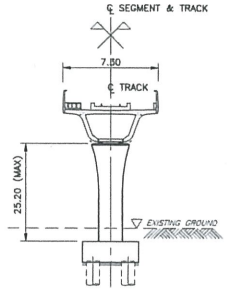




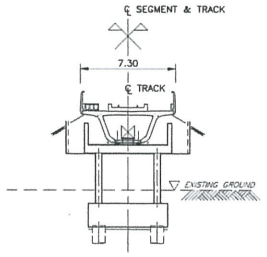
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

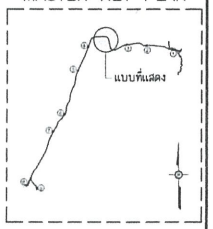


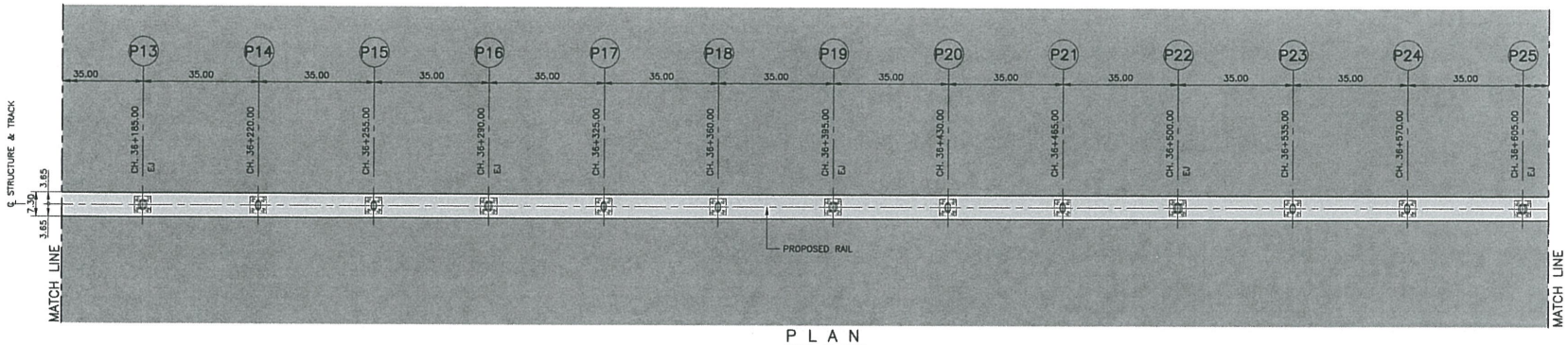
SECTION ABUTMENT
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A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 35+765 TO 35+955 SHEET 1/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-018/1	SCALE: AS SHOWN SHEET NO.: 29

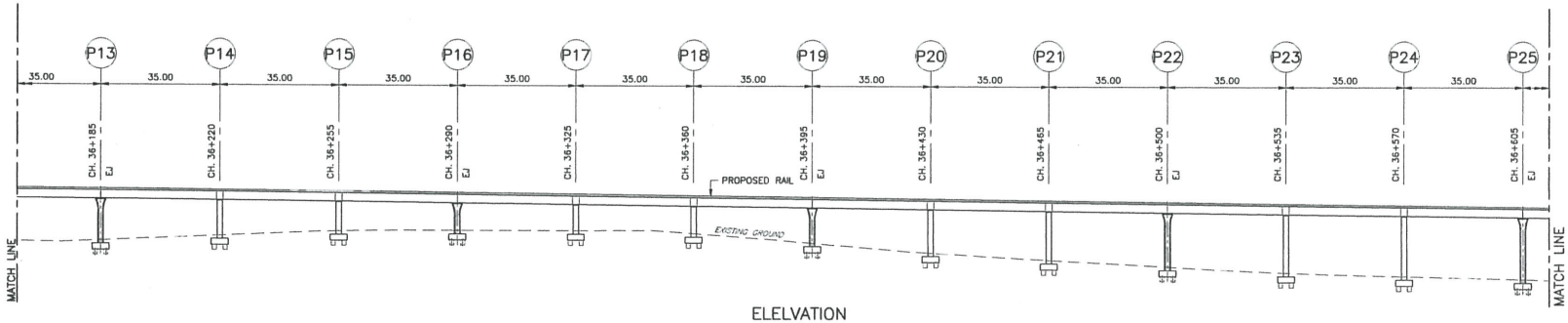
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MASTER KEY PLAN

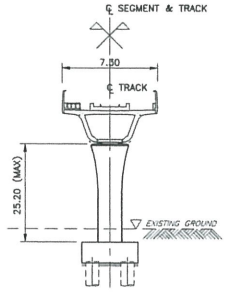




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

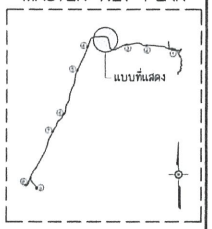


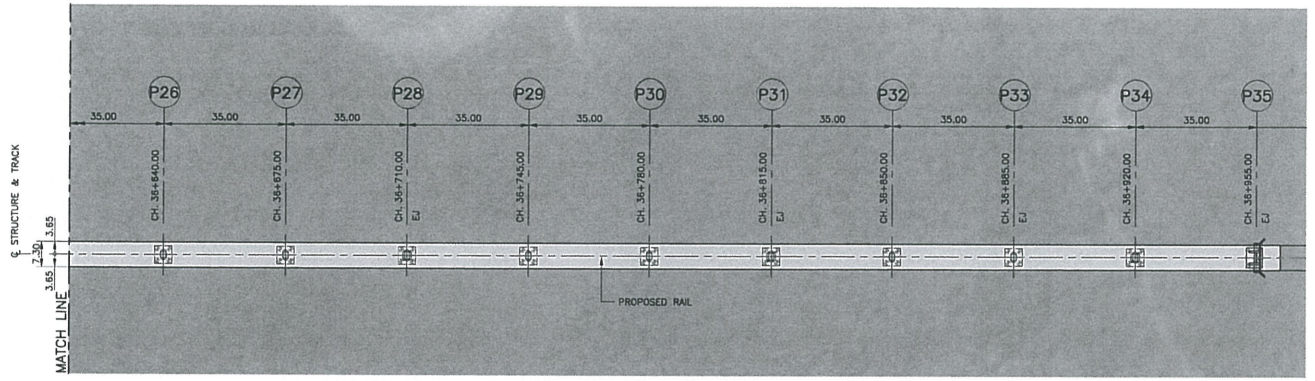
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 35+765 TO 35+955 SHEET 2/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-018/2	SCALE : AS SHOWN SHEET NO. : 30

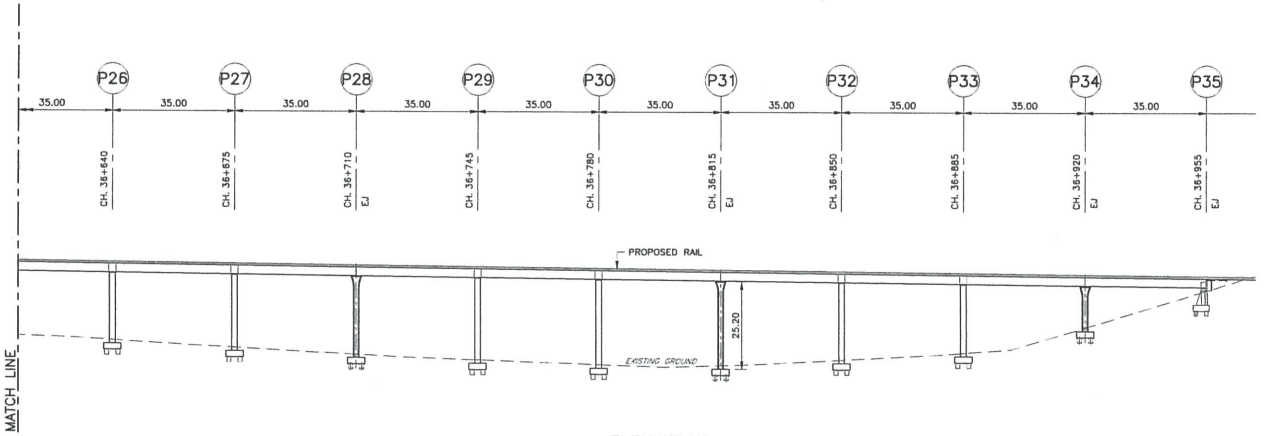
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MASTER KEY PLAN

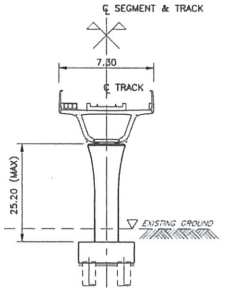




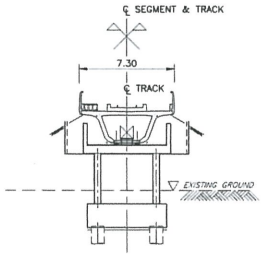
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

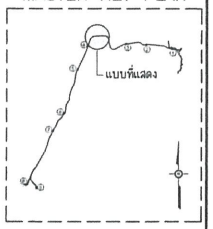


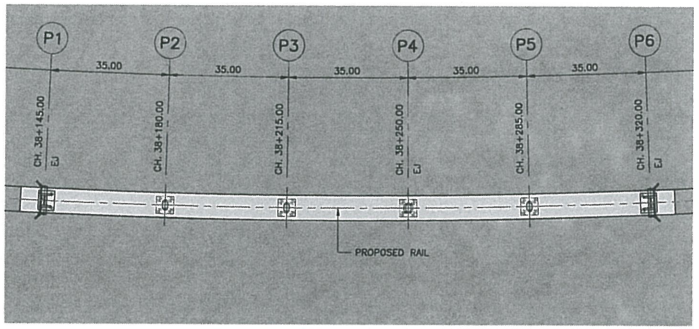
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 35+765 TO 35+955 SHEET 3/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-018/3	SCALE: AS SHOWN SHEET NO.: 31

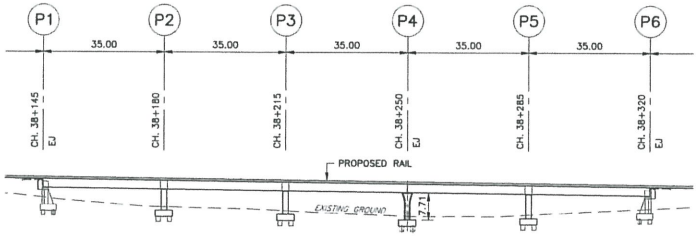
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MASTER KEY PLAN

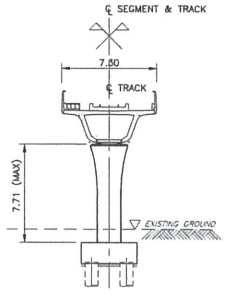




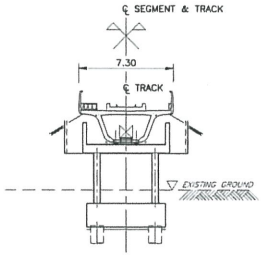
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

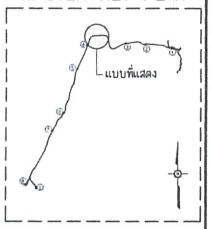


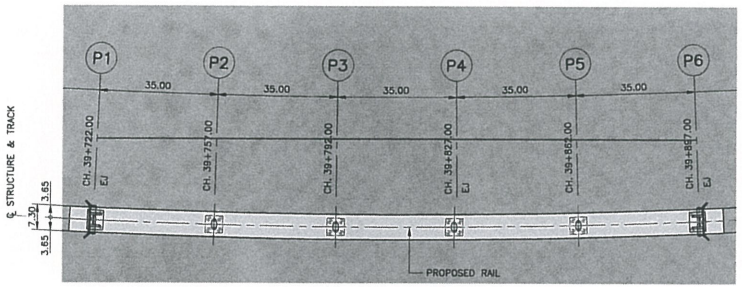
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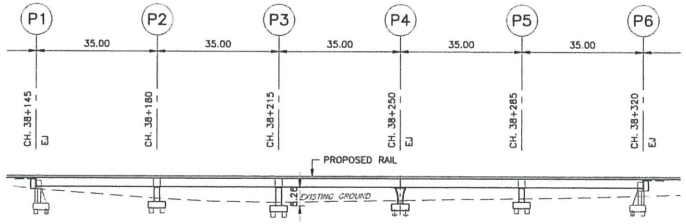
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 38+145 TO 38+320	DATE: Feb-18 DWG. NO.: SCR-RB-LA-019	SCALE: AS SHOWN SHEET NO.: 32

MASTER KEY PLAN

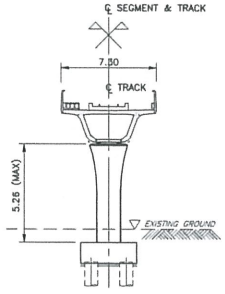




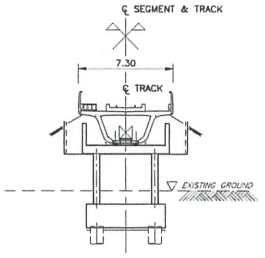
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

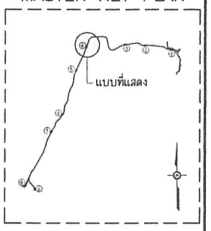


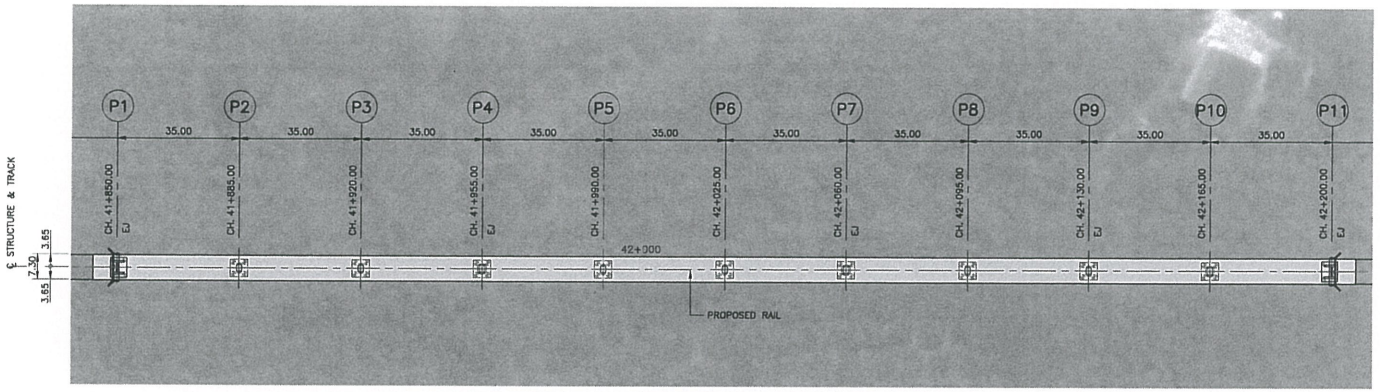
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 39+722TO 39+897	DATE : Feb-18 DWG. NO. : SCR-RB-LA-020	SCALE : AS SHOWN SHEET NO. : 33

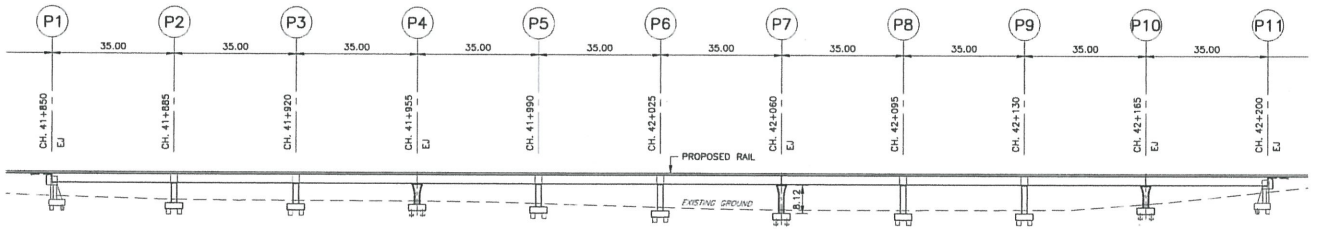
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MASTER KEY PLAN

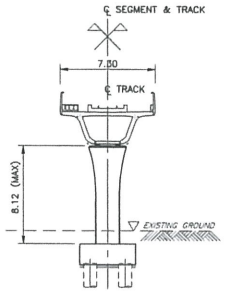




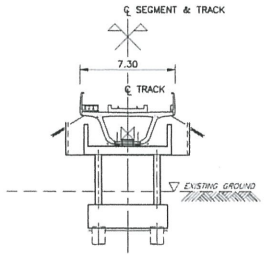
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

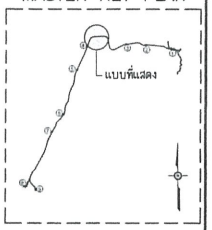


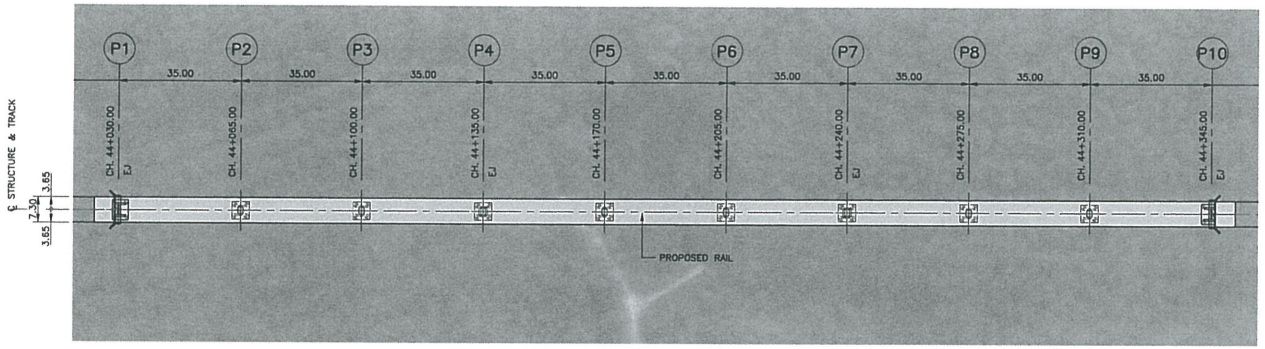
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 41+850 TO 42+200	DATE: Feb-18 DWG. NO.: SCR-RB-LA-021	SCALE: AS SHOWN SHEET NO.: 34

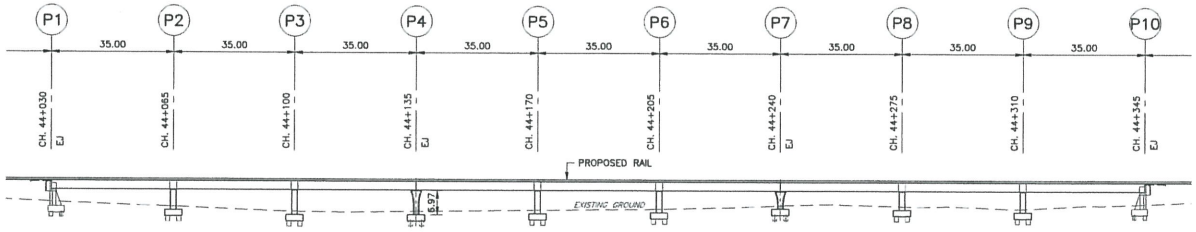
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MASTER KEY PLAN

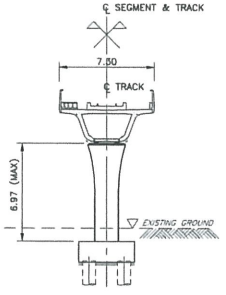




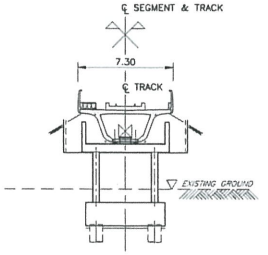
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

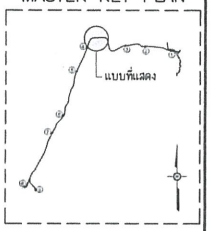


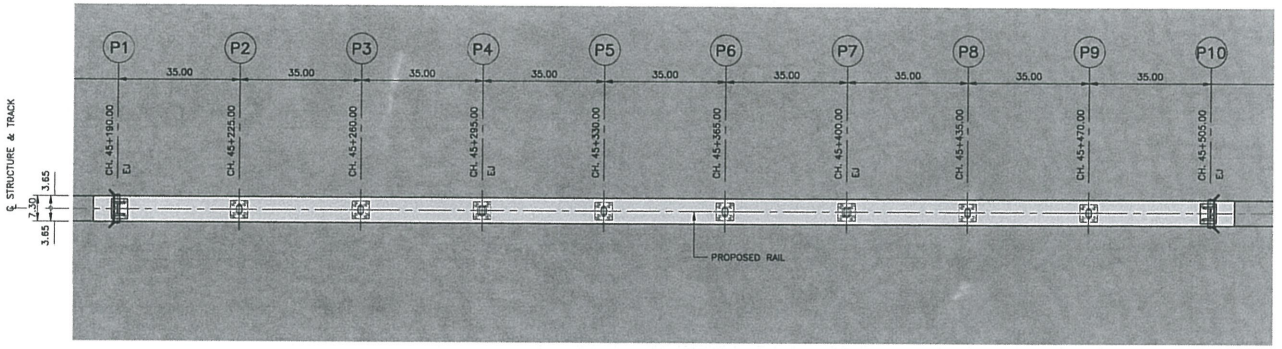
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 44+030 TO 44+345	DATE : Feb-18 DWG. NO. : SCR-RB-LA-022	SCALE : AS SHOWN SHEET NO. : 35

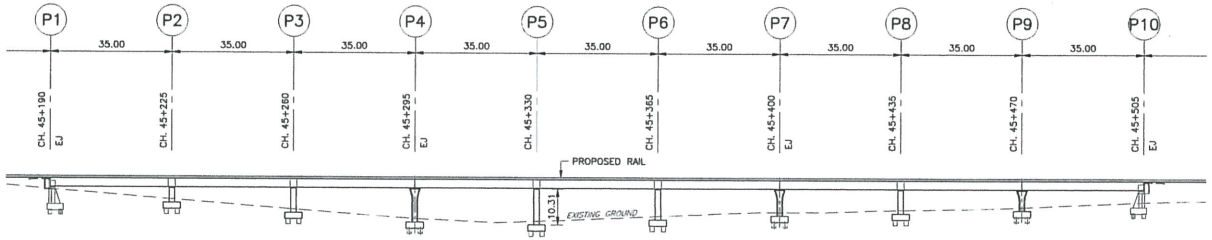
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MASTER KEY PLAN

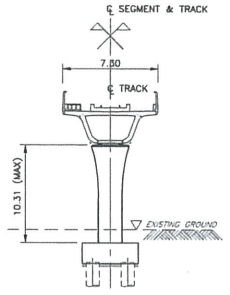




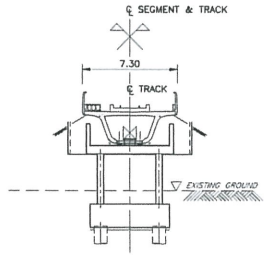
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

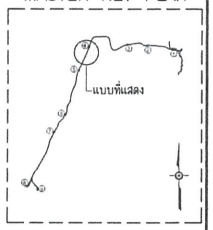


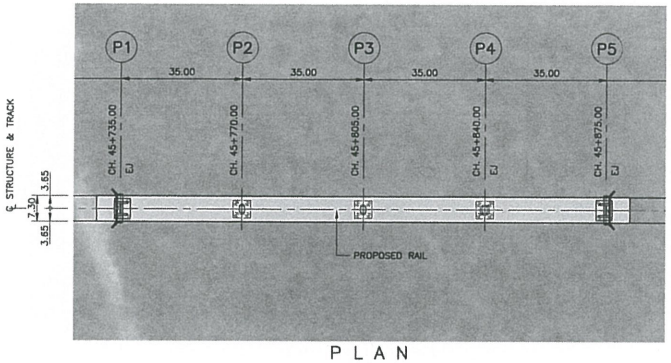
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 45+190 TO 45+505	DATE : Feb-18 / SCALE : AS SHOWN DWG. NO. : SCR-RB-LA-023 / SHEET NO. : 36

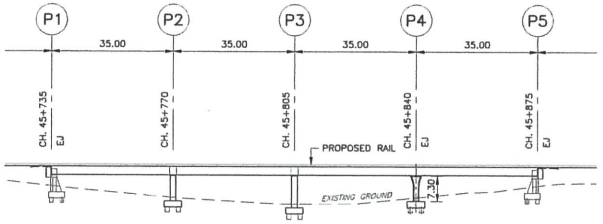
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MASTER KEY PLAN

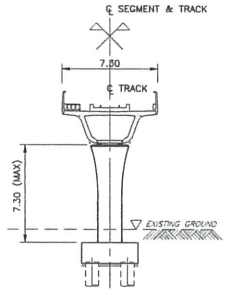




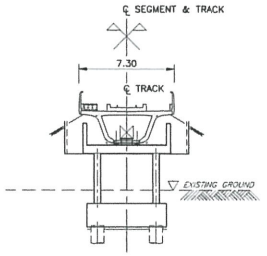
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

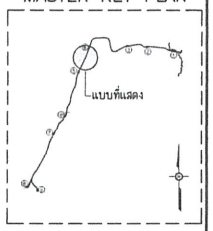


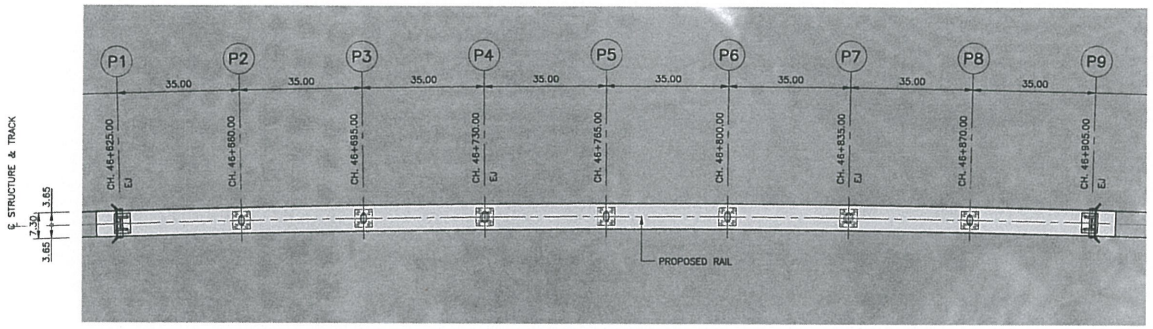
SECTION ABUTMENT
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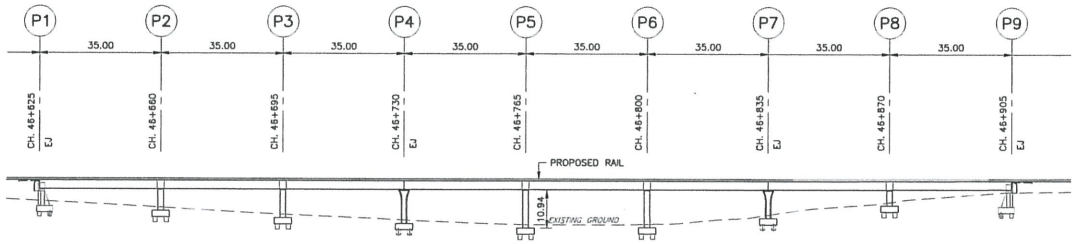
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 45+735 TO 45+875	DATE: Feb-18 DWG. NO.: SCR-RB-LA-024	SCALE: AS SHOWN SHEET NO.: 37

MASTER KEY PLAN

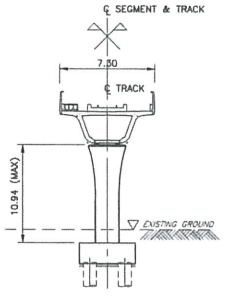




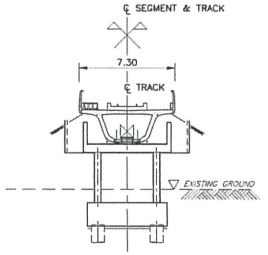
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

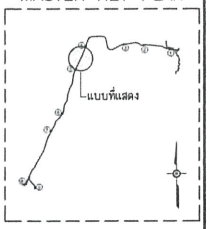
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

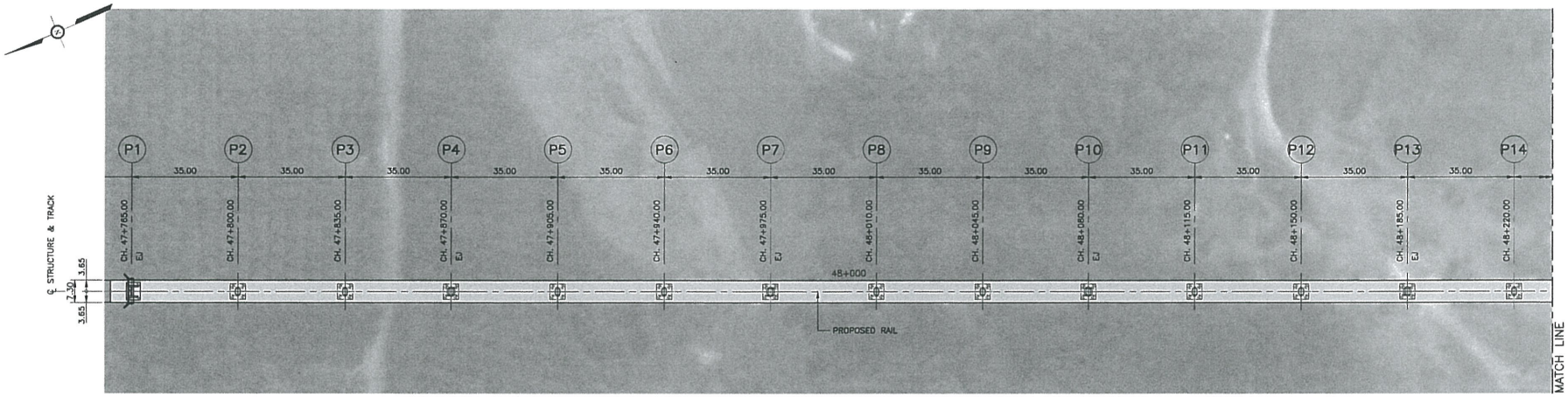
TITLE
RAILWAY BRIDGE LAOUT PLANS
PLAN AND ELEVATION STA. 46+625 TO 46+905

DATE:	SCALE:
Feb-18	AS SHOWN
DWG. NO.:	SHEET NO.:
SCR-RB-LA-025	38

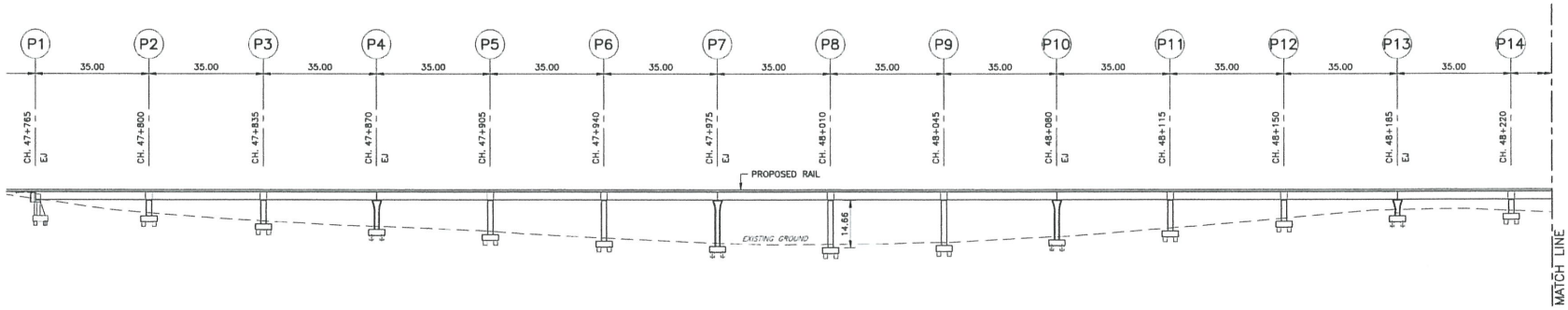
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MASTER KEY PLAN

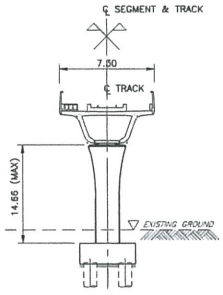




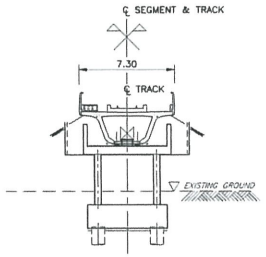
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

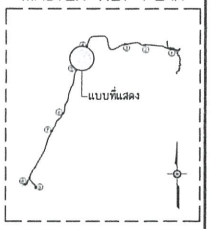


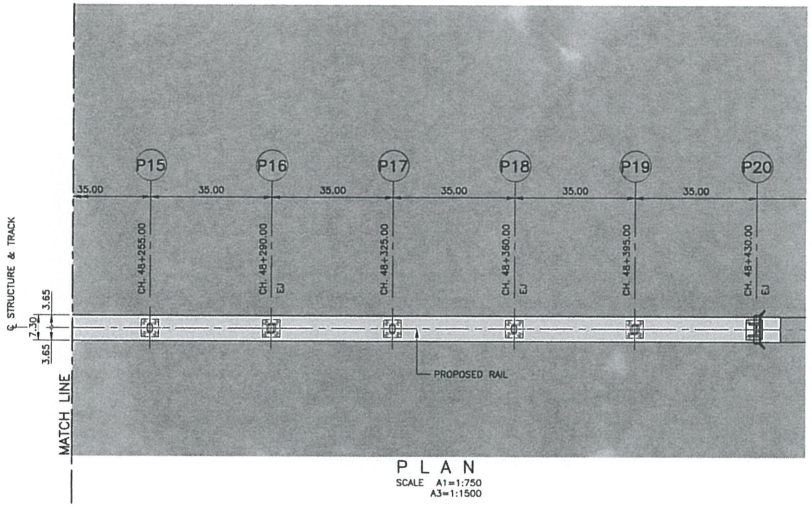
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

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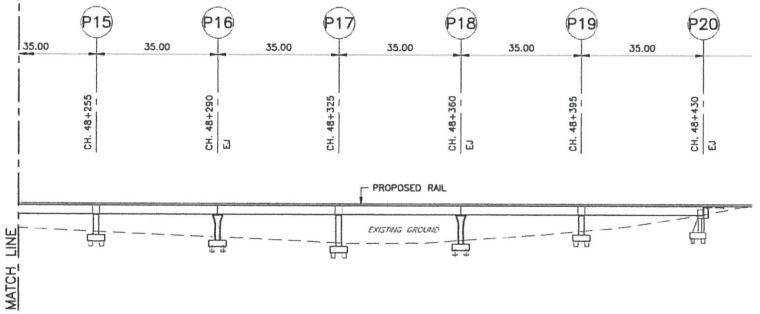
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 47+765 TO 48+430 SHEET 1/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-026/1	SCALE : AS SHOWN SHEET NO. : 39

MASTER KEY PLAN

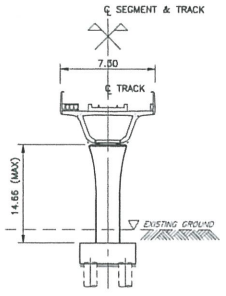




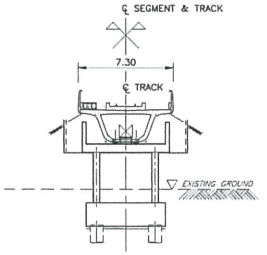
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

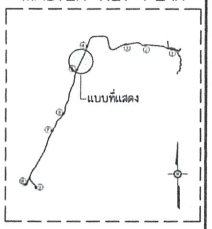
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

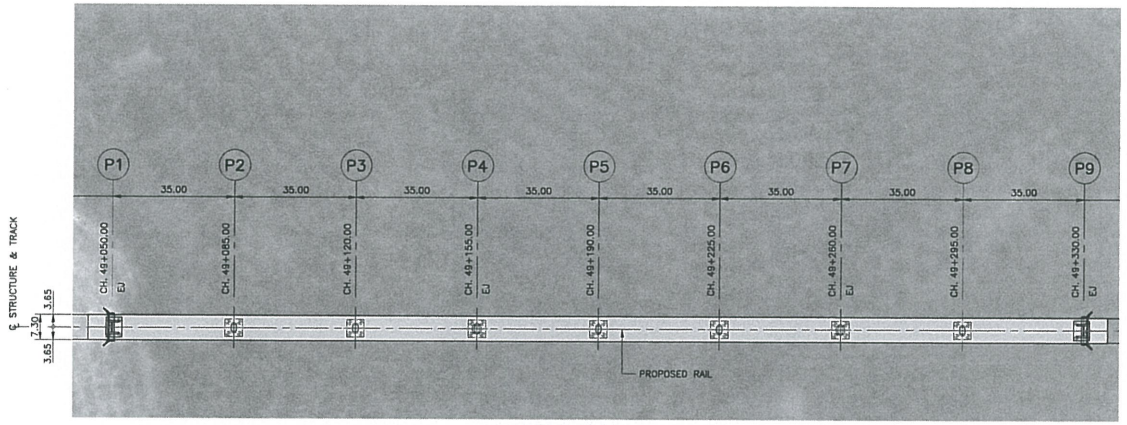
TITLE
RAILWAY BRIDGE LAOUT PLANS
PLAN AND ELEVATION STA. 47+765 TO 48+430
SHEET 2/2

DATE: Feb-18
SCALE: AS SHOWN
DWG. NO.: SCR-RB-LA-026/2
SHEET NO.: 40

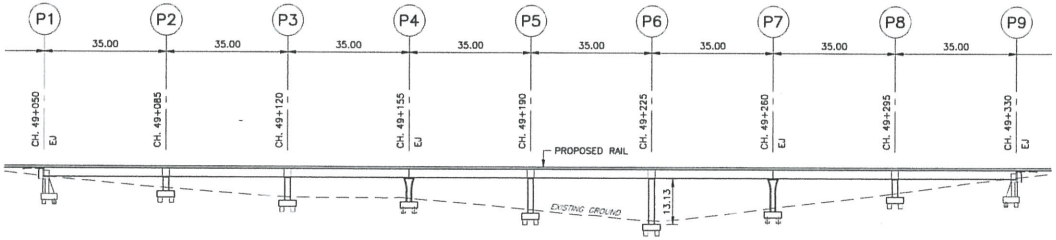
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MASTER KEY PLAN

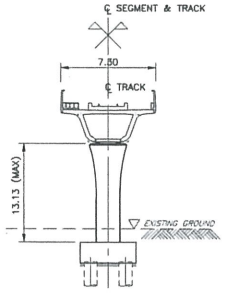




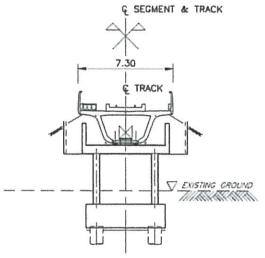
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
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A3=1:400

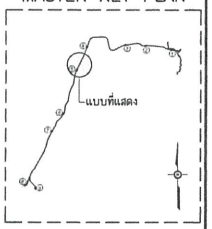


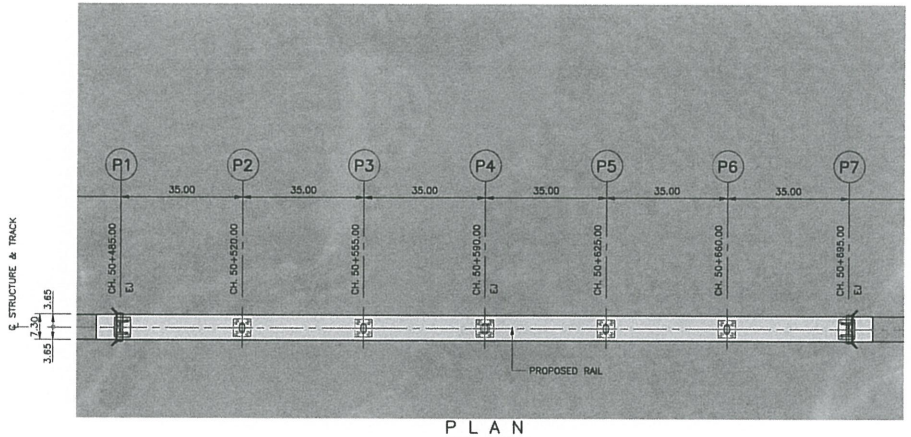
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 49+050 to 49+330	DATE : Feb-18 DWG. NO. : SCR-RB-LA-027	SCALE : AS SHOWN SHEET NO. : 41

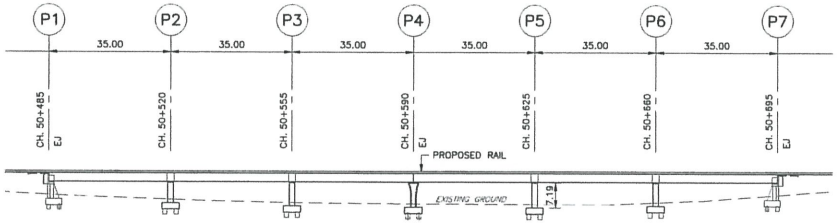
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MASTER KEY PLAN

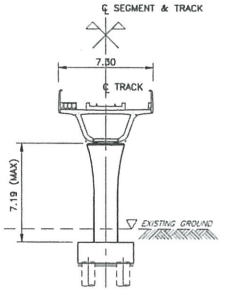




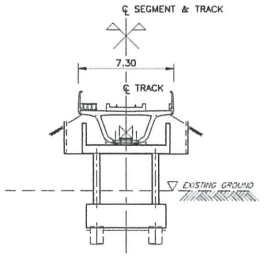
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SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

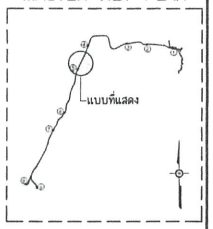


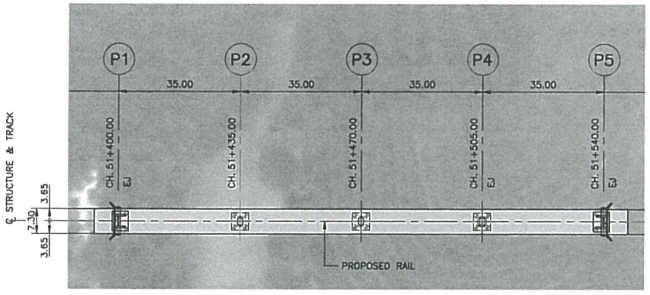
SECTION ABUTMENT
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A3=1:400

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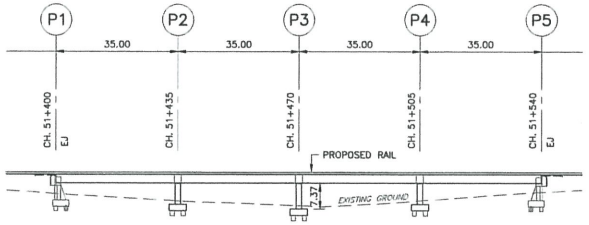
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 50+485 TO 50+695	DATE: Feb-18 DWG. NO.: SCR-RB-LA-028	SCALE: AS SHOWN SHEET NO.: 42

MASTER KEY PLAN

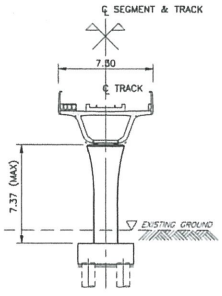




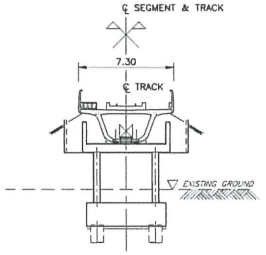
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

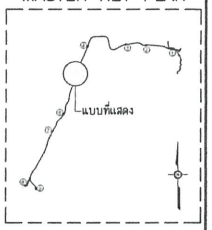


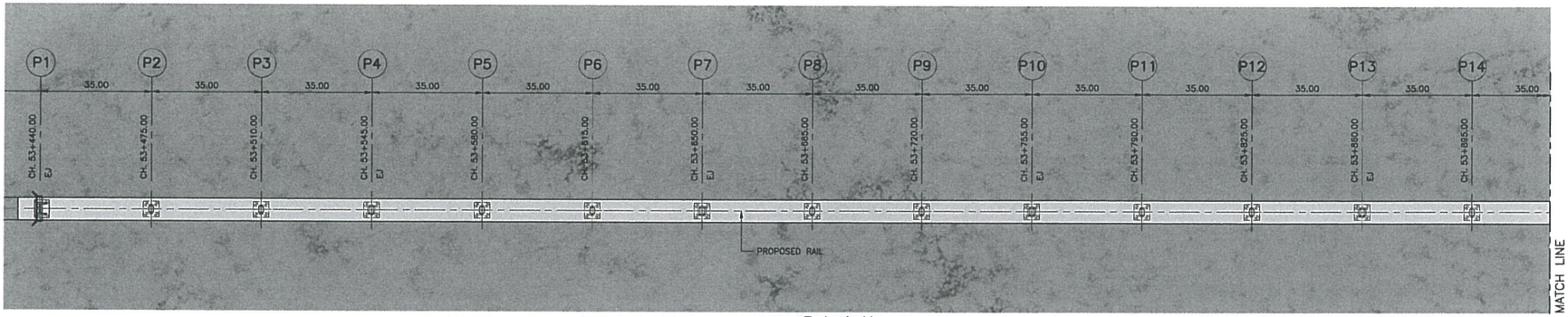
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 51+400 TO 51+540	DATE : Feb-18 DWG. NO. : SCR-RB-LA-029	SCALE : AS SHOWN SHEET NO. : 43

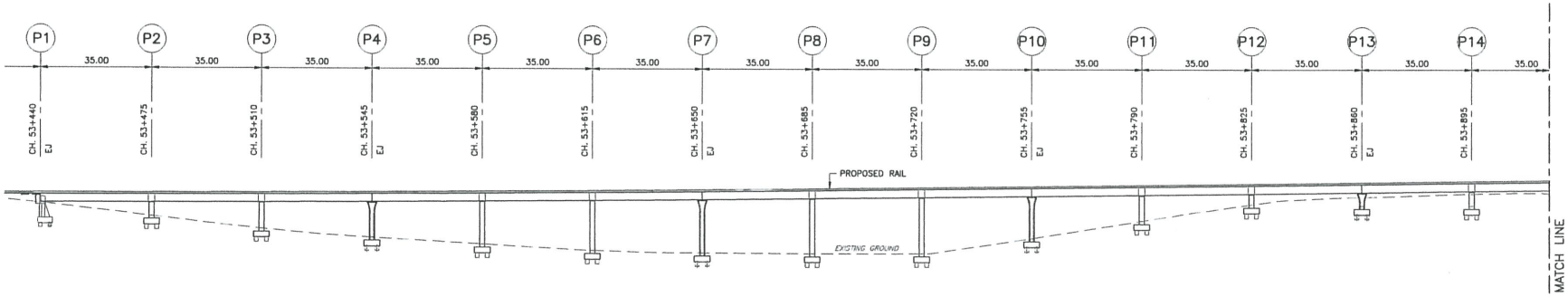
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MASTER KEY PLAN

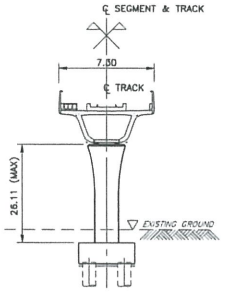




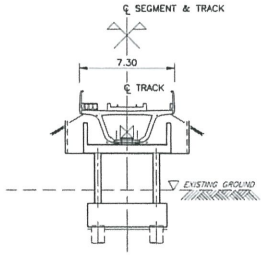
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

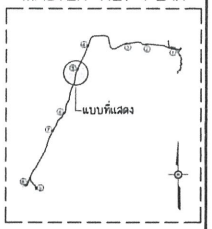


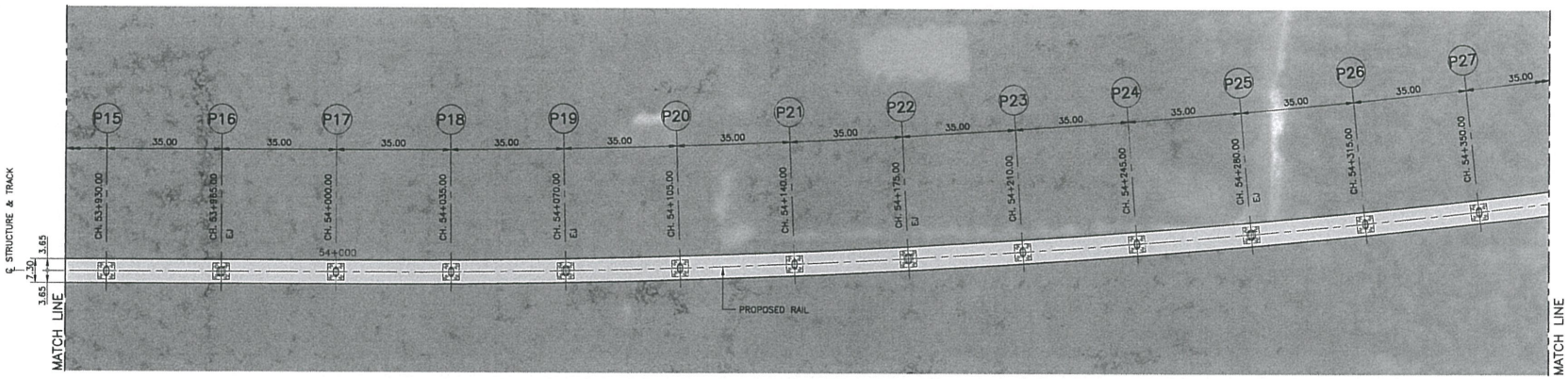
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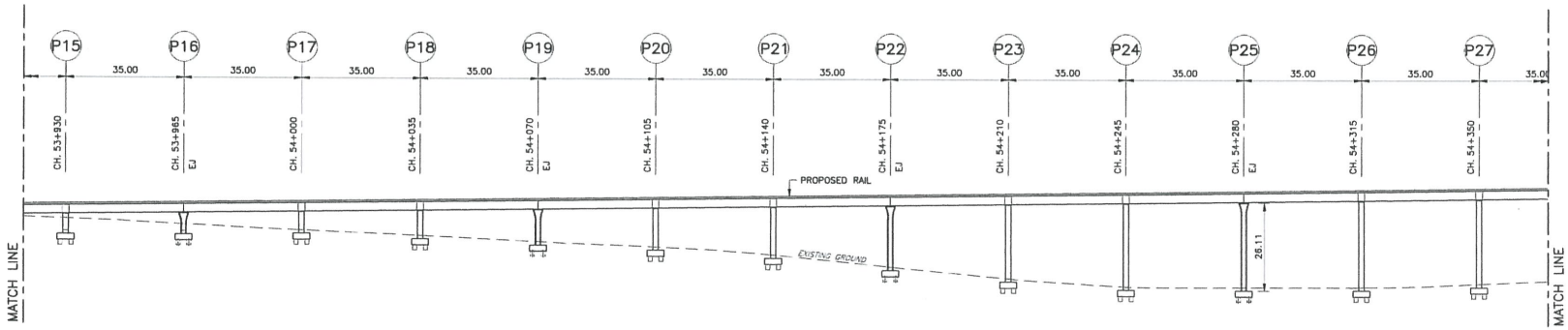
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 53.440 TO 54+700 SHEET 1/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-030/1	SCALE: AS SHOWN SHEET NO.: 44

MASTER KEY PLAN

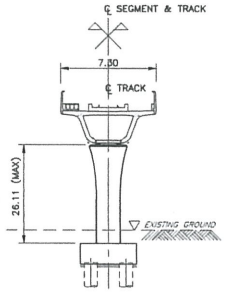




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

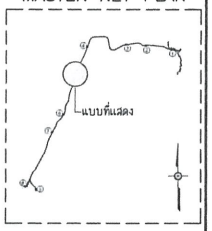


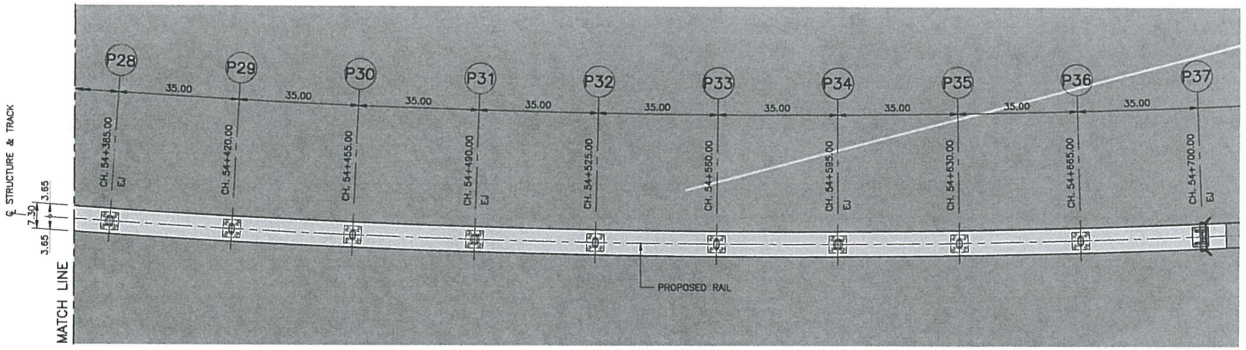
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 53.440 TO 54+700 SHEET 2/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-030/2	SCALE: AS SHOWN SHEET NO.: 45

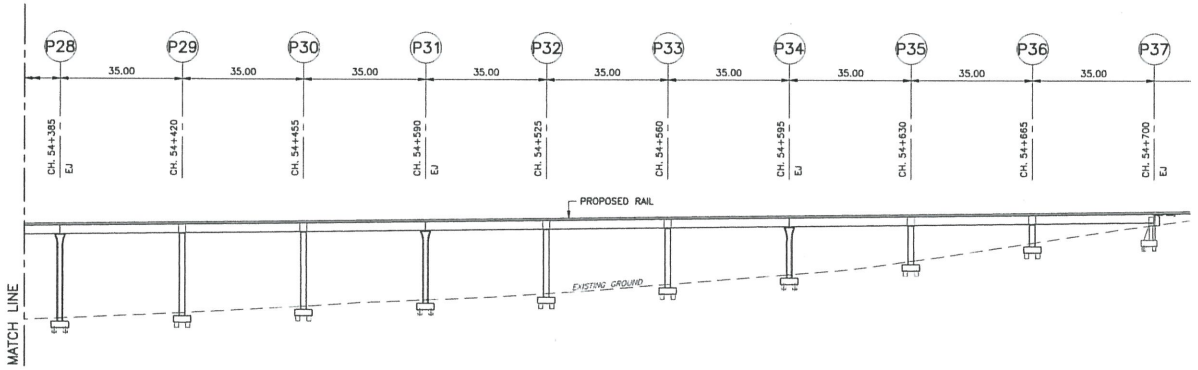
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MASTER KEY PLAN

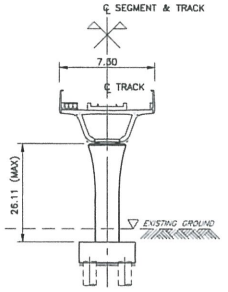




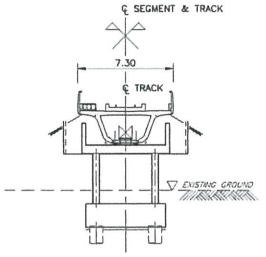
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

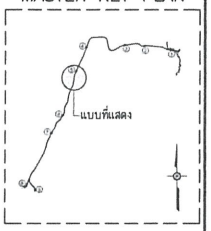


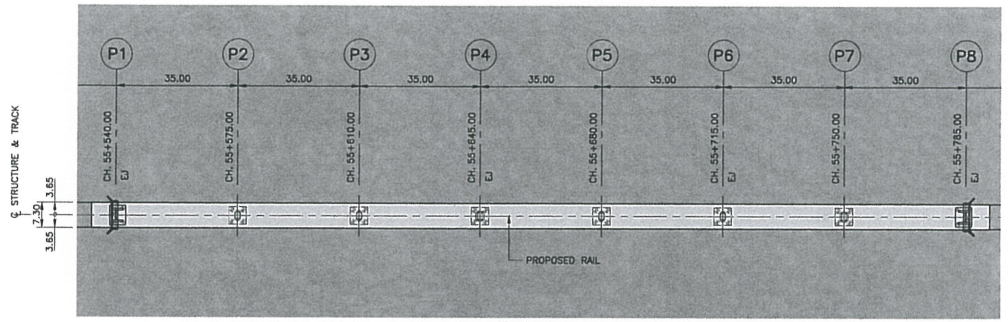
SECTION ABUTMENT
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A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 53.440 TO 54+700 SHEET 3/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-030/3	SCALE : AS SHOWN SHEET NO. : 46

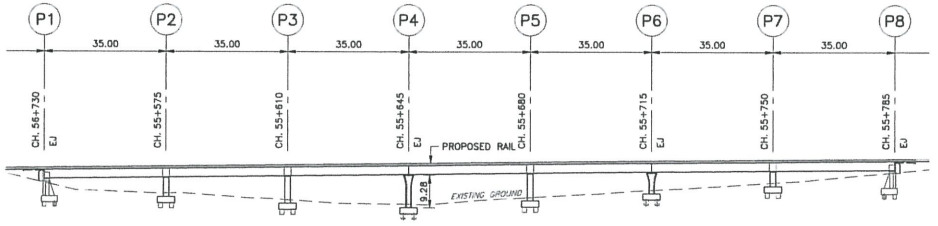
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MASTER KEY PLAN

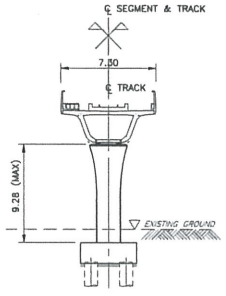




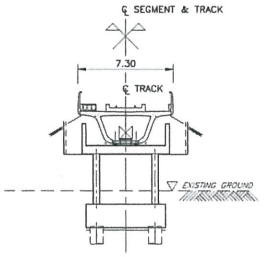
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

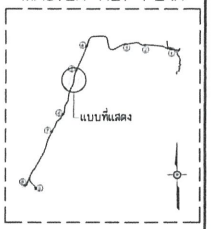


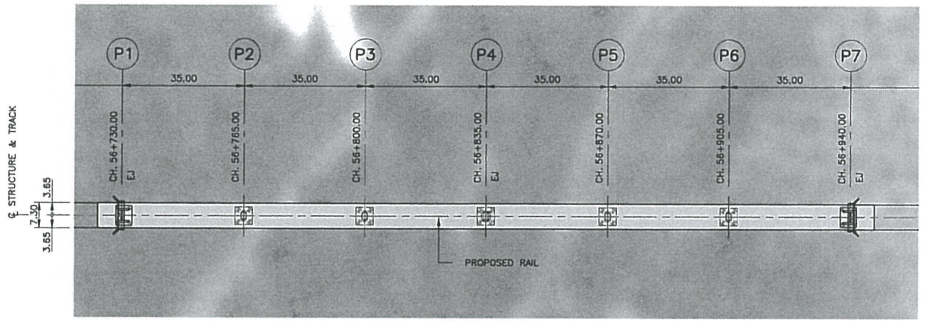
SECTION ABUTMENT
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A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 55+540 TO 55+785	DATE : Feb-18 DWG. NO. : SCR-RB-LA-031	SCALE : AS SHOWN SHEET NO. : 47

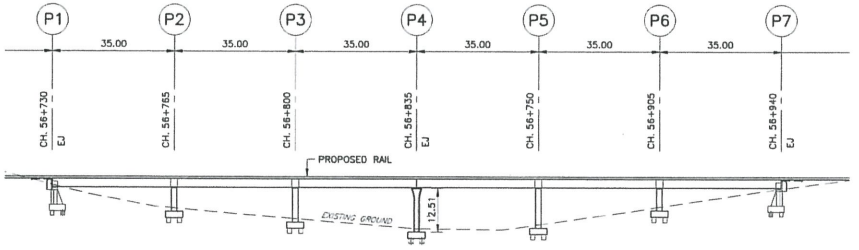
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MASTER KEY PLAN

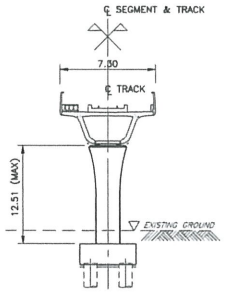




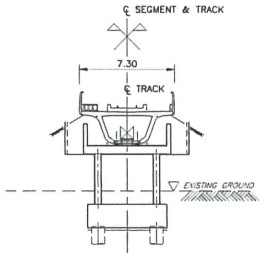
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

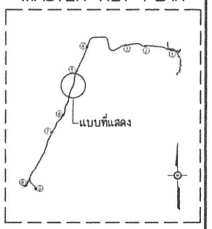


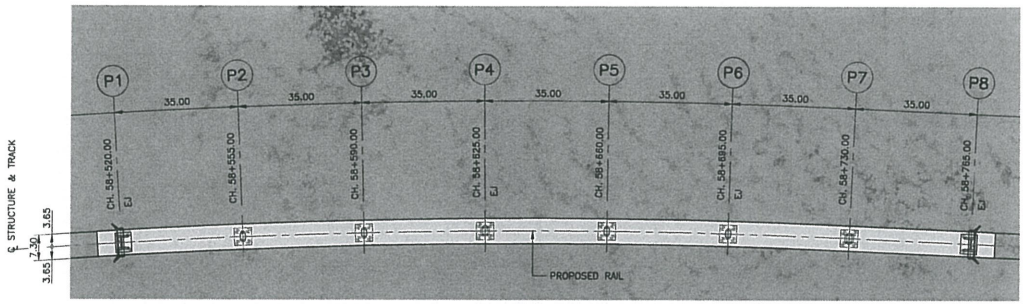
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 56+730 TO 56+940	DATE: Feb-18 DWG. NO. SCR-RB-LA-032	SCALE: AS SHOWN SHEET NO.: 48

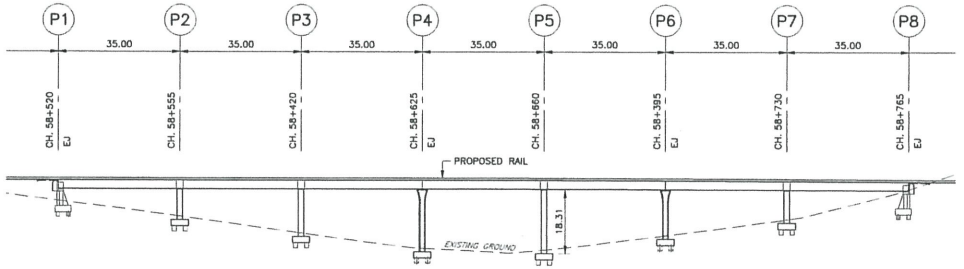
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MASTER KEY PLAN

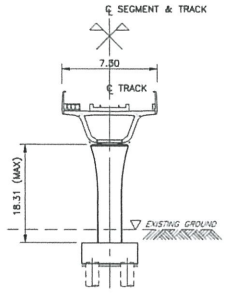




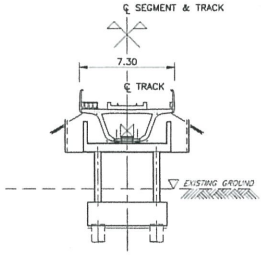
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

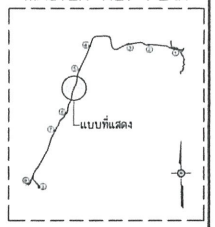


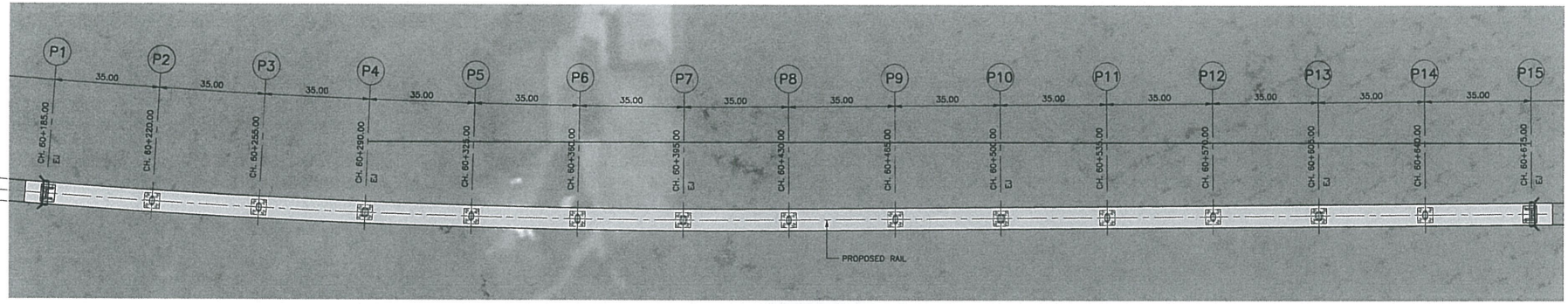
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 58+520 TO 58+765	DATE: Feb-18 DWG. NO.: SCR-RB-LA-033	SCALE: AS SHOWN SHEET NO.: 49

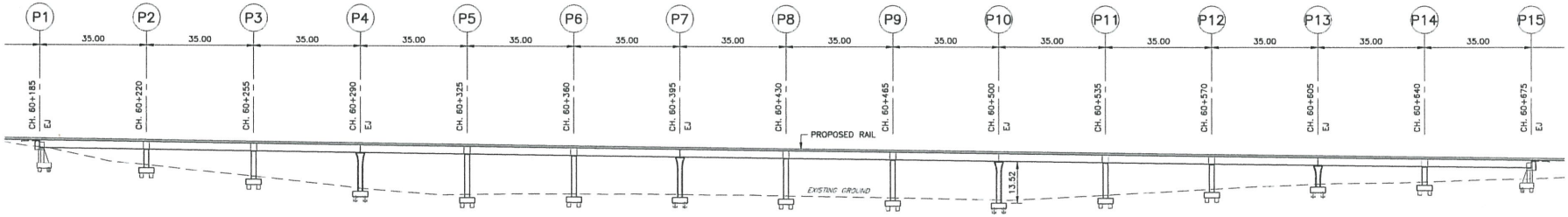
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MASTER KEY PLAN

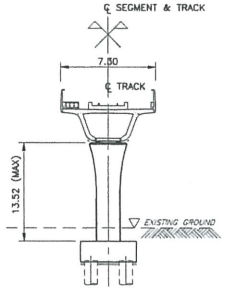




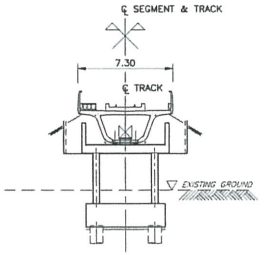
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

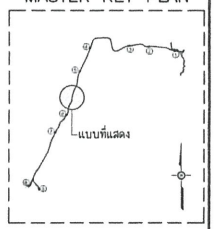


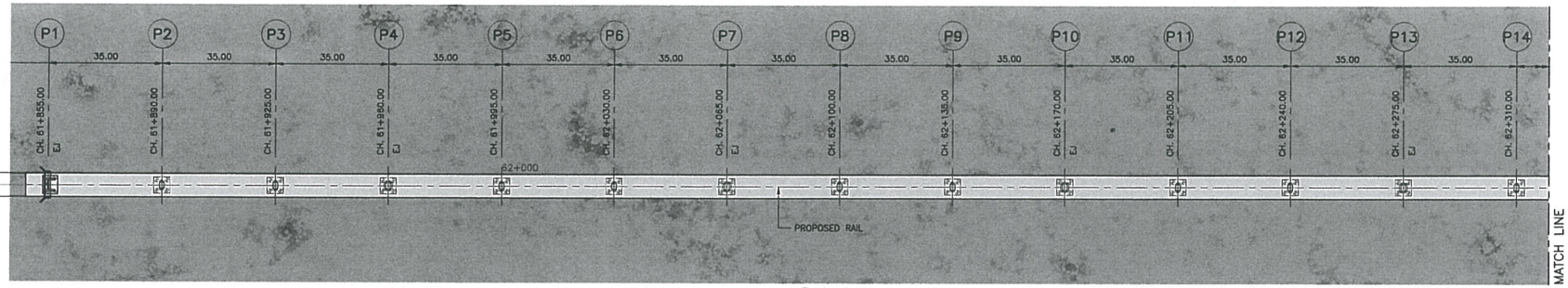
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

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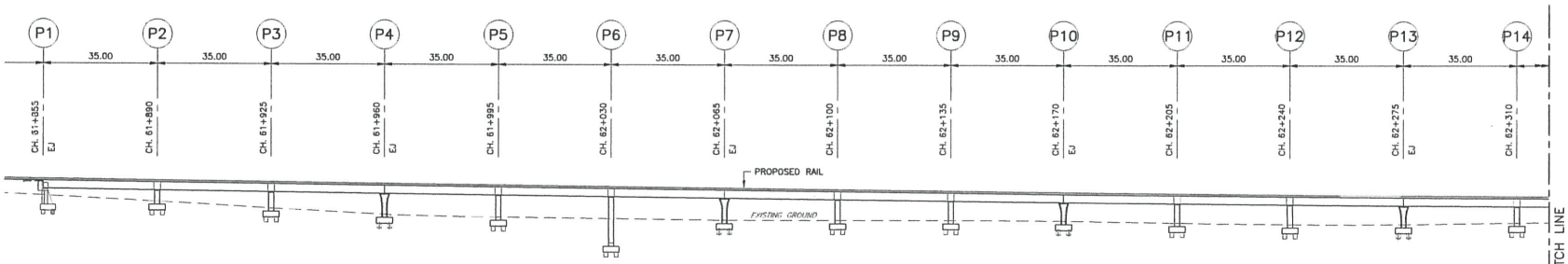
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 60+185 TO 60+675	DATE : Feb-18 DWG. NO. : SCR-RB-LA-034	SCALE : AS SHOWN SHEET NO. : 50

MASTER KEY PLAN

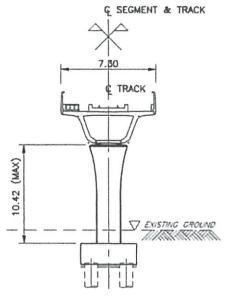




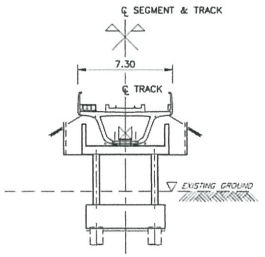
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

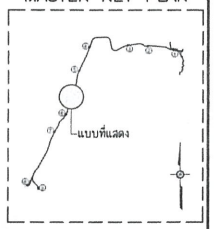


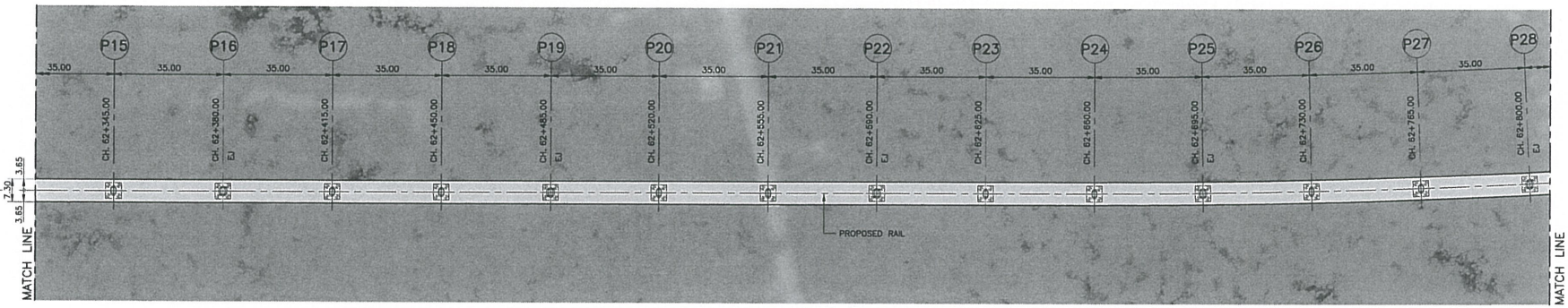
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 1/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/1	SCALE: AS SHOWN SHEET NO.: 51

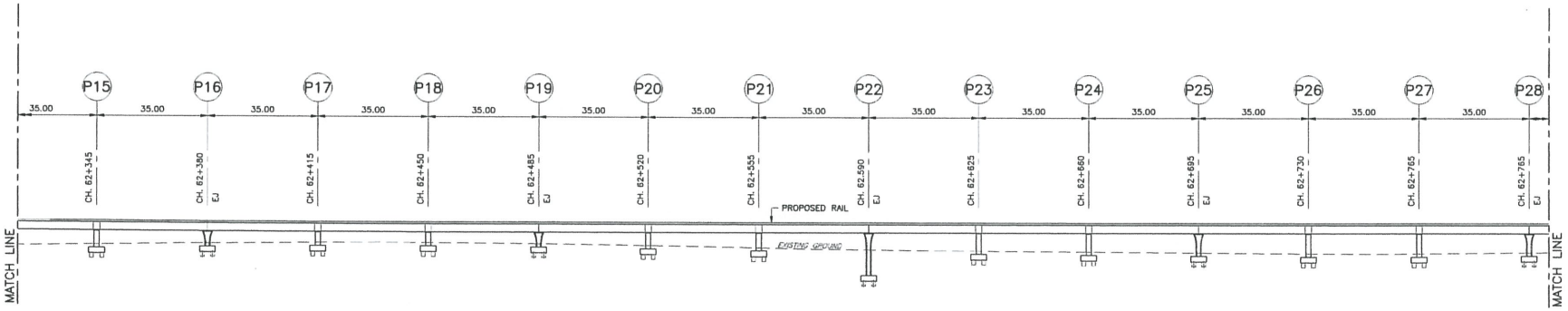
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MASTER KEY PLAN

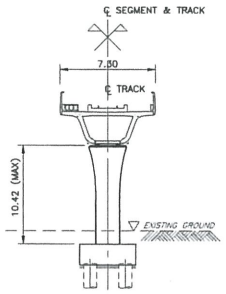




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

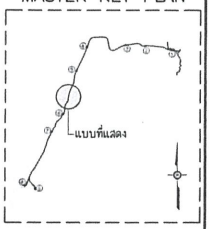


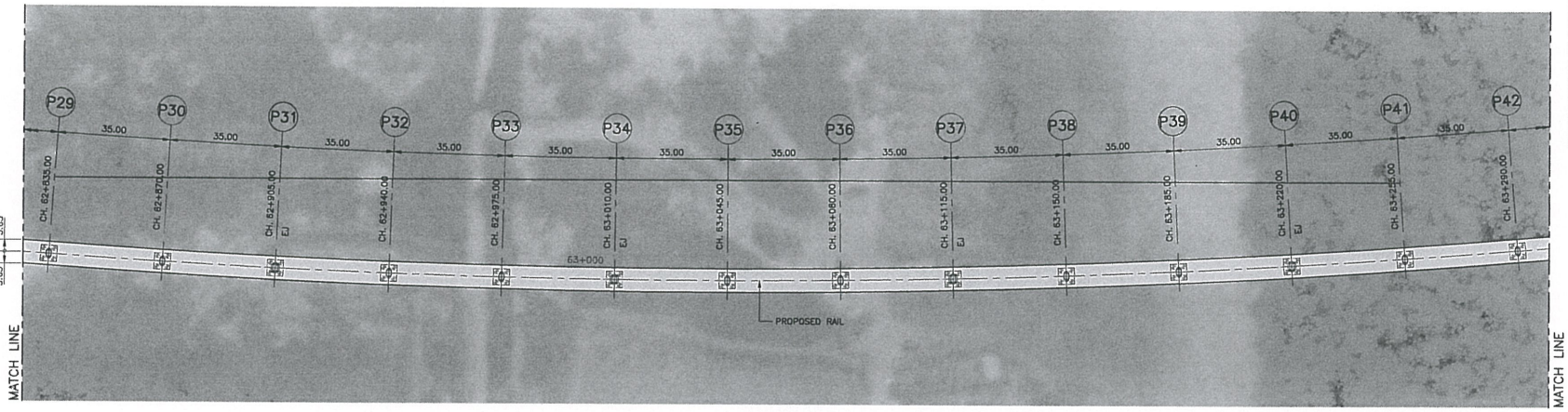
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 2/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/2	SCALE: AS SHOWN SHEET NO.: 52

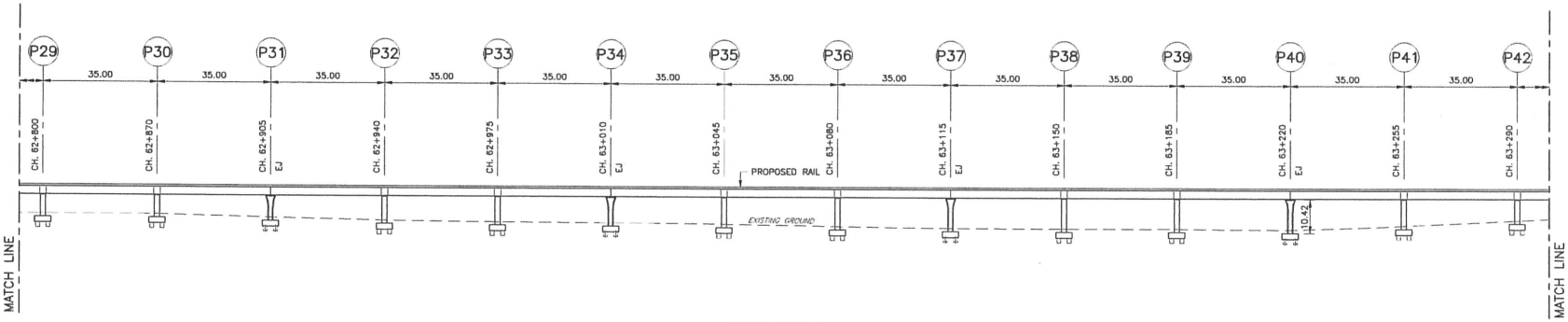
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MASTER KEY PLAN

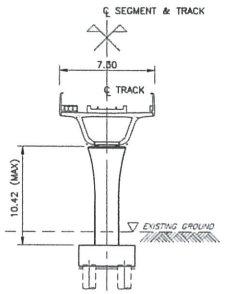




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

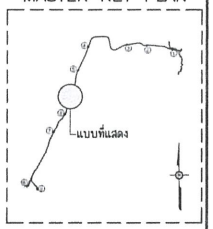


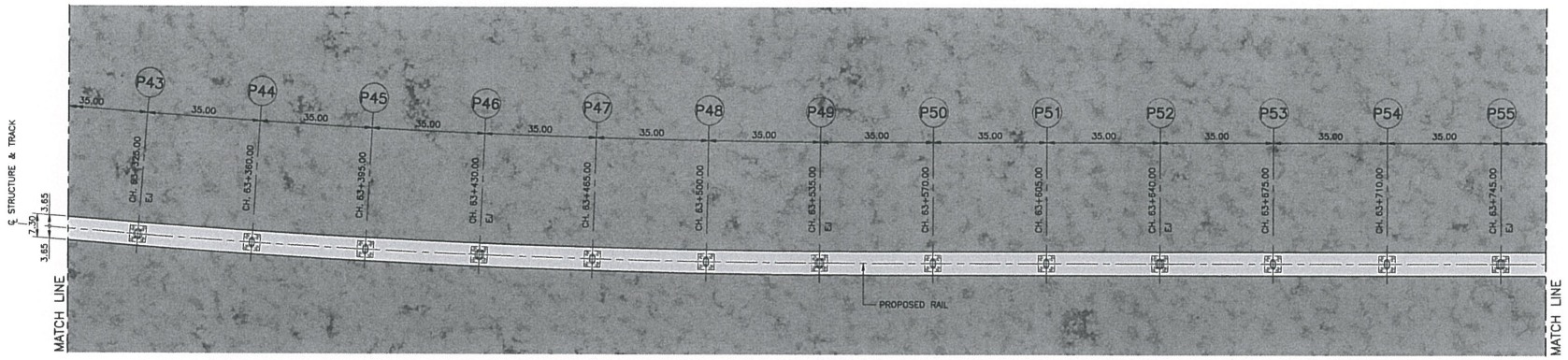
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

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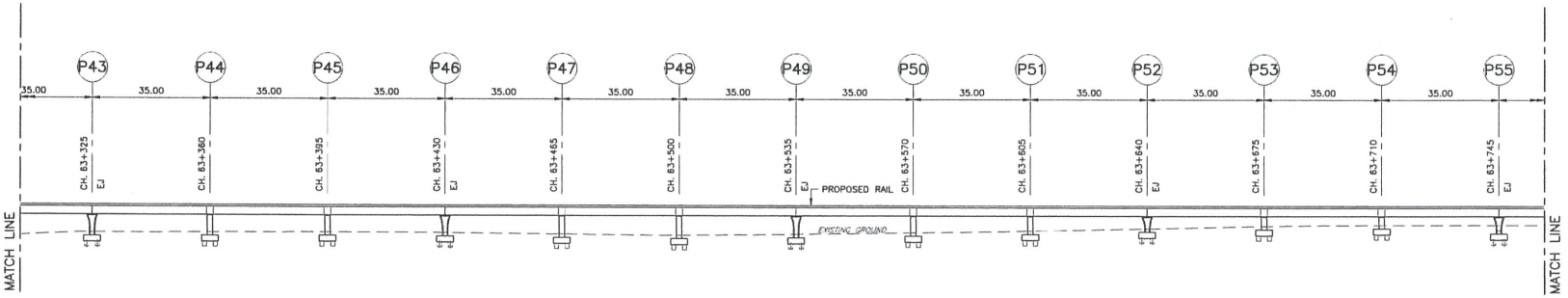
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 3/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/3	SCALE: AS SHOWN SHEET NO.: 53

MASTER KEY PLAN

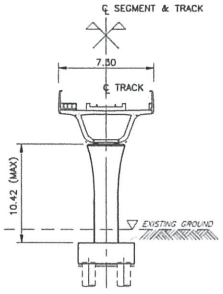




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

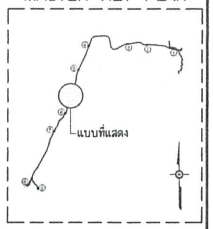


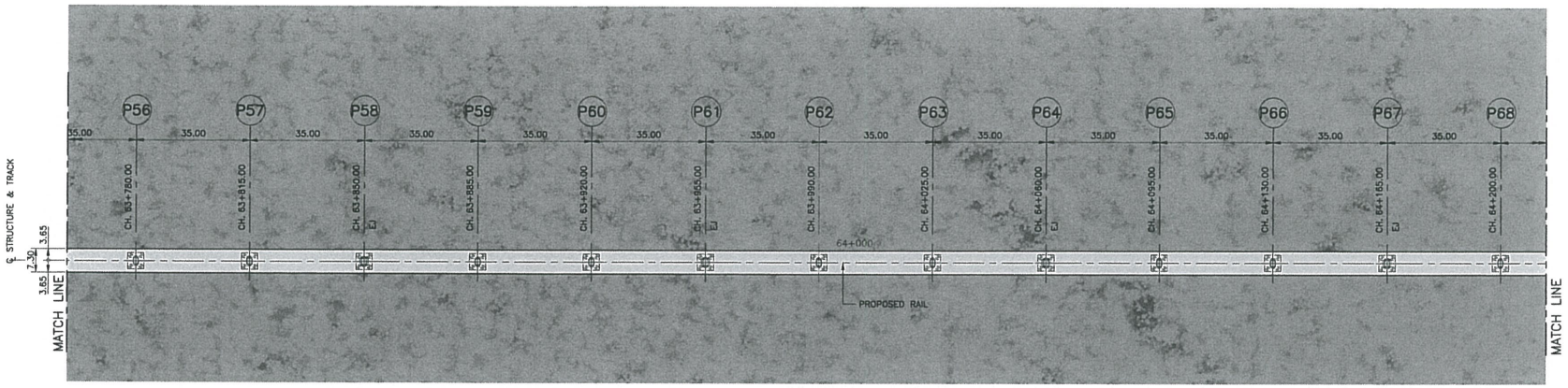
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 4/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/4	SCALE: AS SHOWN SHEET NO.: 54

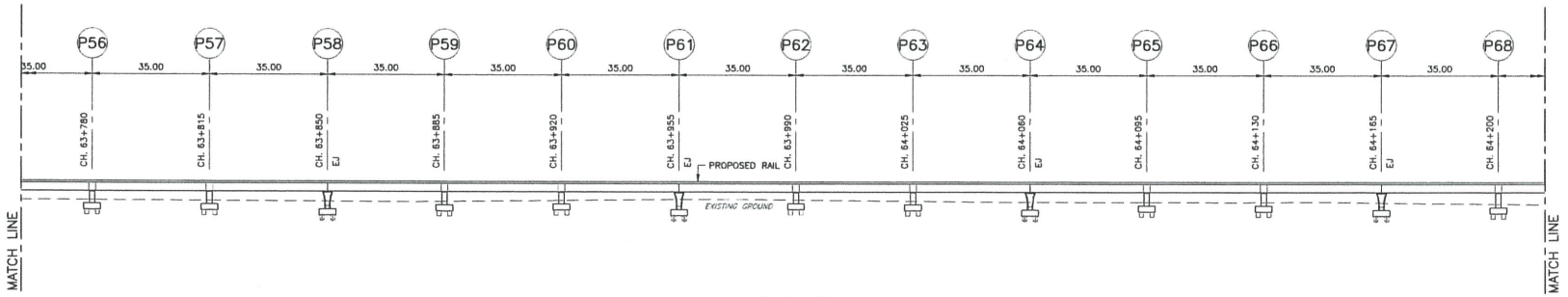
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MASTER KEY PLAN

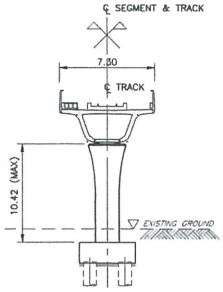




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

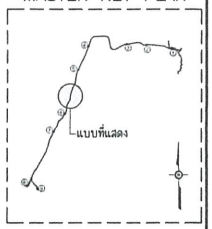


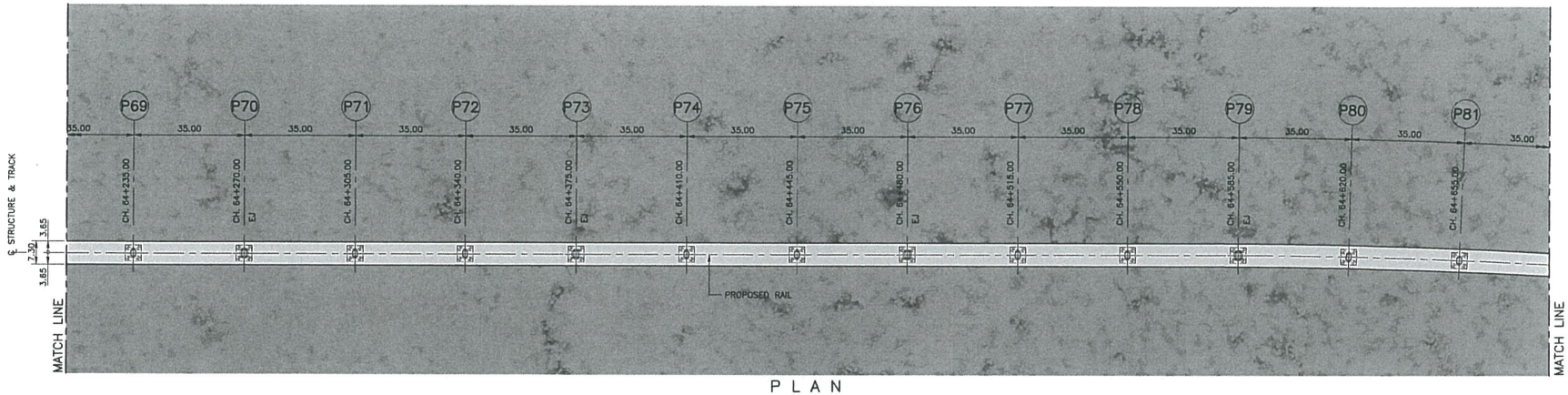
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 5/8	DATE : Feb-18 DWG. NO. : SCR-RB-LA-035/5	SCALE : AS SHOWN SHEET NO. : 55

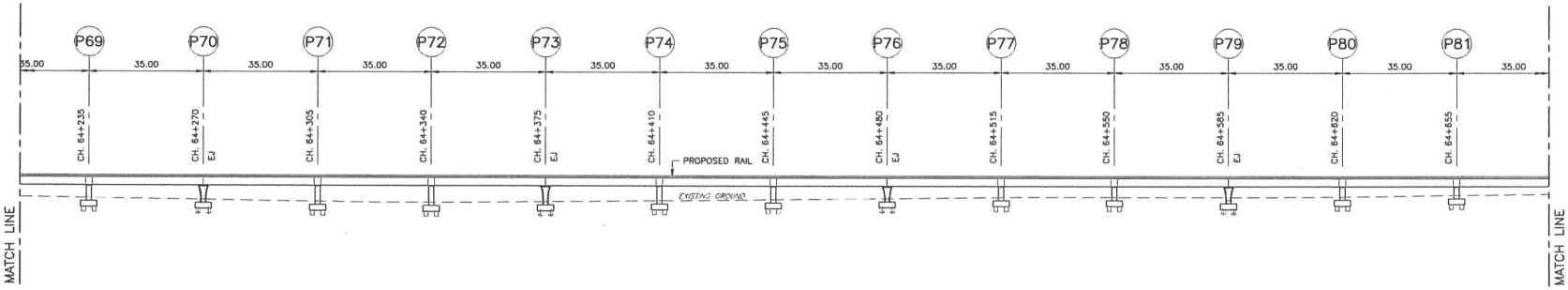
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MASTER KEY PLAN

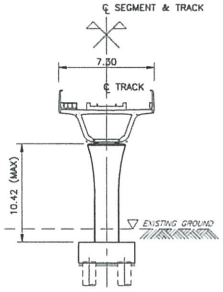




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



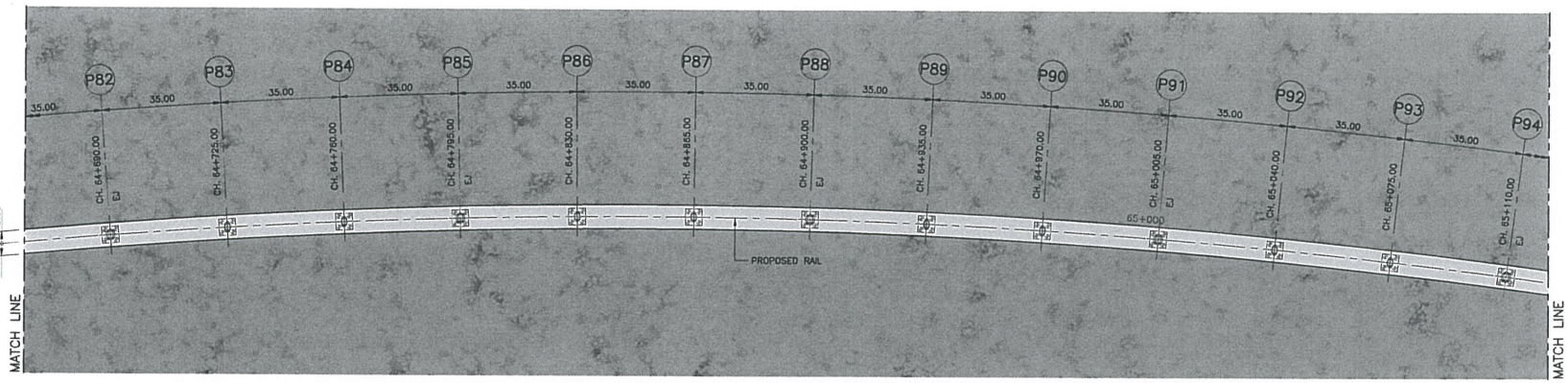
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 6/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/6	SCALE: AS SHOWN SHEET NO.: 56

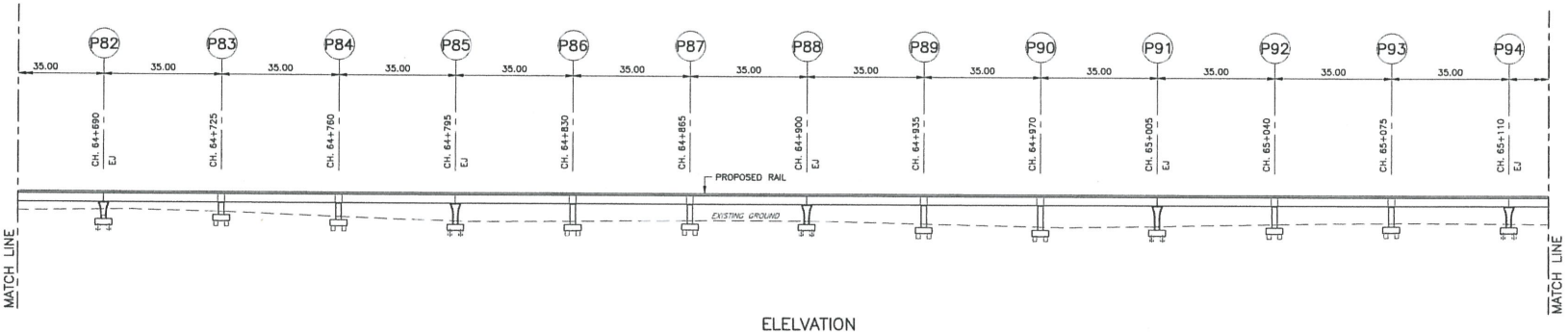
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MASTER KEY PLAN

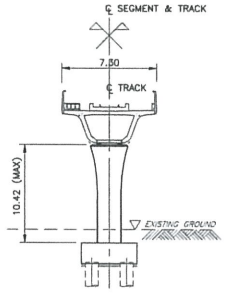




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

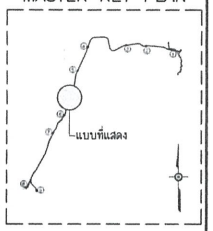


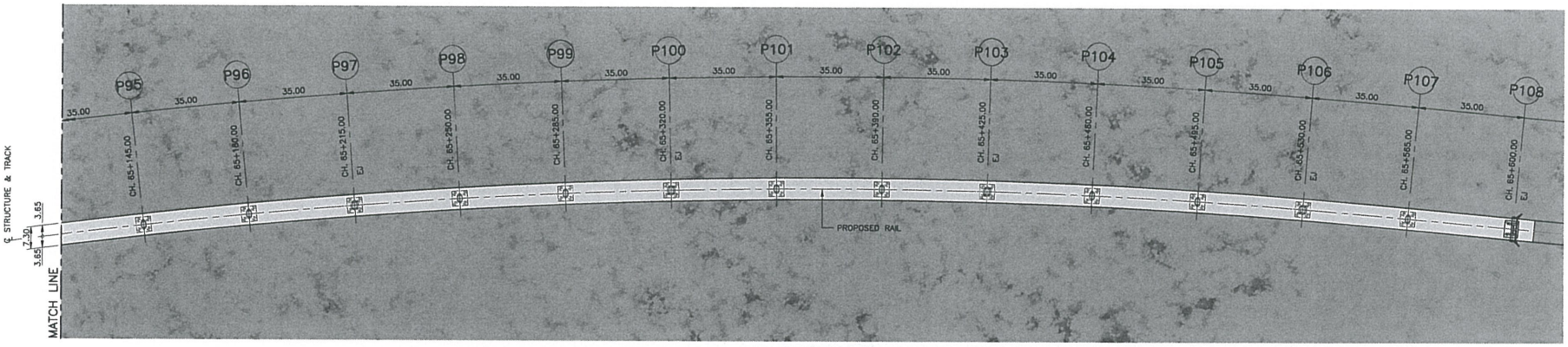
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 7/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-035/7	SCALE: AS SHOWN SHEET NO.: 57

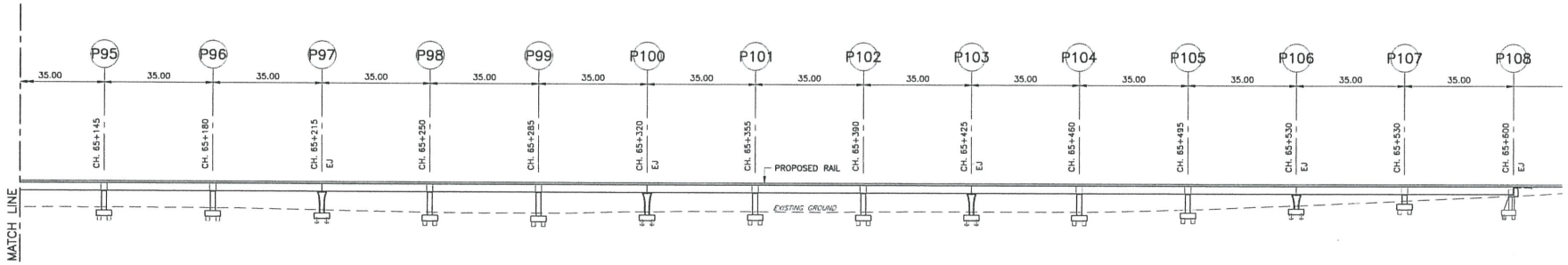
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MASTER KEY PLAN

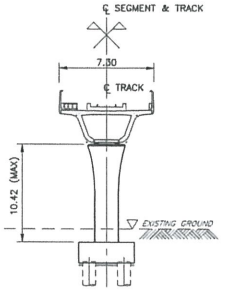




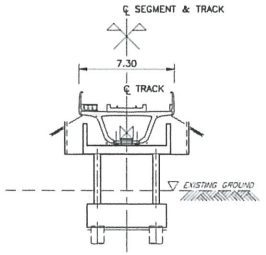
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

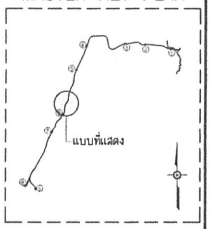


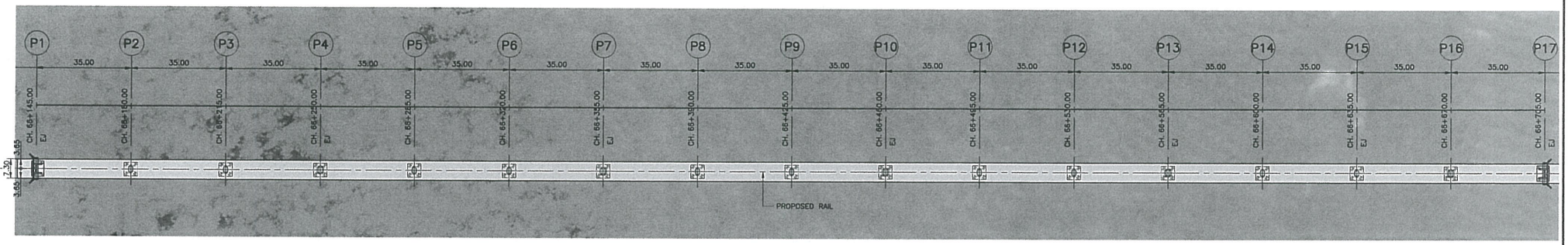
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 61+855 TO 65+600 SHEET 8/8	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-035/8 / SHEET NO.: 58

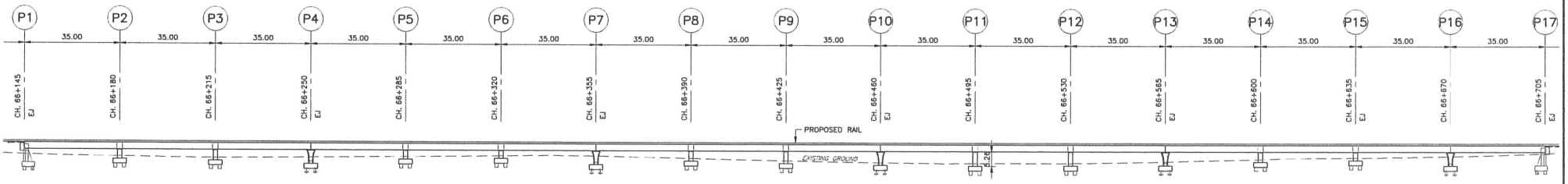
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MASTER KEY PLAN

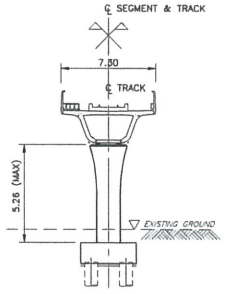




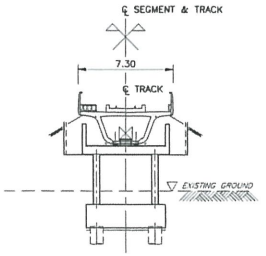
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

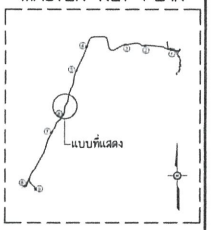
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

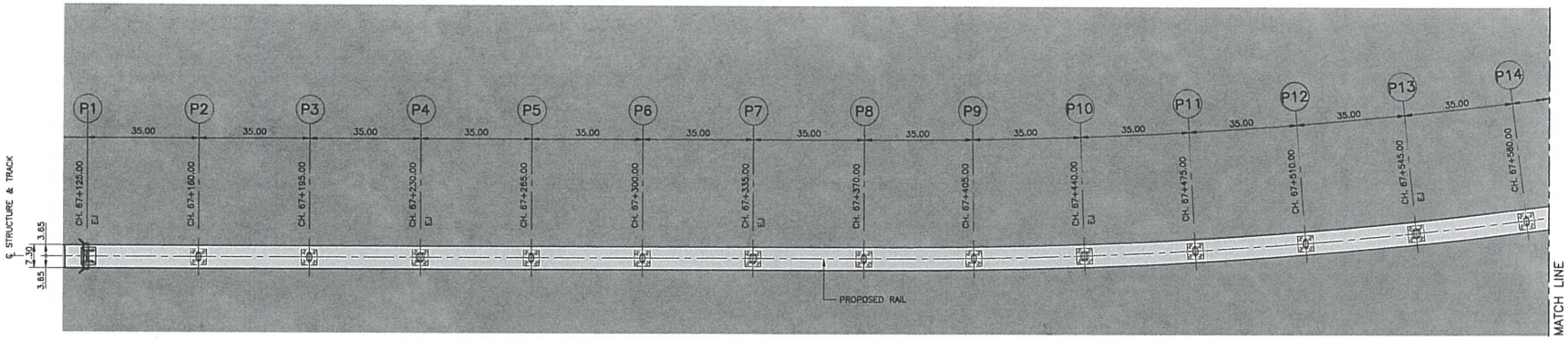
TITLE
RAILWAY BRIDGE LAOUT PLANS
PLAN AND ELEVATION STA. 66+145 TO 66+705

DATE	SCALE
Feb-18	AS SHOWN
DWG. NO.	SHEET NO.
SCR-RB-LA-036	59

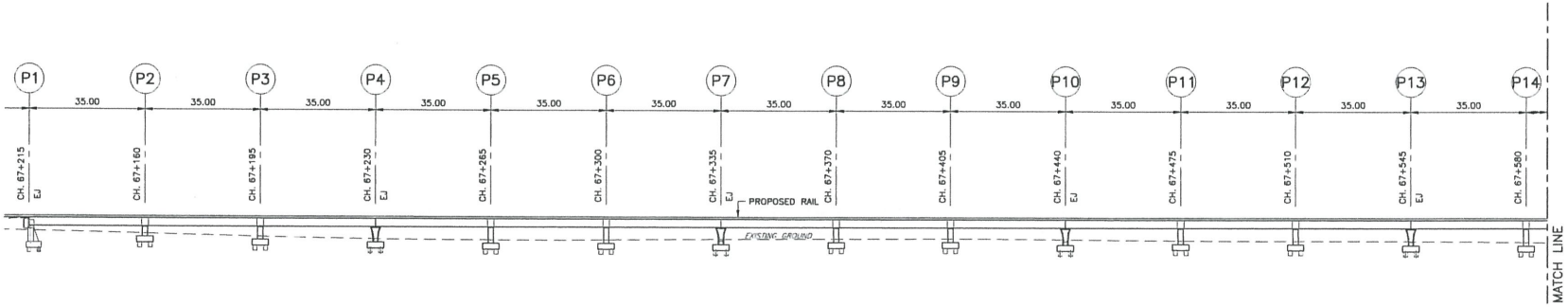
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MASTER KEY PLAN

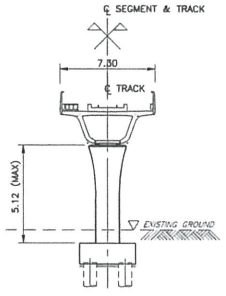




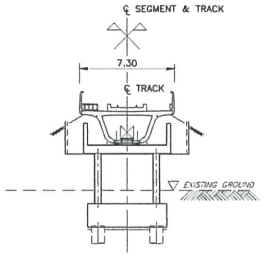
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

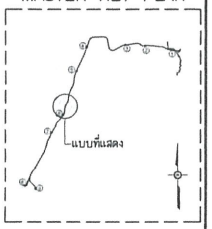


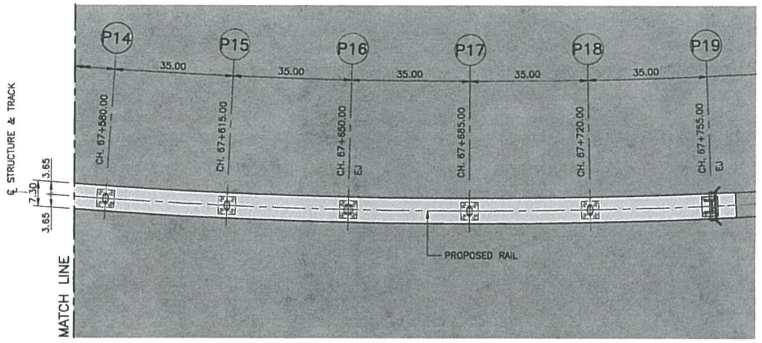
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

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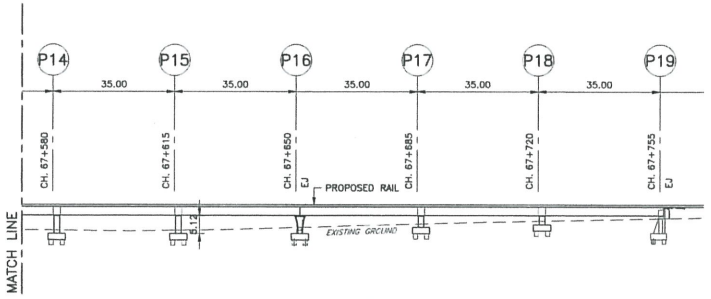
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 67+125 TO 67+755 SHEET 1/2	DATE: Feb-18 DWG. NO.: SCR-RB-LA-037/1	SCALE: AS SHOWN SHEET NO.: 60

MASTER KEY PLAN

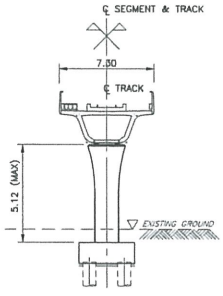




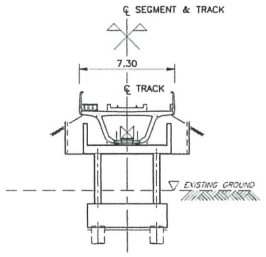
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

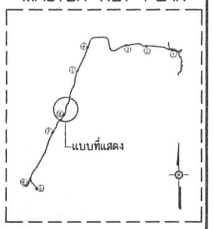
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

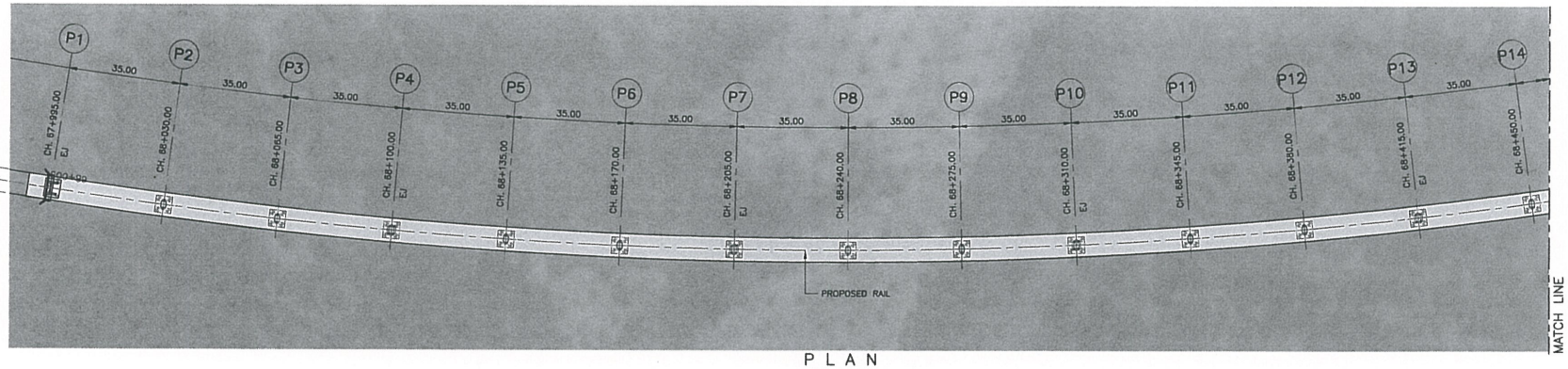
TITLE
RAILWAY BRIDGE LAOUT PLANS
PLAN AND ELEVATION STA. 67+125 TO 67+755
SHEET 2/2

DATE: Feb-18
SCALE: AS SHOWN
DWG. NO.: SCR-RB-LA-037/2
SHEET NO.: 61

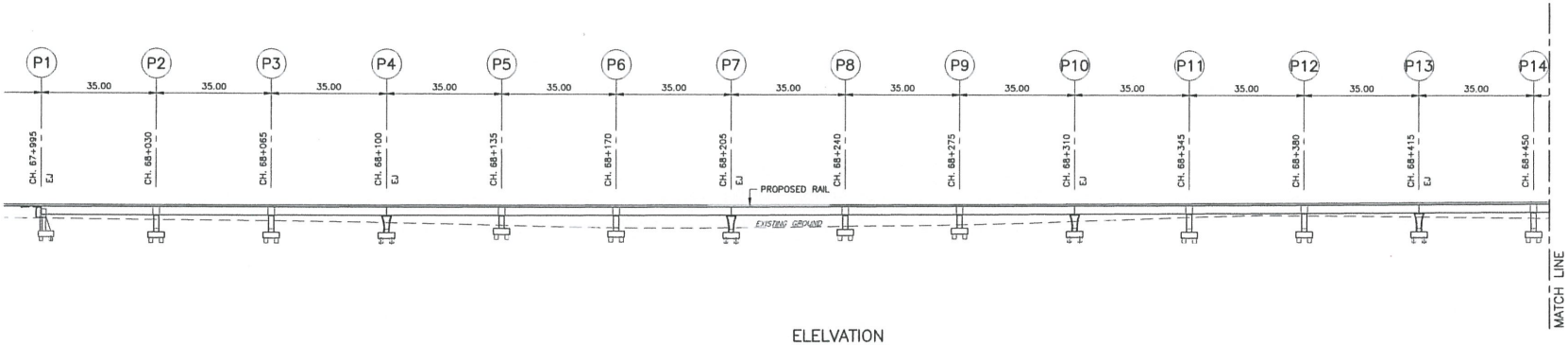
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MASTER KEY PLAN

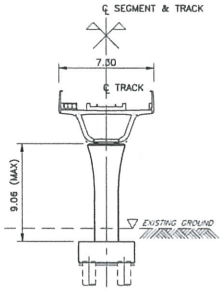




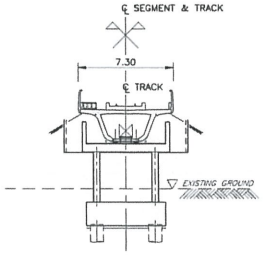
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

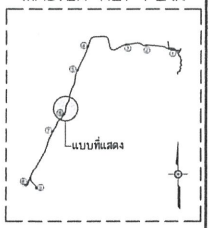


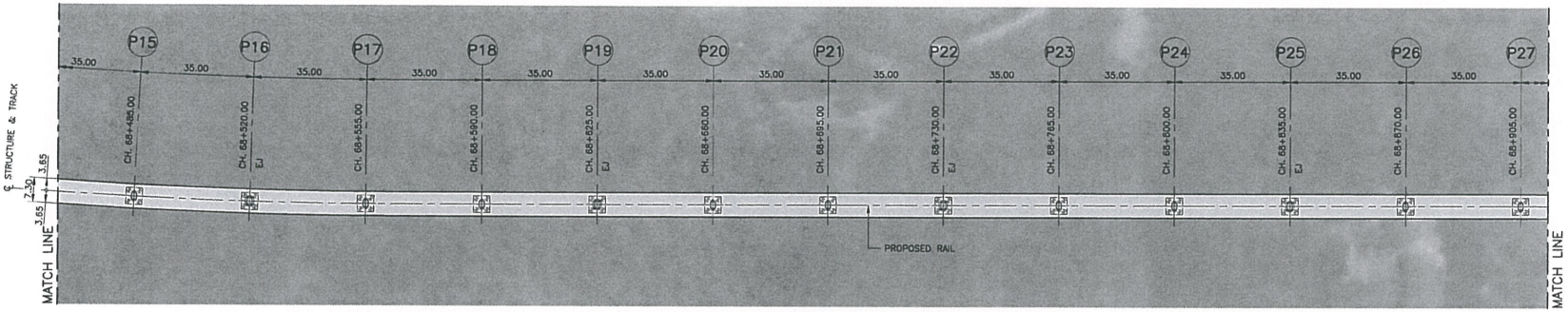
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 67+995 TO 69+220 SHEET 1/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-038/1	SCALE : AS SHOWN SHEET NO. : 62

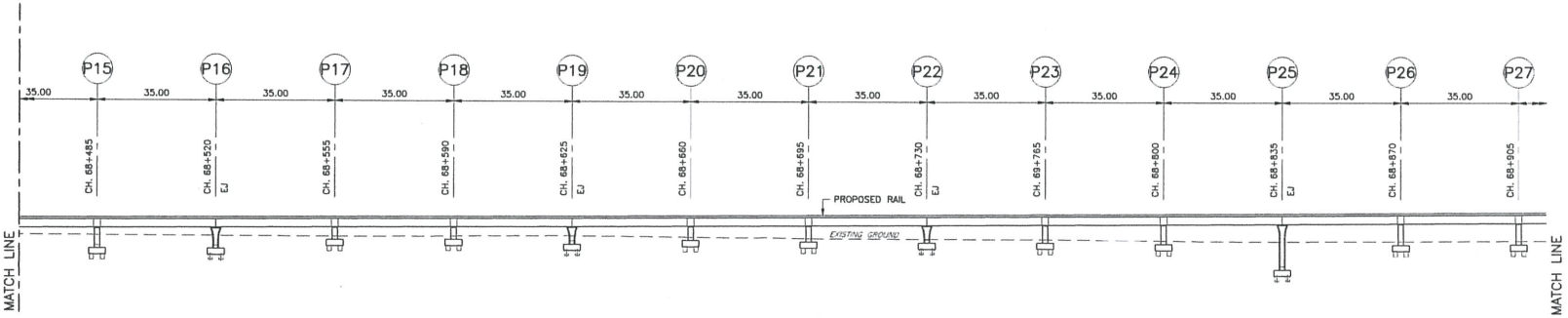
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MASTER KEY PLAN

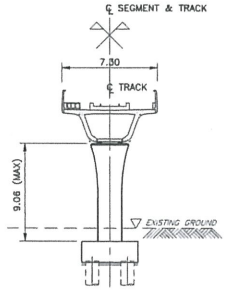




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

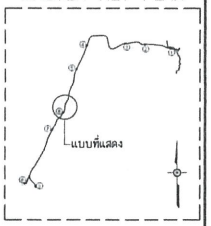


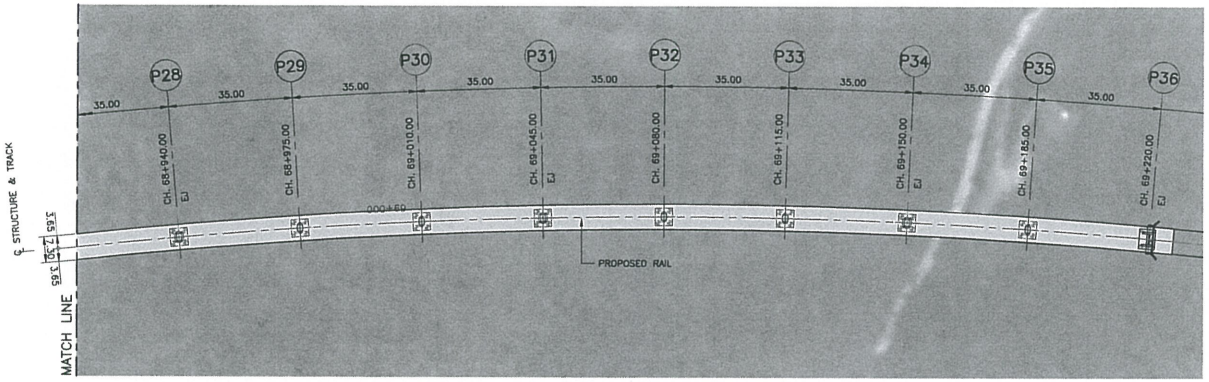
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 67+995 TO 69+220 SHEET 2/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-038/2	SCALE: AS SHOWN SHEET NO.: 63

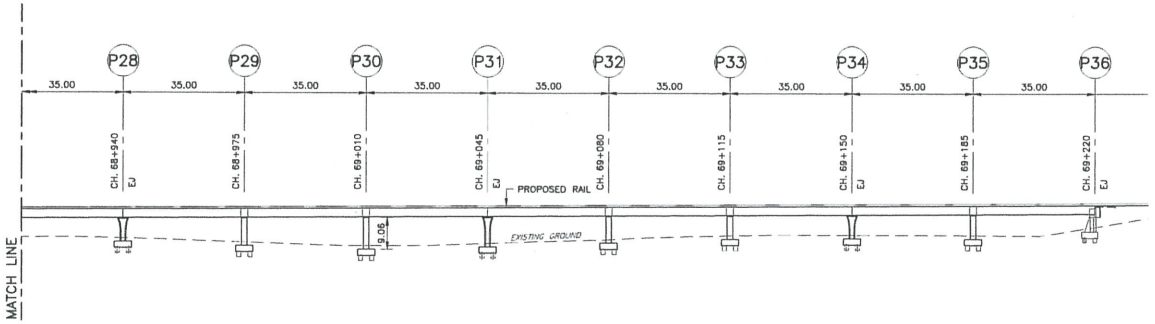
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MASTER KEY PLAN

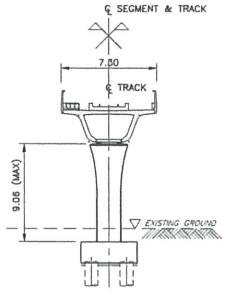




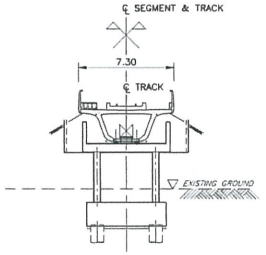
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

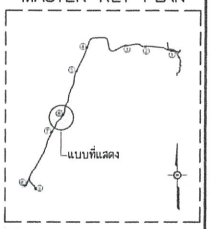


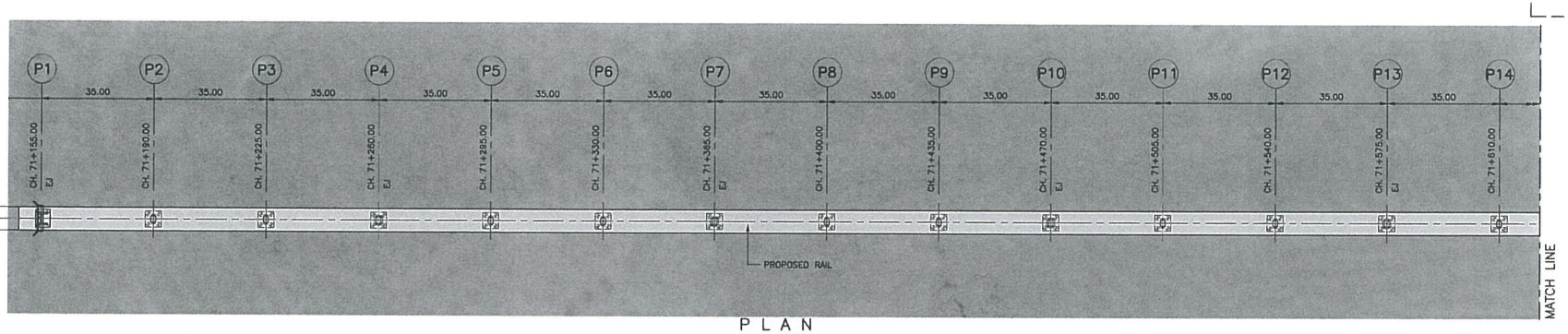
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

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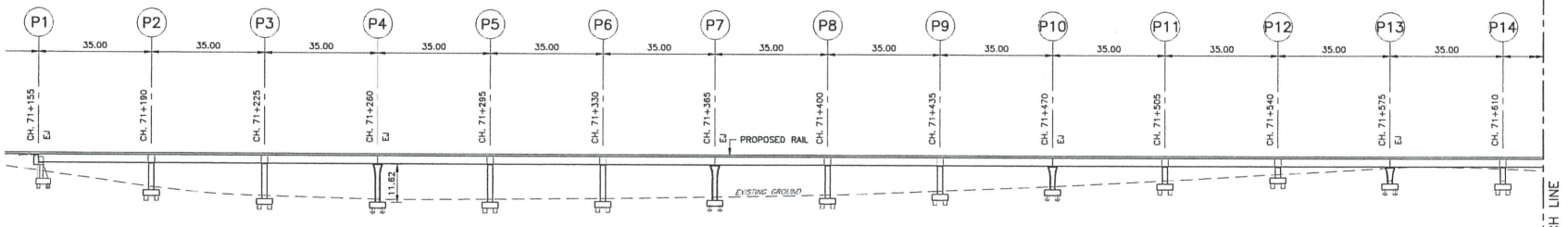
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 67+995 TO 69+220 SHEET 3/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-038/3	SCALE : AS SHOWN SHEET NO. : 64

MASTER KEY PLAN

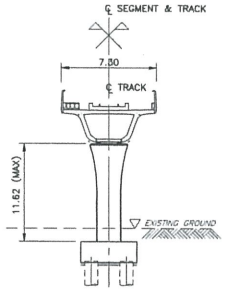




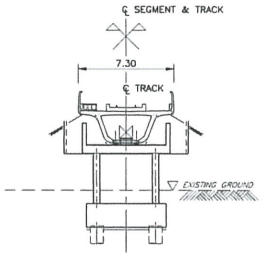
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

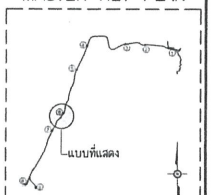


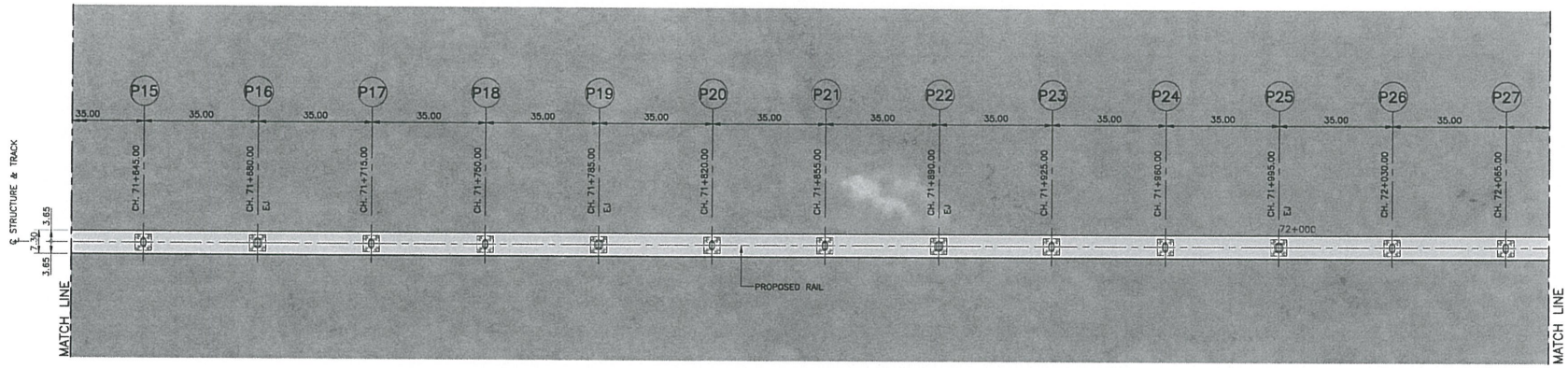
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 71+115 TO 72+940 SHEET 1/4	DATE : Feb-18 DWG. NO. : SCR-RB-LA-039/1	SCALE : AS SHOWN SHEET NO. : 65

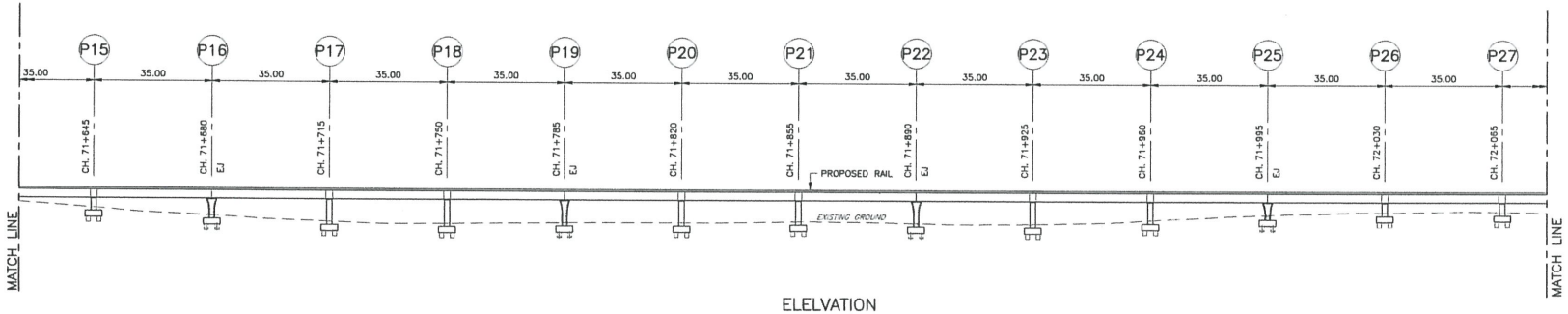
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MASTER KEY PLAN

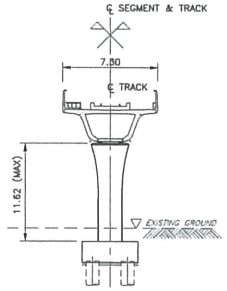




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

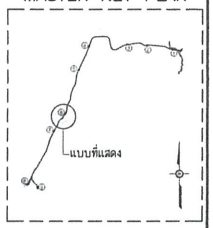


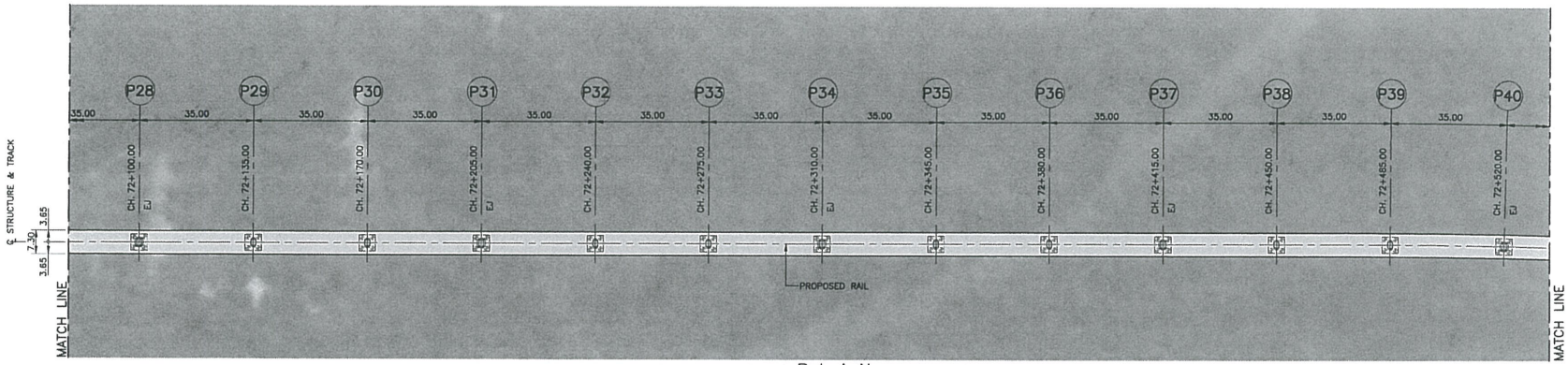
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

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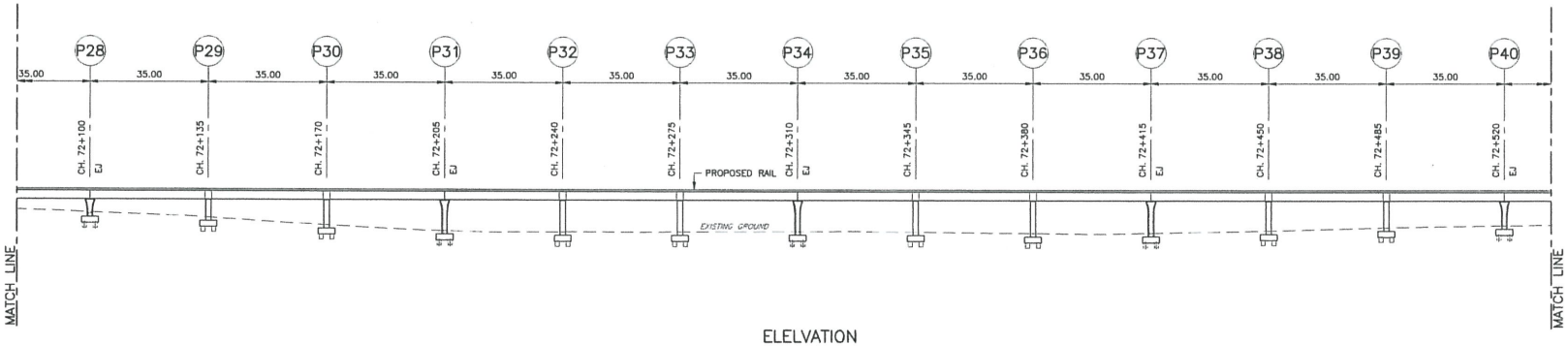
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 71+115 TO 72+940 SHEET 2/4	DATE : Feb-18 DWG. NO. : SCR-RB-LA-039/2	SCALE : AS SHOWN SHEET NO. : 66

MASTER KEY PLAN

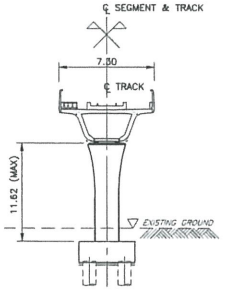




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

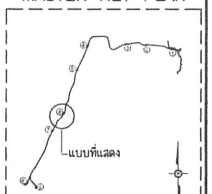


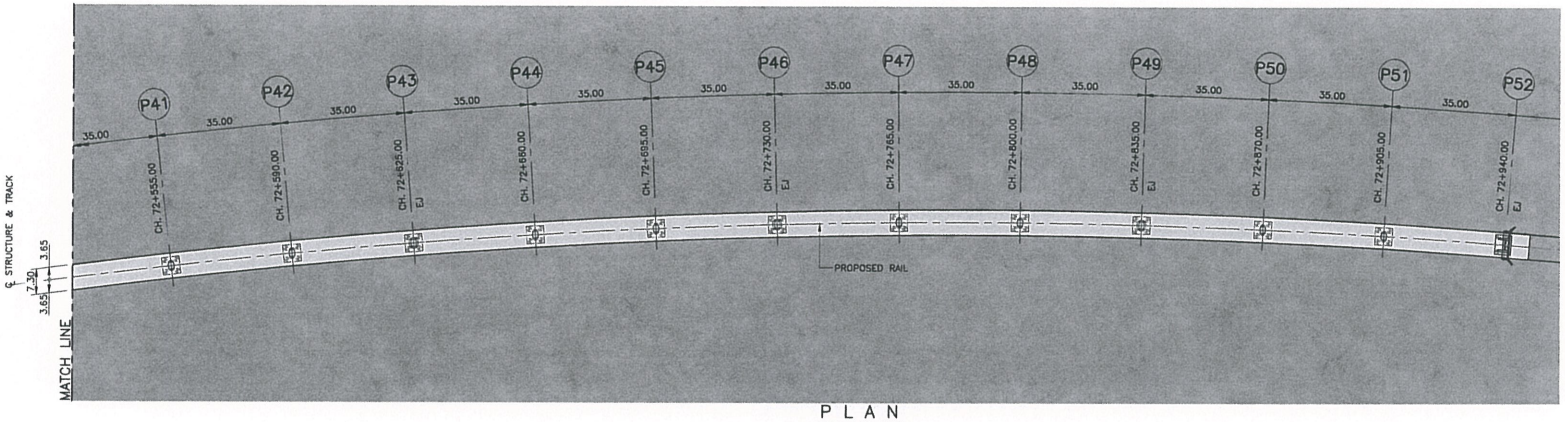
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 71+115 TO 72+940 SHEET 3/4	DATE : Feb-18 DWG. NO. : SCR-RB-LA-039/3	SCALE : AS SHOWN SHEET NO. : 67

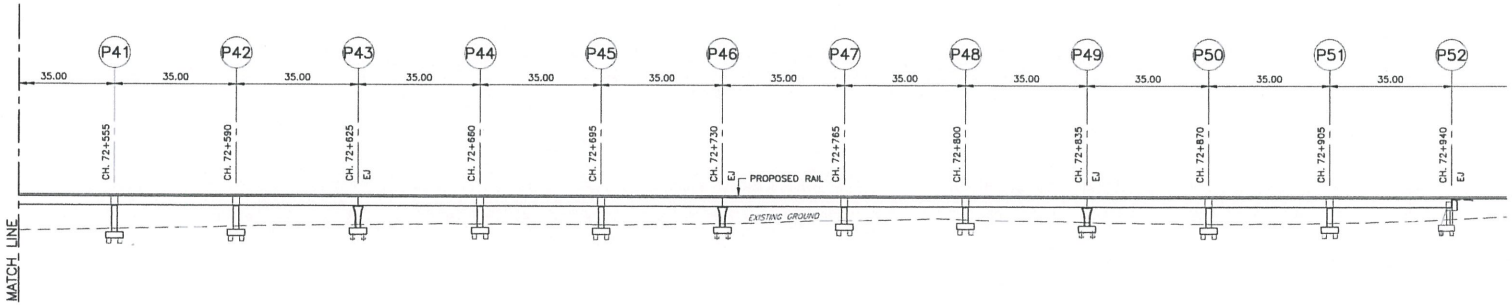
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MASTER KEY PLAN

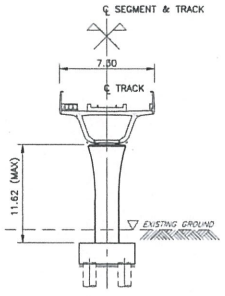




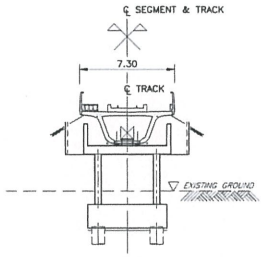
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

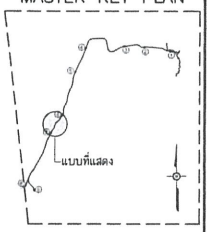


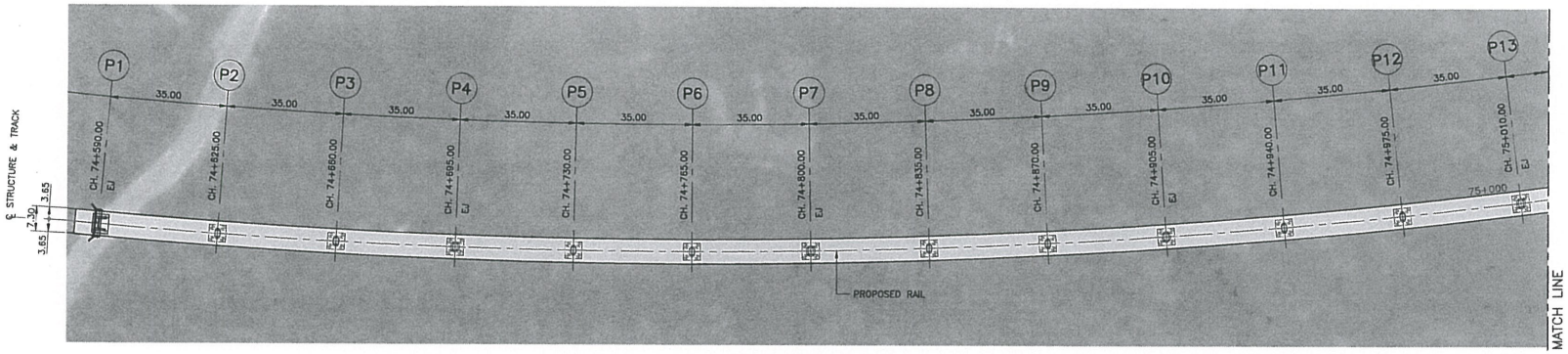
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 71+115 TO 72+940 SHEET 4/4	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-039/4 / SHEET NO.: 68

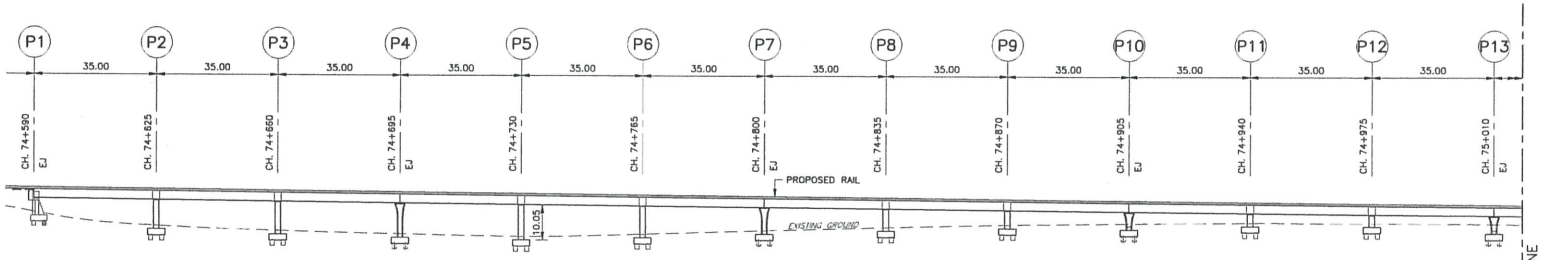
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MASTER KEY PLAN

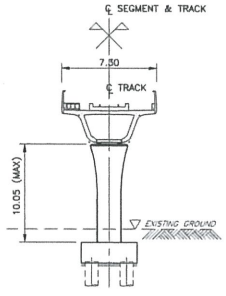




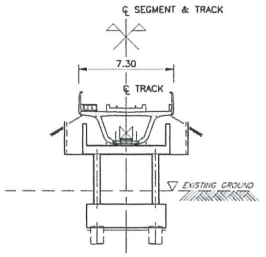
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

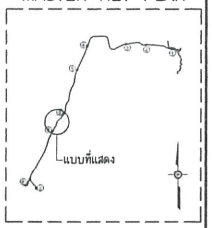


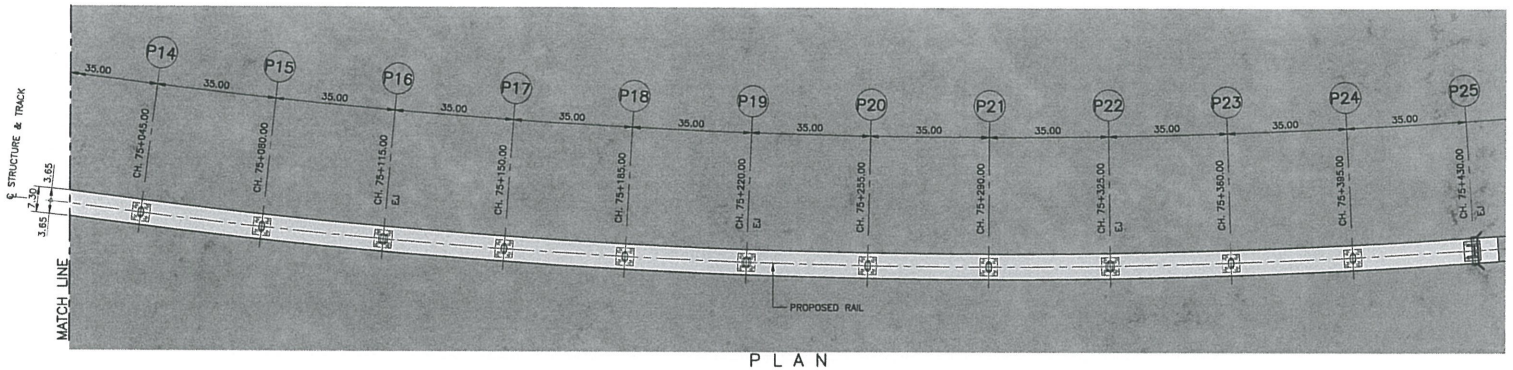
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 74+590 TO 75+430 SHEET 1/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-040/1	SCALE : AS SHOWN SHEET NO. : 69

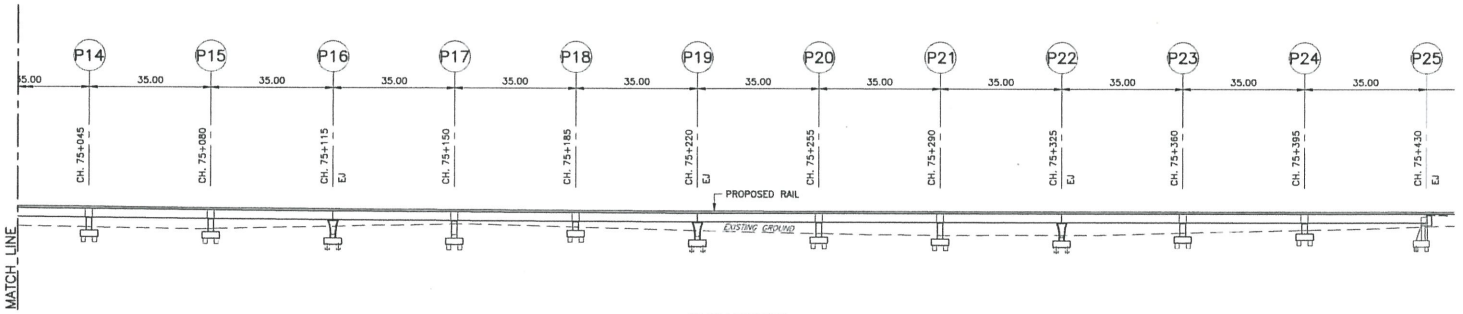
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MASTER KEY PLAN

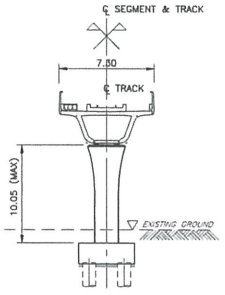




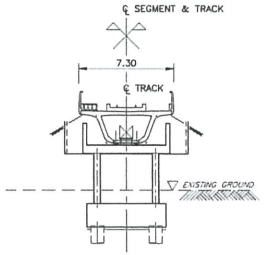
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

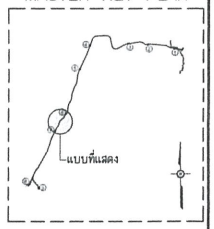


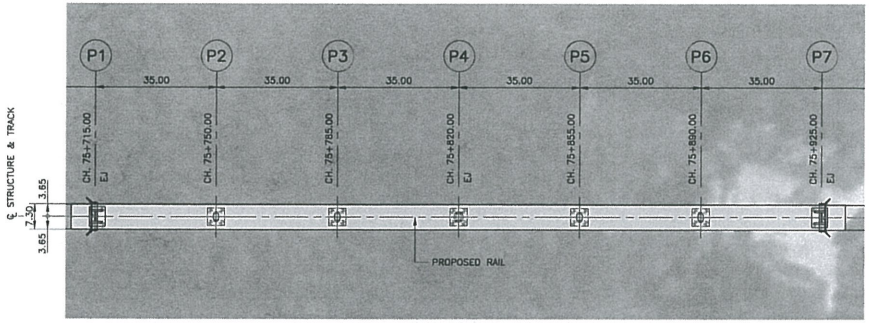
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 74+590 TO 75+430 SHEET 2/2	DATE: Feb-18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-040/2 / SHEET NO.: 70

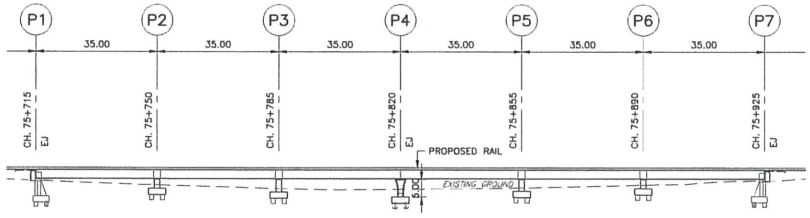
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MASTER KEY PLAN

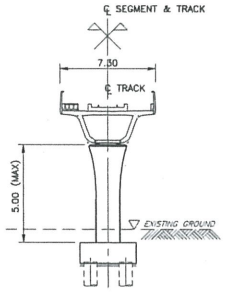




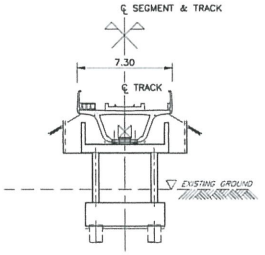
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

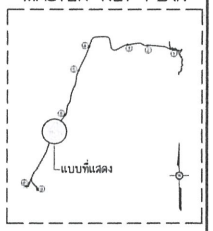


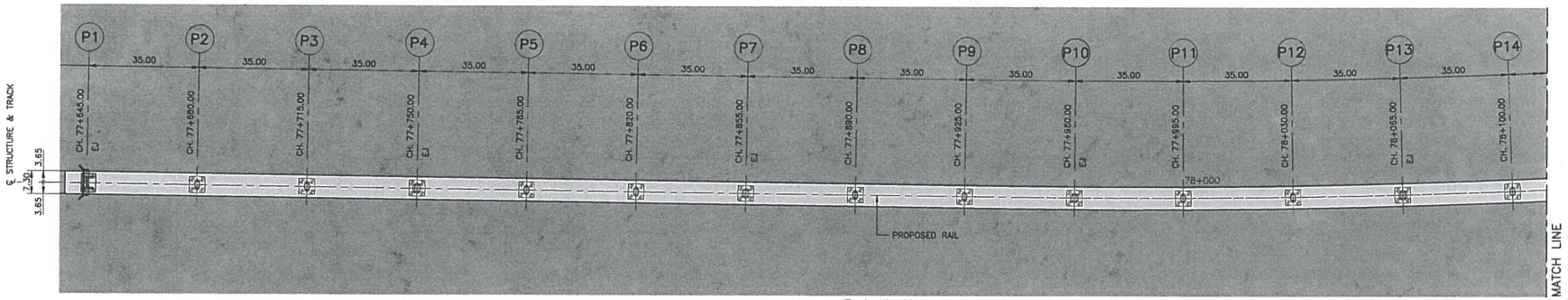
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 75+715 TO 75+925	DATE: Feb-18 DWG. NO.: SCR-RB-LA-041	SCALE: AS SHOWN SHEET NO.: 71

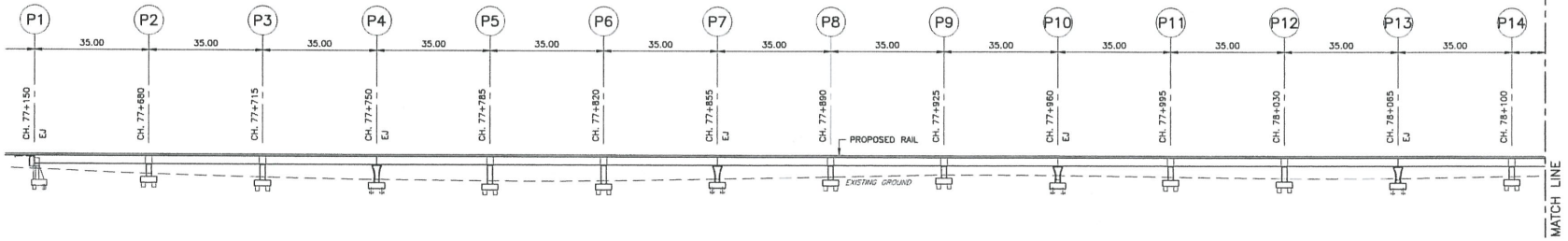
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MASTER KEY PLAN

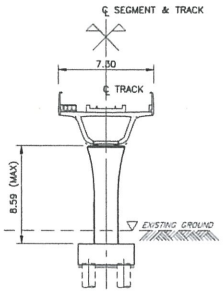




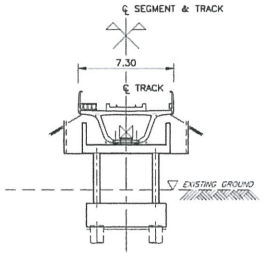
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

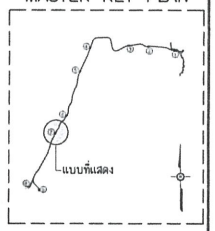


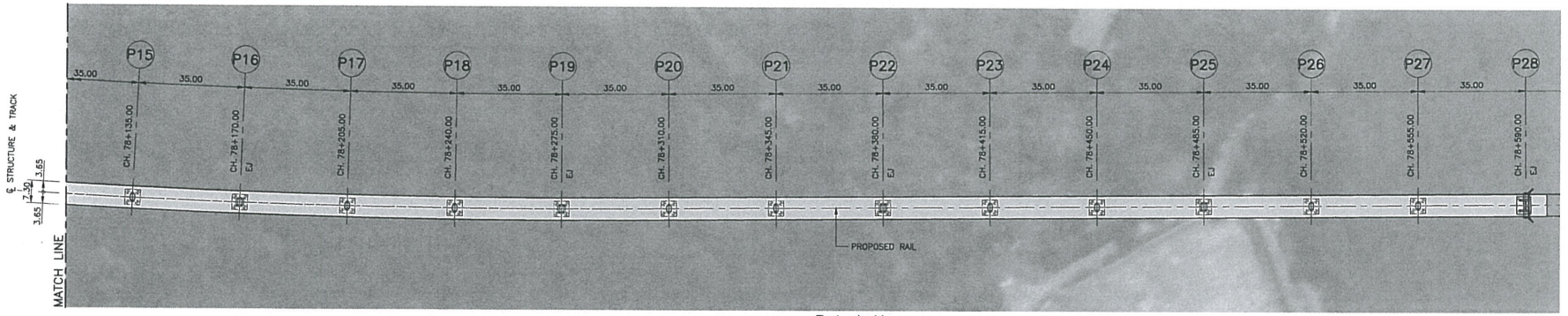
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 77+645 TO 78+590 SHEET 1/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-042/1	SCALE : AS SHOWN SHEET NO. : 72

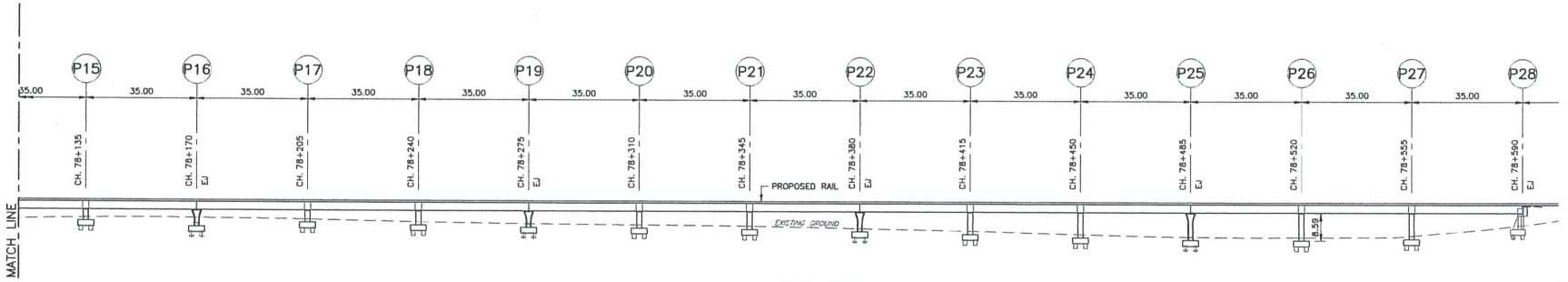
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MASTER KEY PLAN

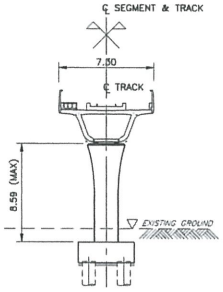




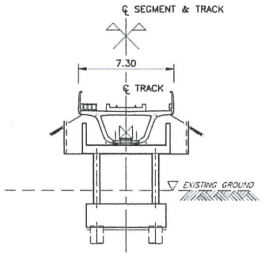
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

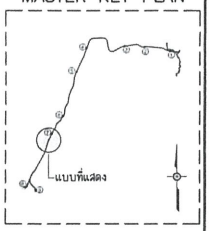


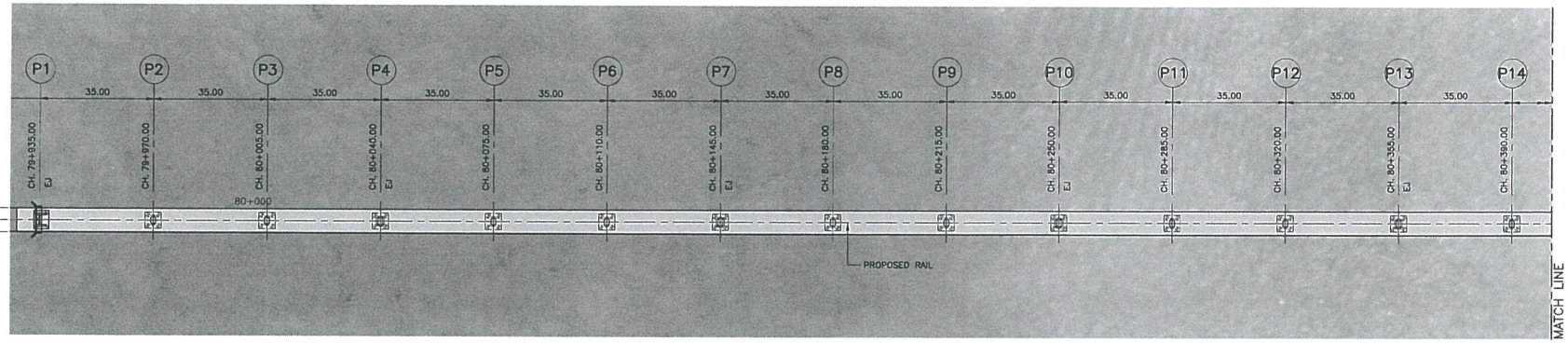
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 77+645 TO 78+590 SHEET 2/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-042/2	SCALE : AS SHOWN SHEET NO. : 73

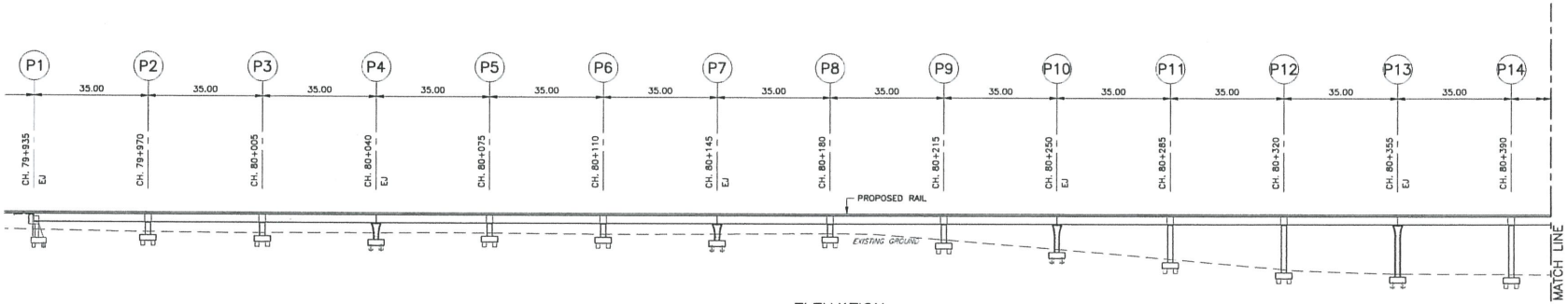
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MASTER KEY PLAN

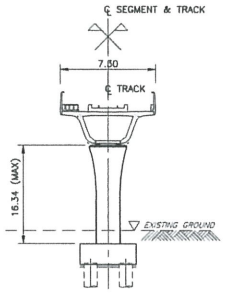




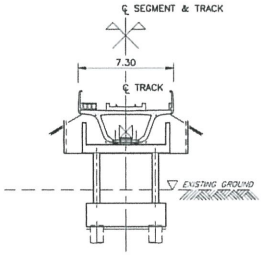
PLAN
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ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
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A3=1:400

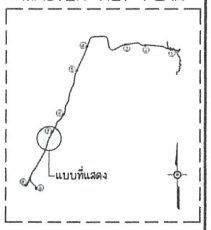


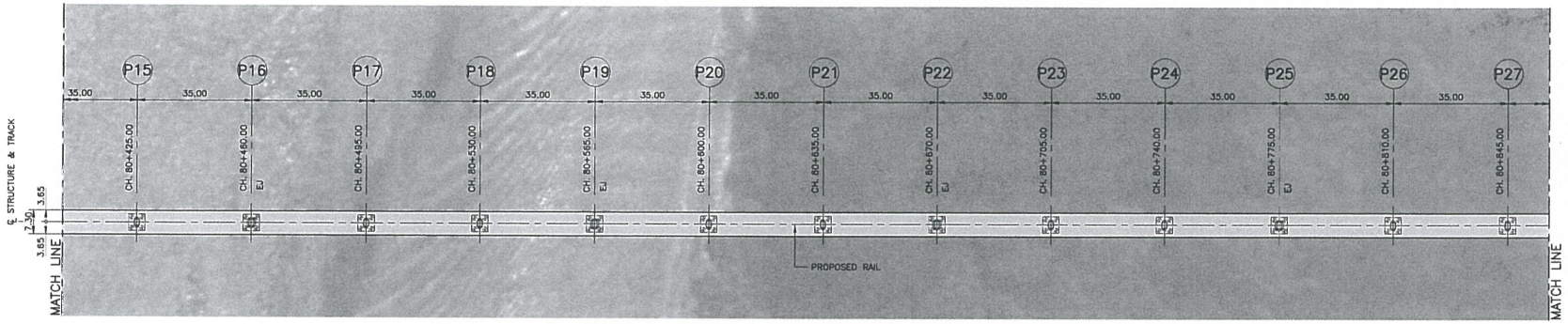
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 1/8	DATE : Feb-18 DWG. NO. : SCR-RB-LA-043/1	SCALE : AS SHOWN SHEET NO. : 74

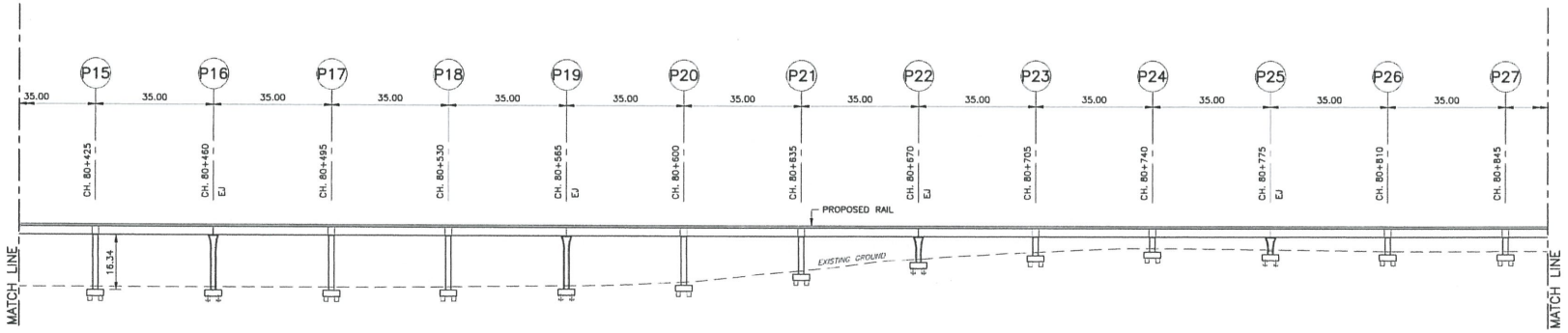
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MASTER KEY PLAN

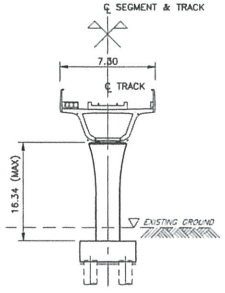




PLAN
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ELELVATION
SCALE A1=1:750
A3=1:1500

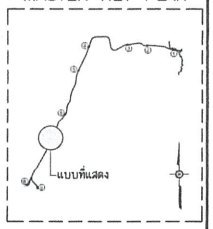


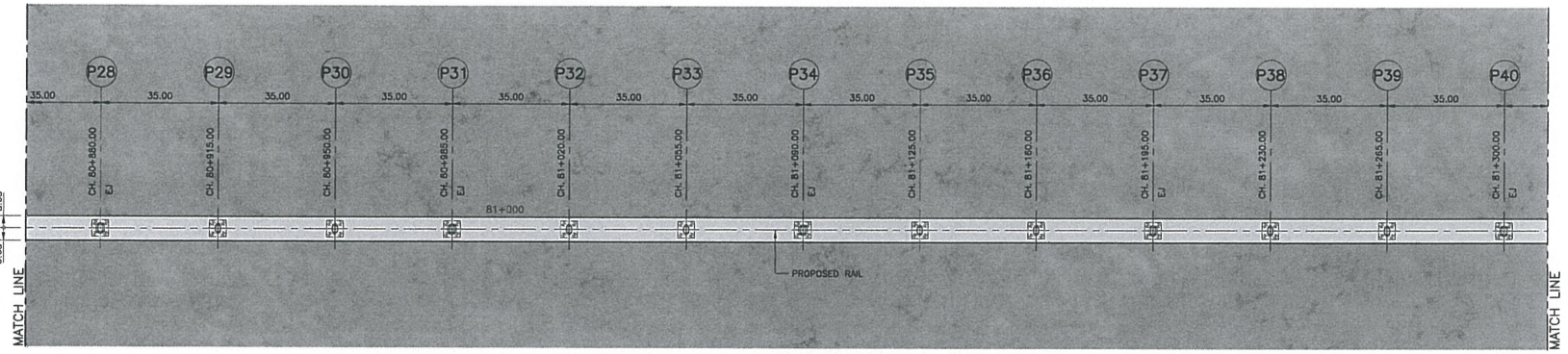
SECTION BRIDGE
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A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 2/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-043/2	SCALE: AS SHOWN SHEET NO.: 75

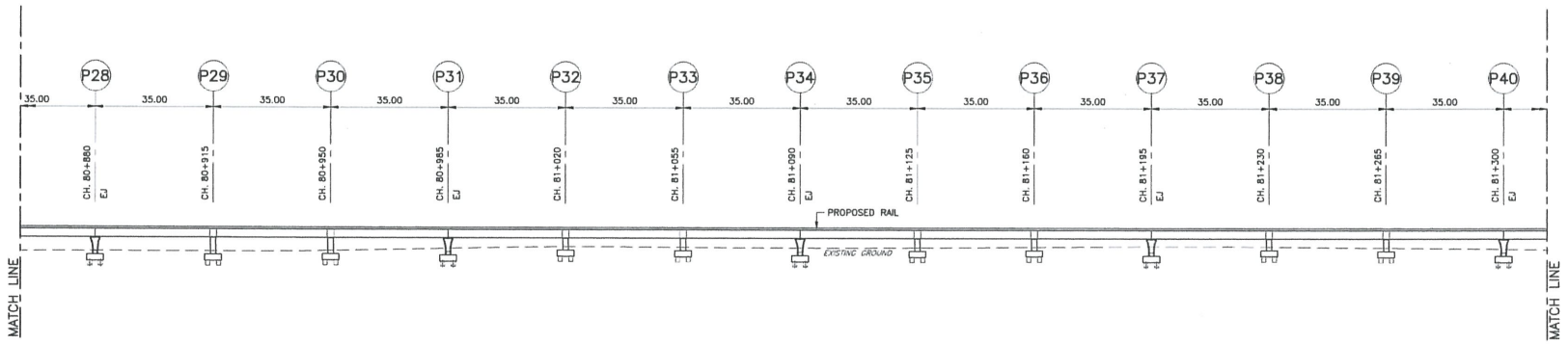
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MASTER KEY PLAN

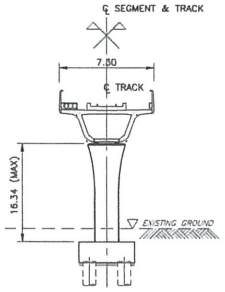




PLAN
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A3=1:1500



ELELVATION
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A3=1:1500

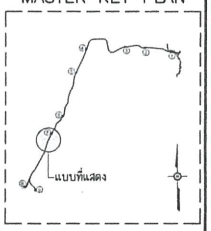


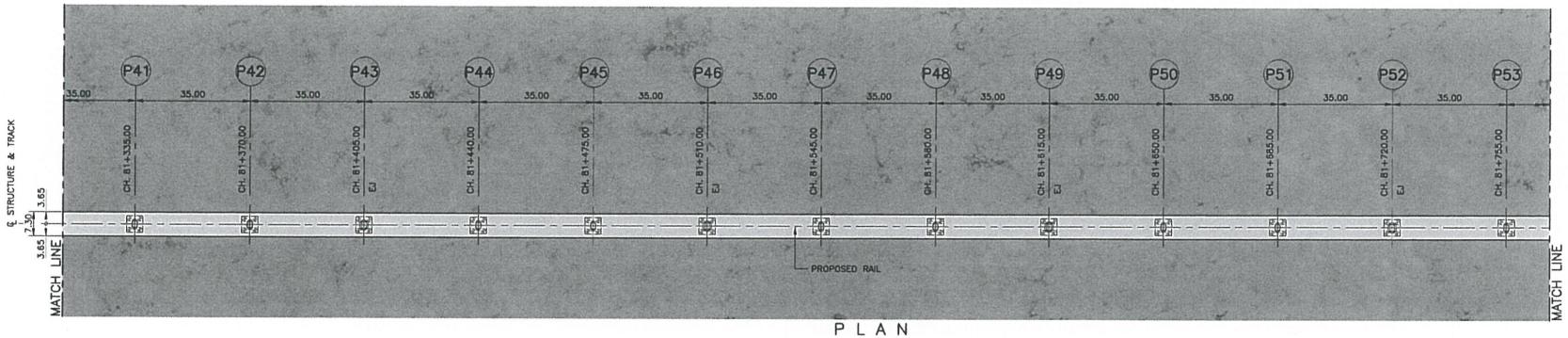
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 3/8	DATE : Feb-18 DWG. NO. : SCR-RB-LA-043/3	SCALE : AS SHOWN SHEET NO. : 76

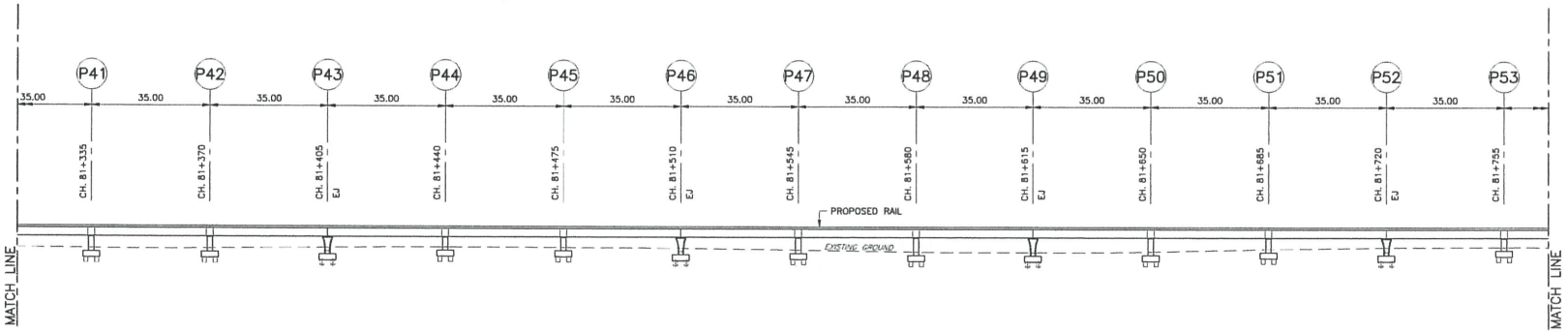
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MASTER KEY PLAN

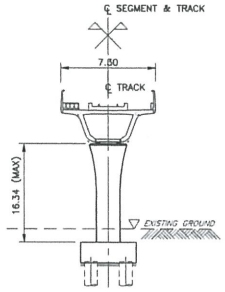




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

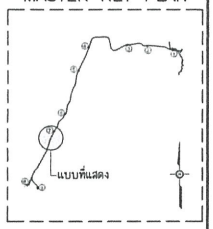


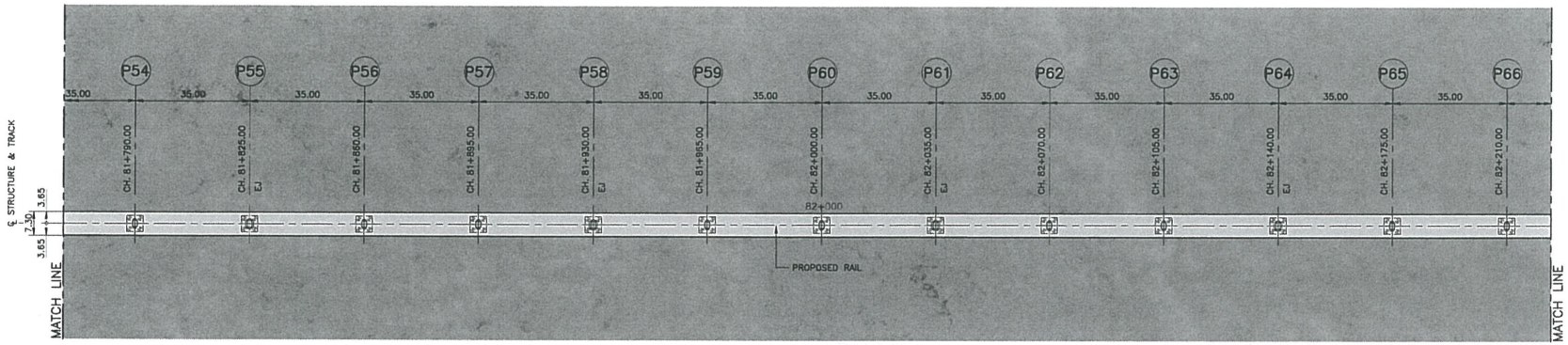
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 4/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-043/4	SCALE: AS SHOWN SHEET NO.: 77

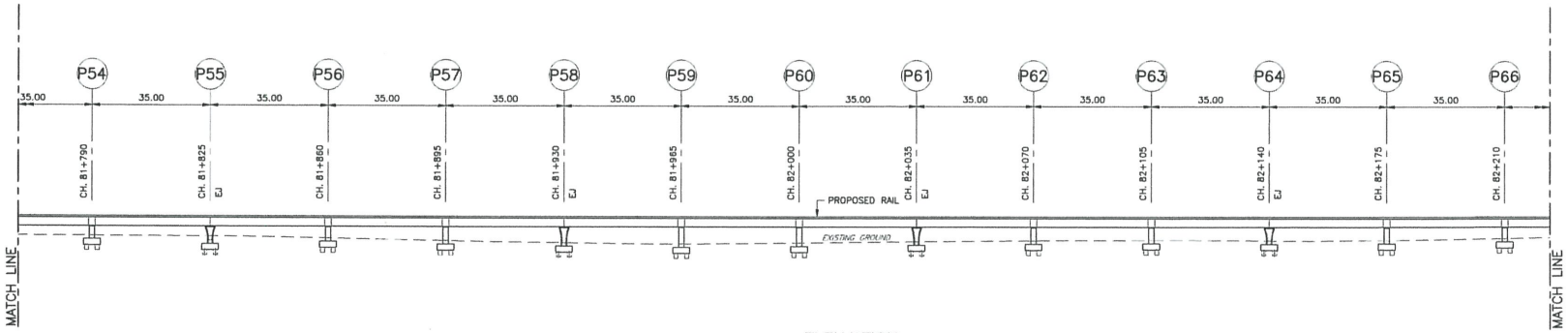
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MASTER KEY PLAN

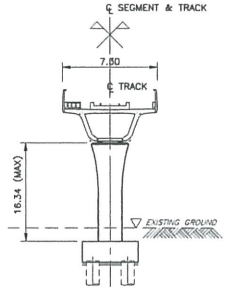




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

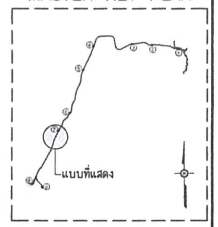


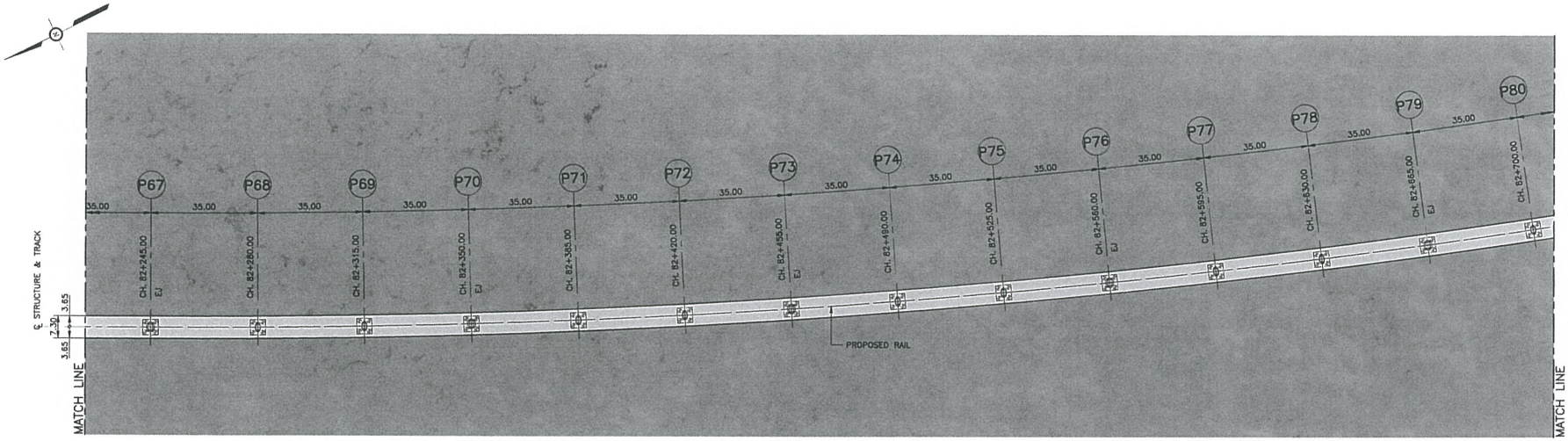
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 5/8	DATE: Feb-18 DWG. NO. SCR-RB-LA-043/5	SCALE: AS SHOWN SHEET NO.: 78

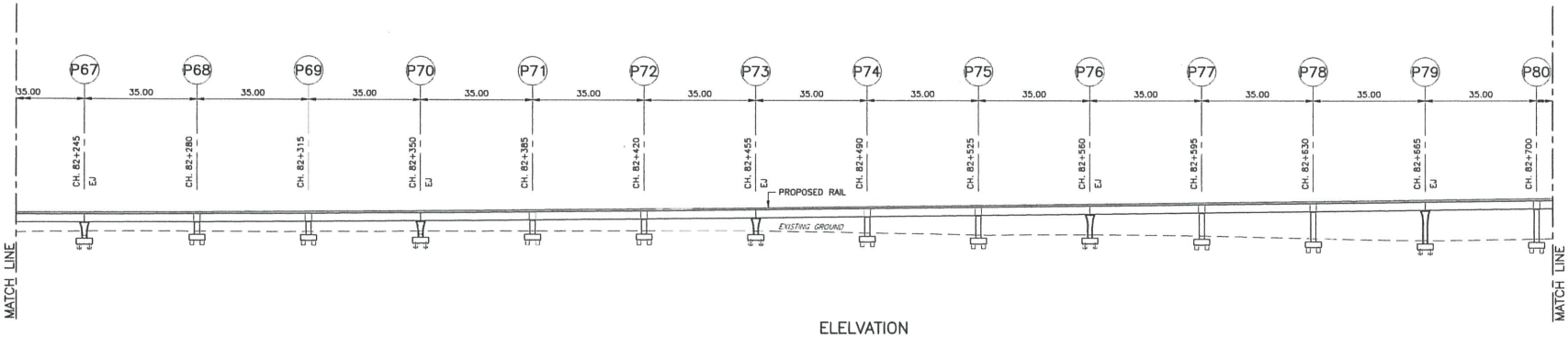
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MASTER KEY PLAN

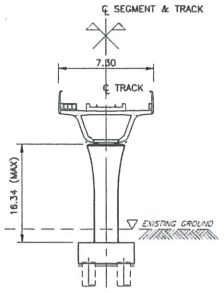




P L A N
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A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

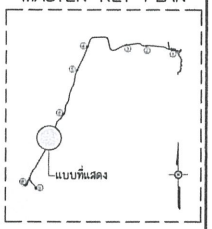


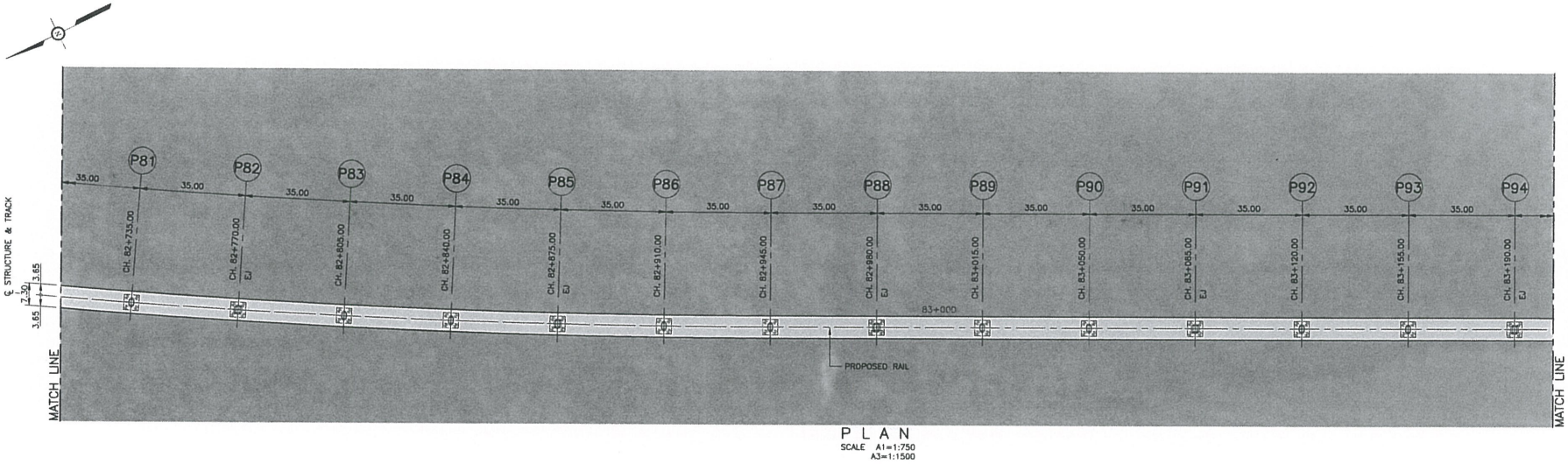
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consulanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 6/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-043/6	SCALE: AS SHOWN SHEET NO.: 79

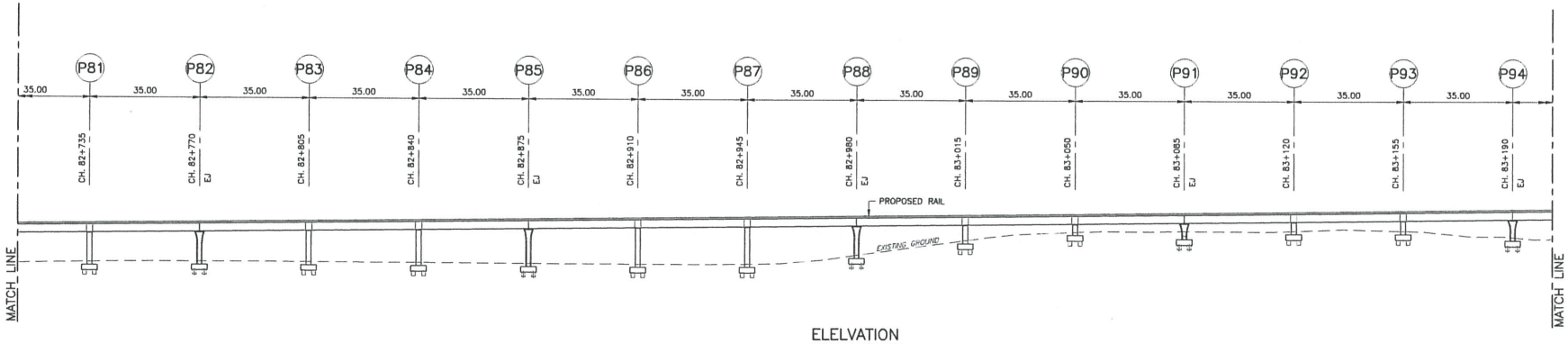
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MASTER KEY PLAN

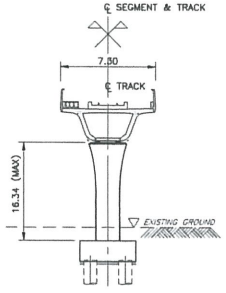




P L A N
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A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

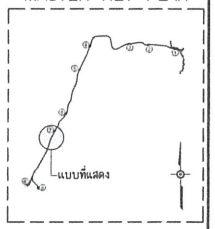


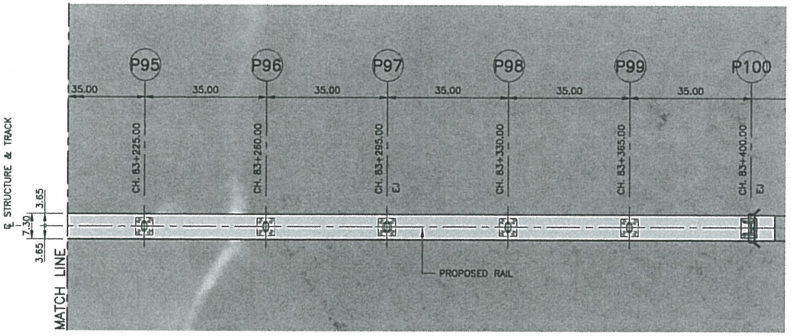
SECTION BRIDGE
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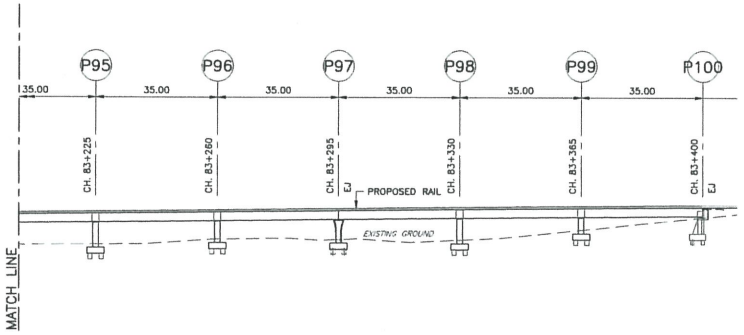
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 7/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-043/7	SCALE: AS SHOWN SHEET NO.: 80

MASTER KEY PLAN

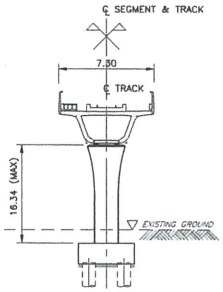




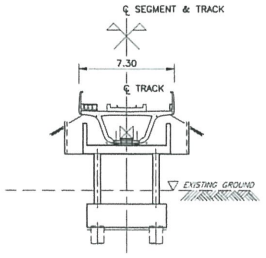
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

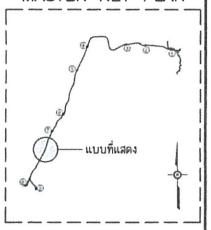


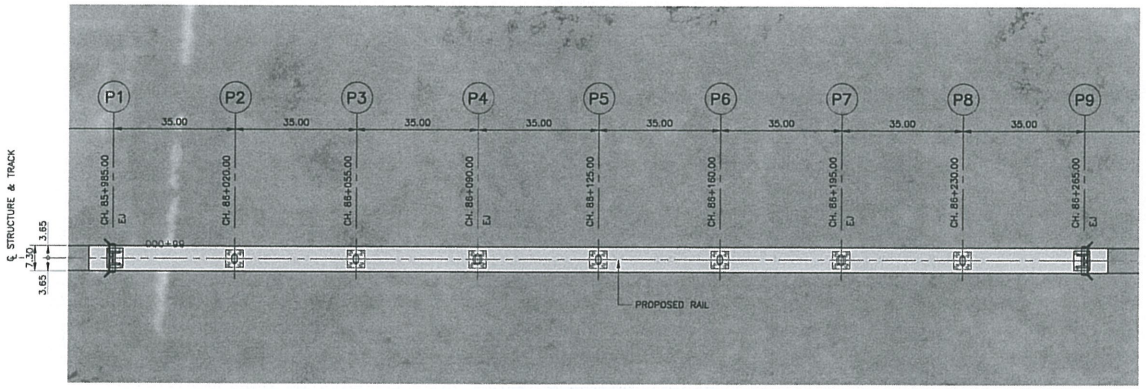
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE 81 PLAN AND ELEVATION STA. 79+935 TO 83+400 SHEET 8/8	DATE: Feb-18 DWG. NO.: SCR-RB-LA-043/8	SCALE: AS SHOWN SHEET NO.: 81

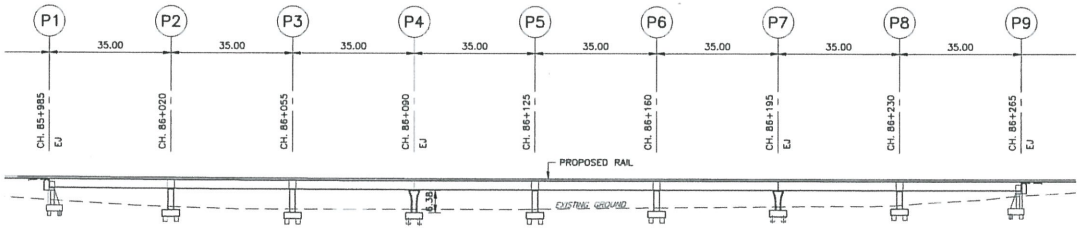
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MASTER KEY PLAN

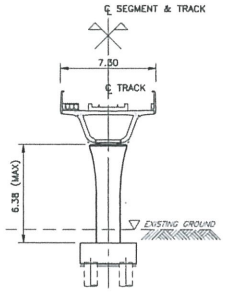




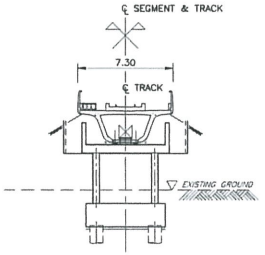
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

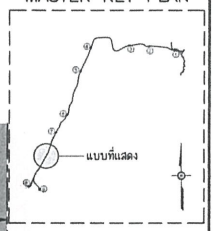


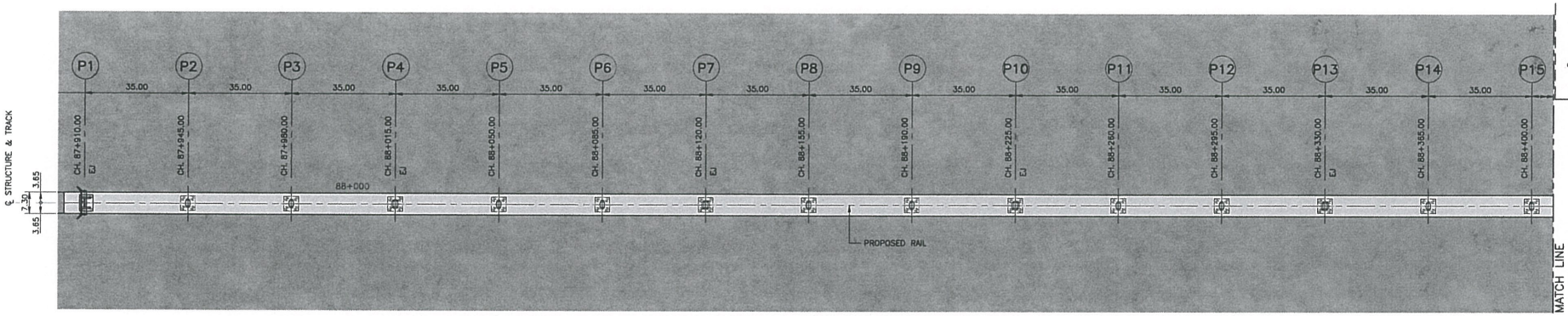
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 85+985 TO 86+265	DATE: Feb-18 DWG. NO.: SCR-RB-LA-044	SCALE: AS SHOWN SHEET NO.: 82

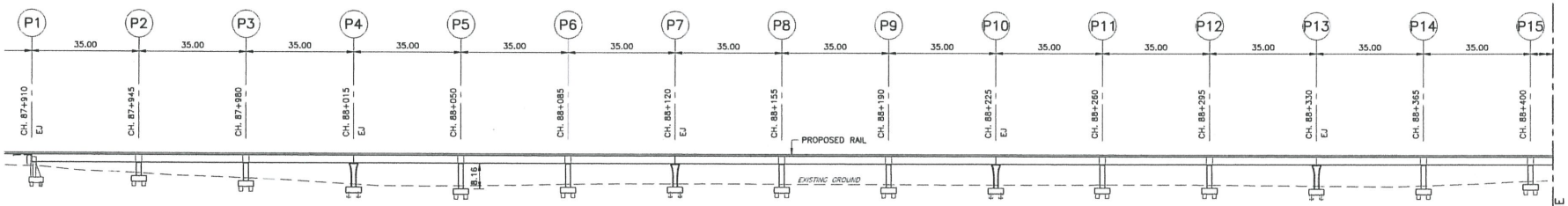
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MASTER KEY PLAN

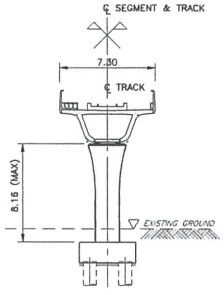




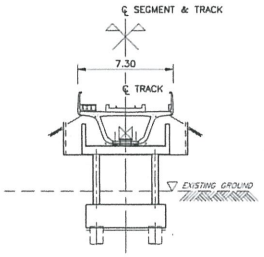
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ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
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A3=1:400

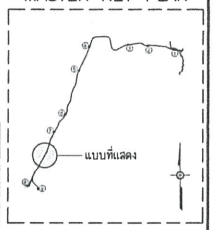


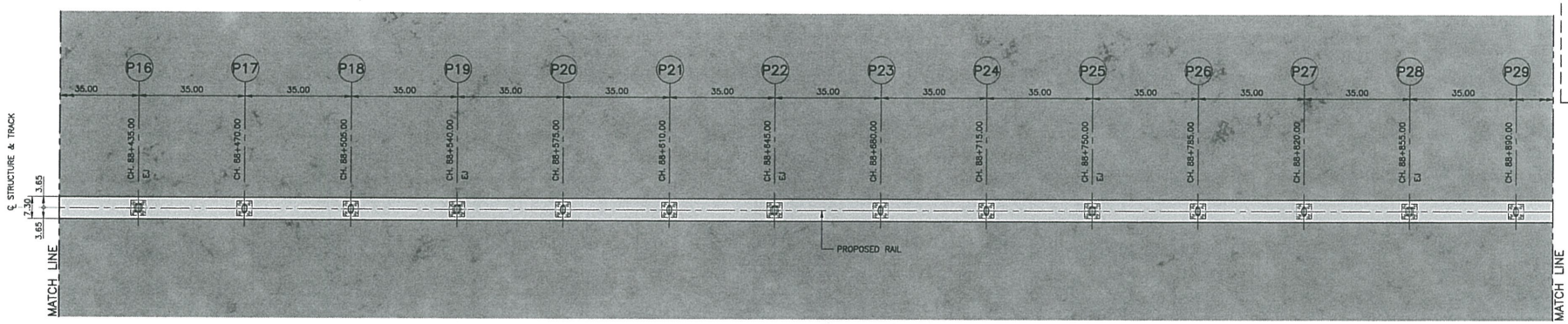
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SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 87+910 TO 89+380 SHEET 1/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-045/1	SCALE : AS SHOWN SHEET NO. : 83

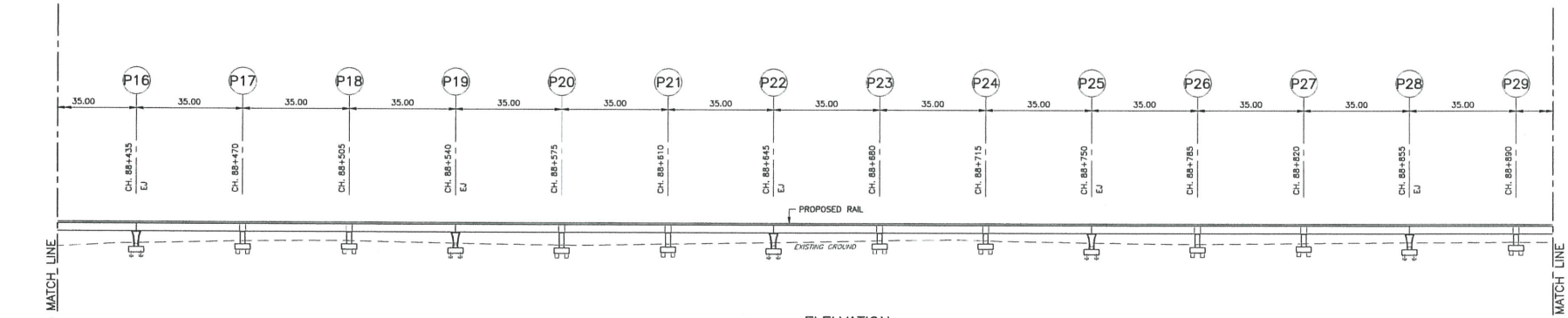
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MASTER KEY PLAN

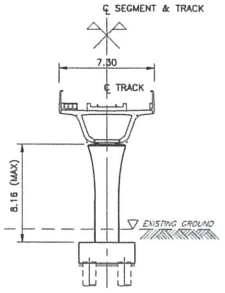




PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

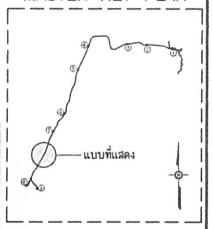


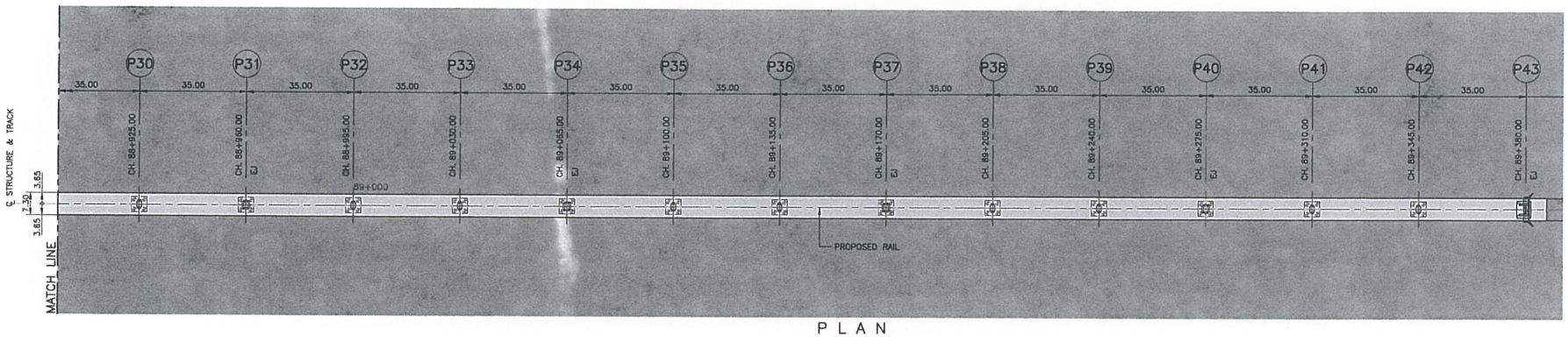
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 87+910 TO 89+380 SHEET 2/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-045/2	SCALE : AS SHOWN SHEET NO. : 84

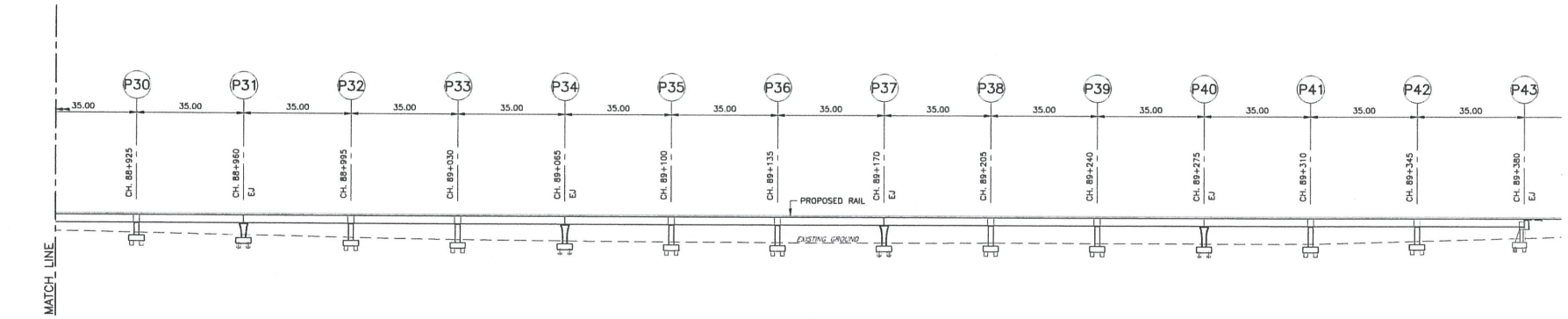
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MASTER KEY PLAN

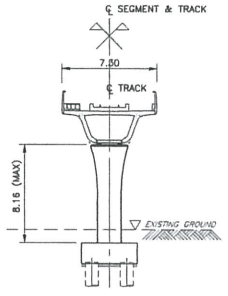




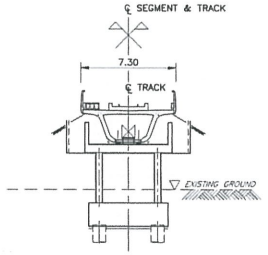
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

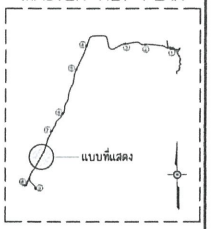


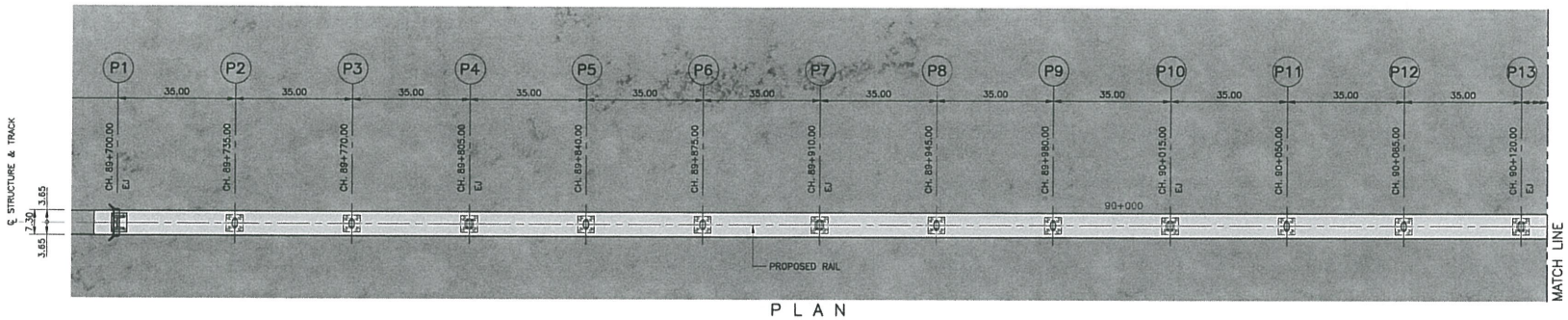
SECTION ABUTMENT
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 87+910 TO 89+380 SHEET 3/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-045/3	SCALE : AS SHOWN SHEET NO. : 85

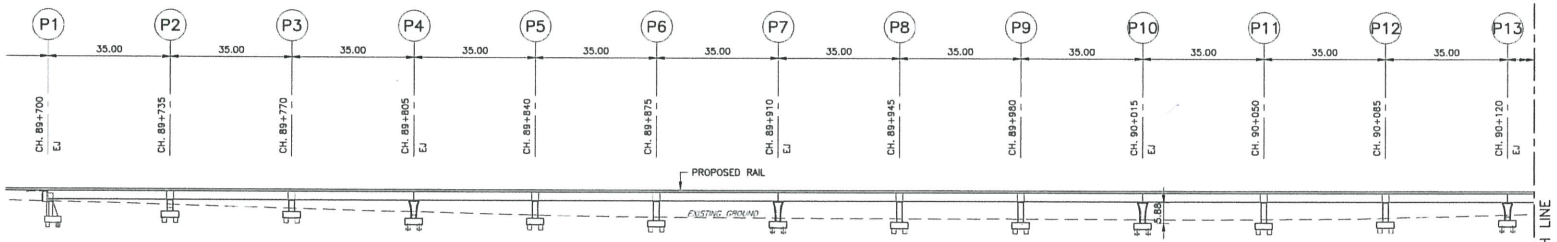
S:\WORKING_CAD\1465-SCR-2_WORKING\1_RAILWAY BRIDGE\2_LAYOUT PLANS\SCR-RB-LA-045(SHEET1-3).DWG

MASTER KEY PLAN

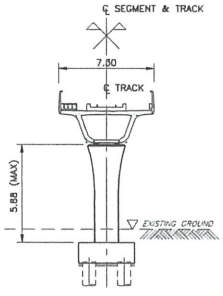




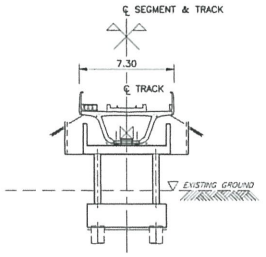
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

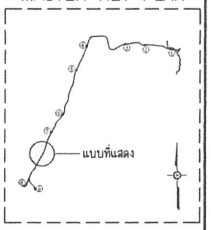


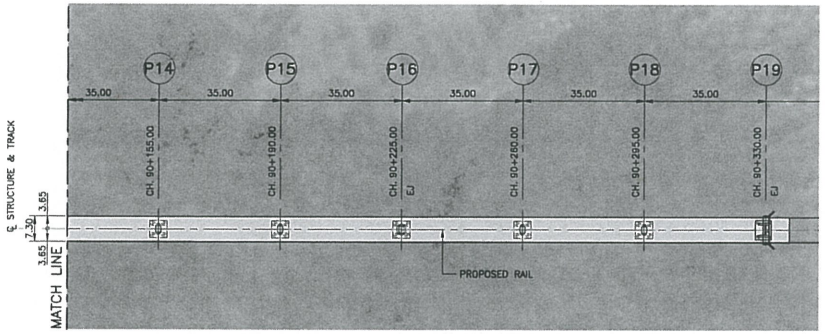
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 89+700 TO 90+330 SHEET 1/2	DATE Feb-18 DWG. NO. SCR-RB-LA-046/1	SCALE AS SHOWN SHEET NO. 86

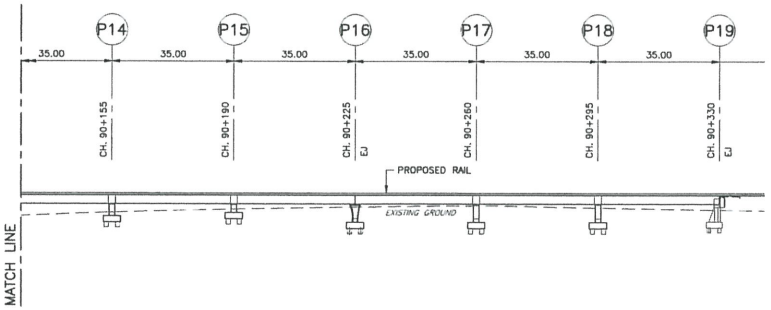
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MASTER KEY PLAN

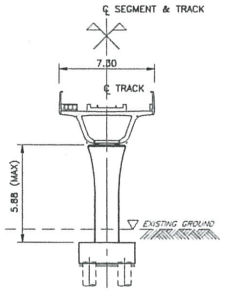




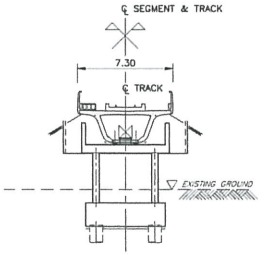
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

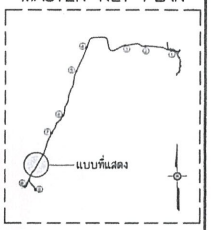


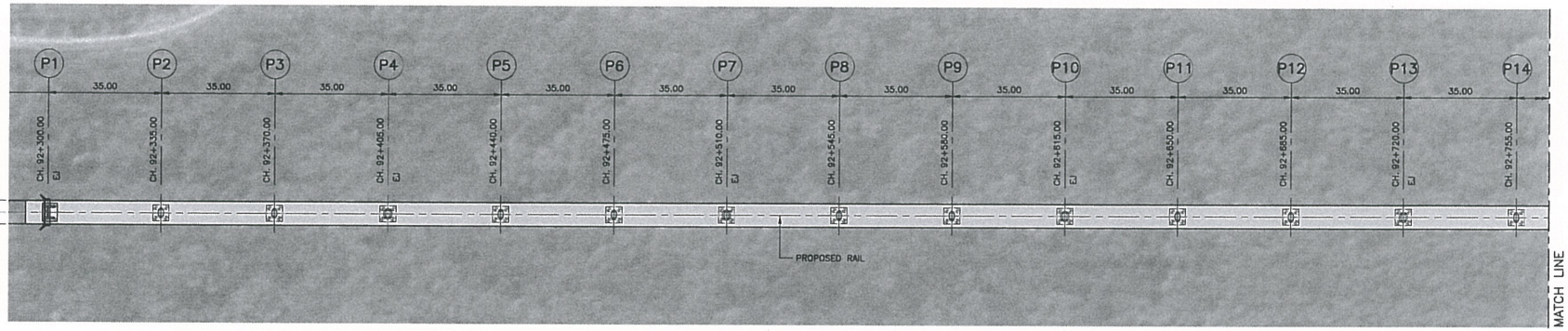
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 89+700 TO 90+330 SHEET 2/2	DATE: Feb-18 DWG. NO.: SCR-RB-LA-046/2	SCALE: AS SHOWN SHEET NO.: 87

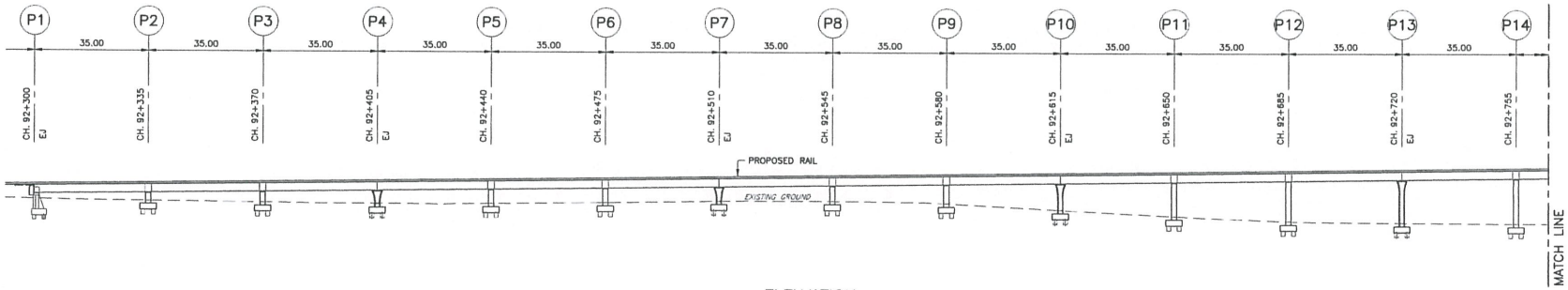
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MASTER KEY PLAN

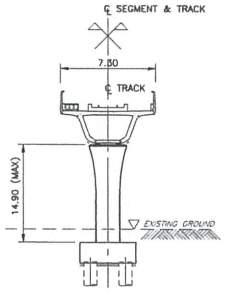




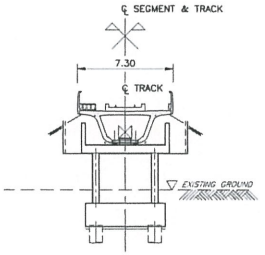
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

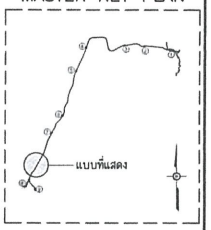


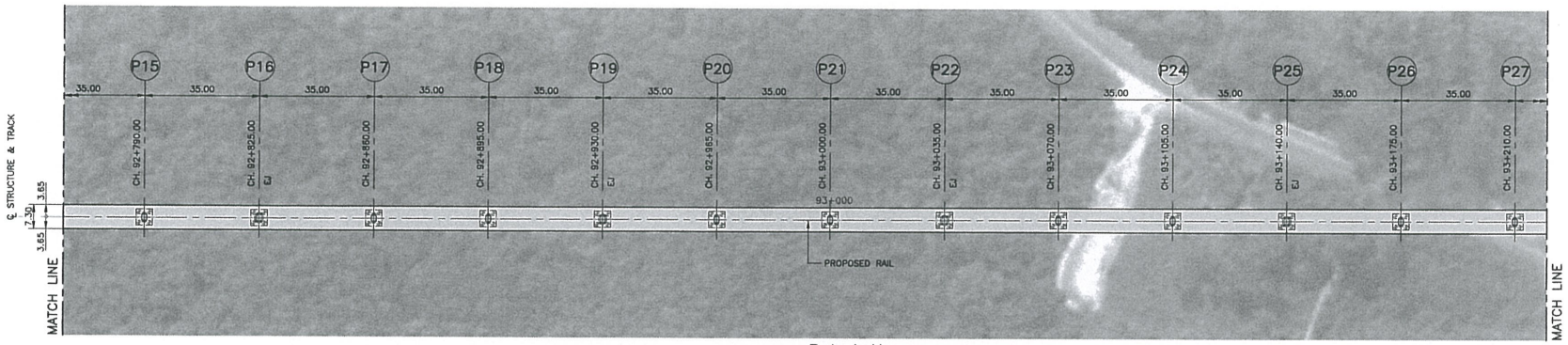
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

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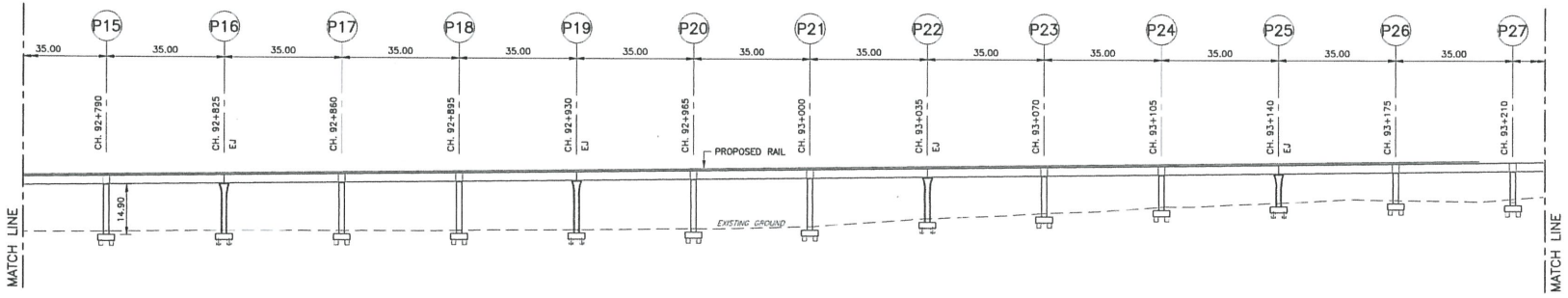
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 92+300 TO 93+455 SHEET 1/3	DATE: Feb-18 DWG. NO.: SCR-RB-LA-047/1	SCALE: AS SHOWN SHEET NO.: 88

MASTER KEY PLAN

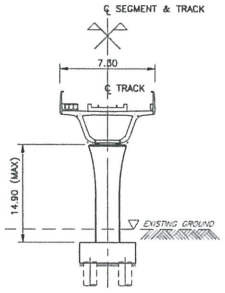




P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500

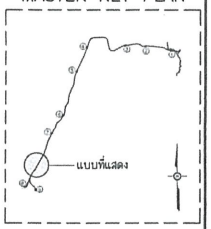


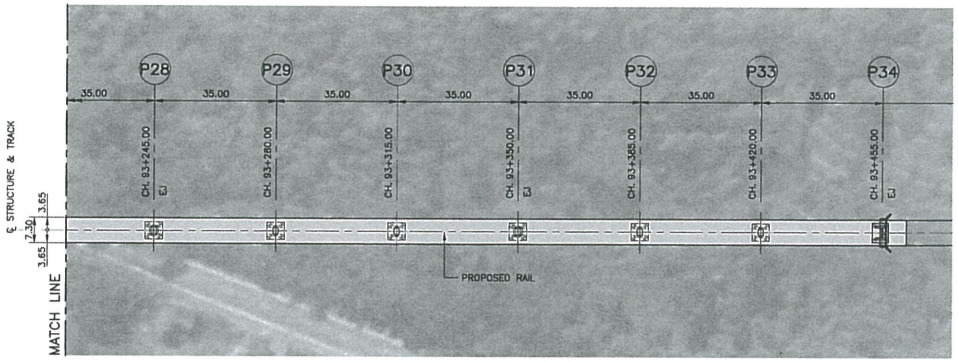
SECTION BRIDGE
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 92+300 TO 93+455 SHEET 2/3	DATE: Feb-18 DWG. NO. SCR-RB-LA-047/2	SCALE: AS SHOWN SHEET NO.: 89

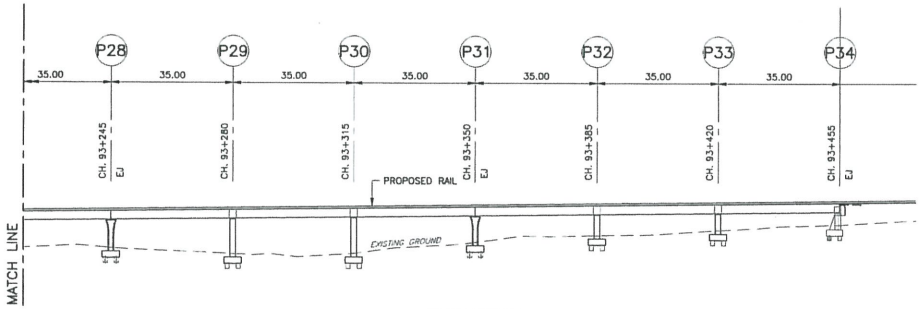
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MASTER KEY PLAN

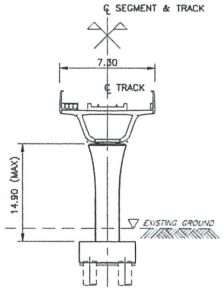




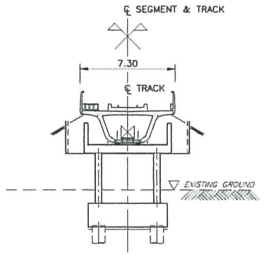
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

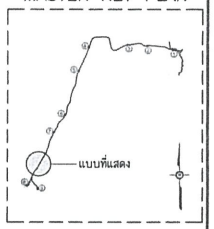


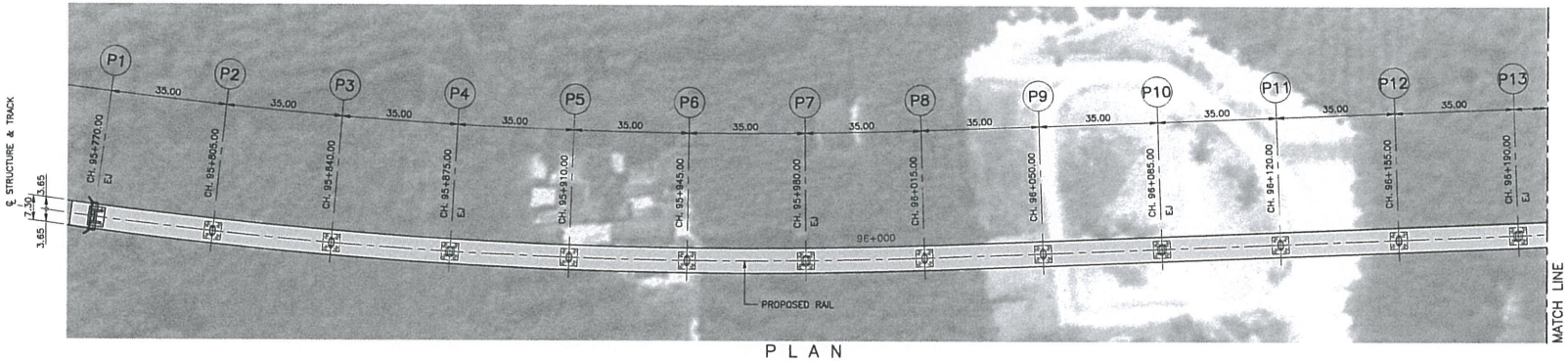
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 92+300 TO 93+455 SHEET 3/3	DATE : Feb-18 DWG. NO. : SCR-RB-LA-047/3	SCALE : AS SHOWN SHEET NO. : 90

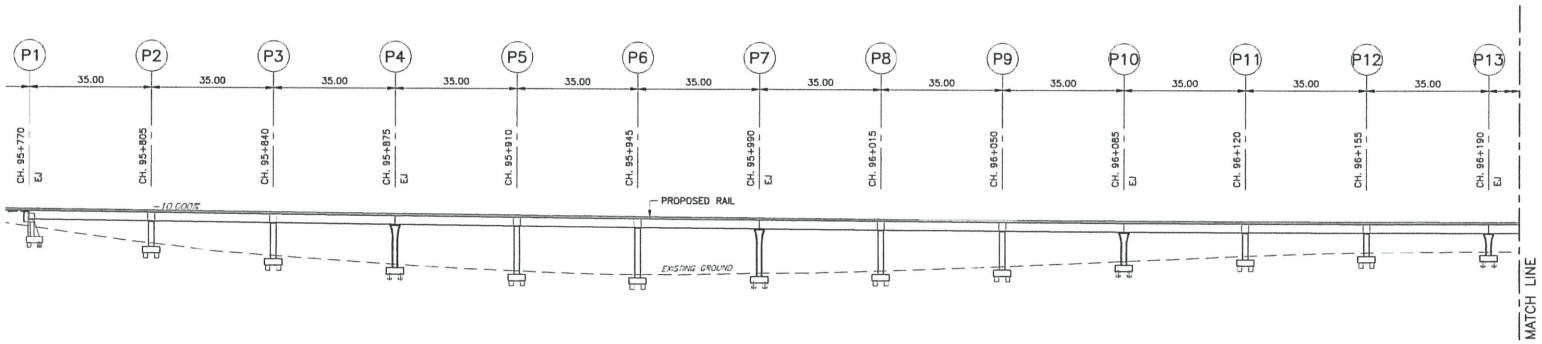
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MASTER KEY PLAN

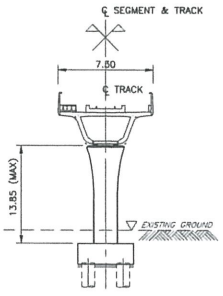




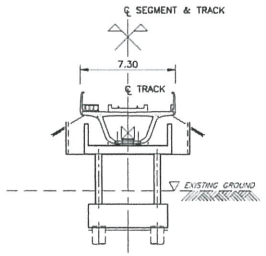
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



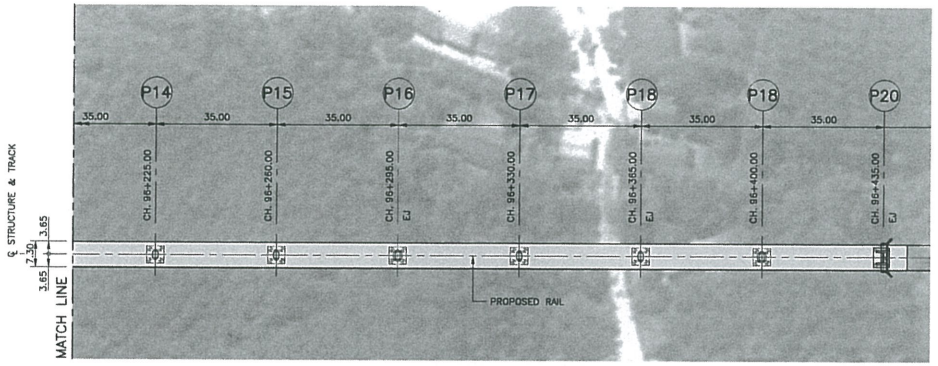
SECTION ABUTMENT
SCALE A1=1:200
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 95+770 TO 96+435 SHEET 1/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-048/1	SCALE : AS SHOWN SHEET NO. : 91

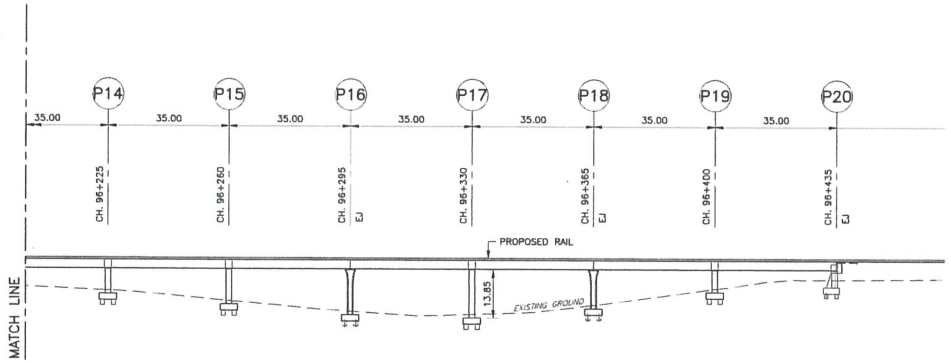
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MASTER KEY PLAN

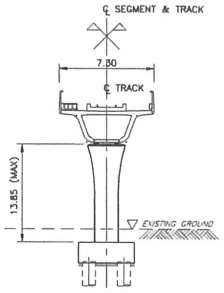




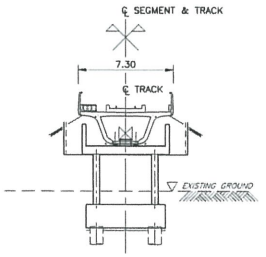
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



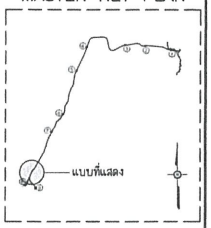
SECTION ABUTMENT
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A3=1:400

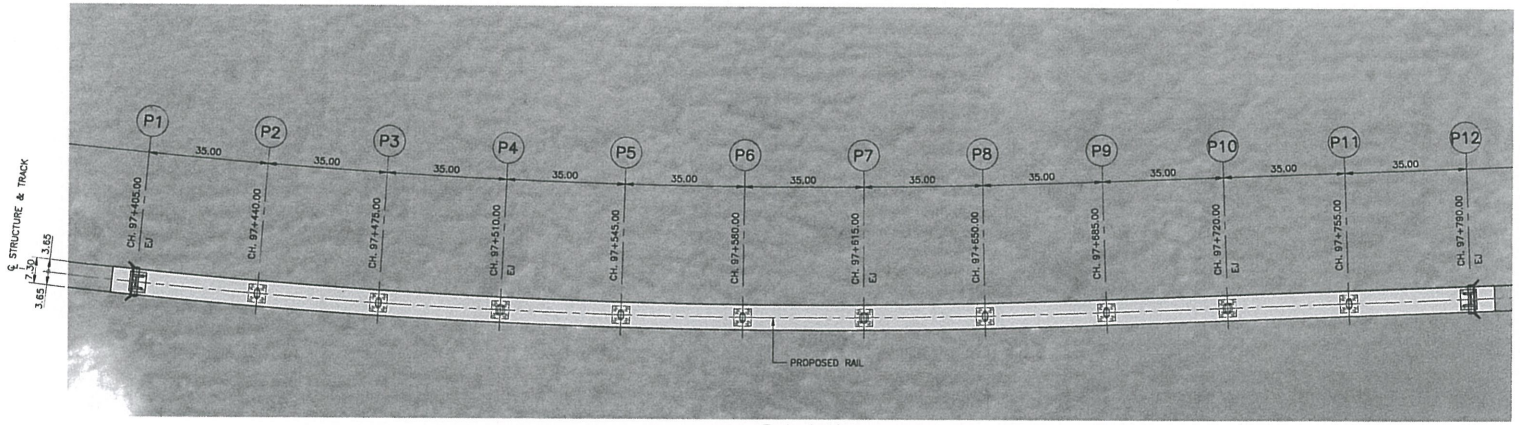
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 95+770 TO 96+435 SHEET 2/2

DATE: Feb-18	SCALE: AS SHOWN
DWG. NO.: SCR-RB-LA-048/2	SHEET NO.: 92

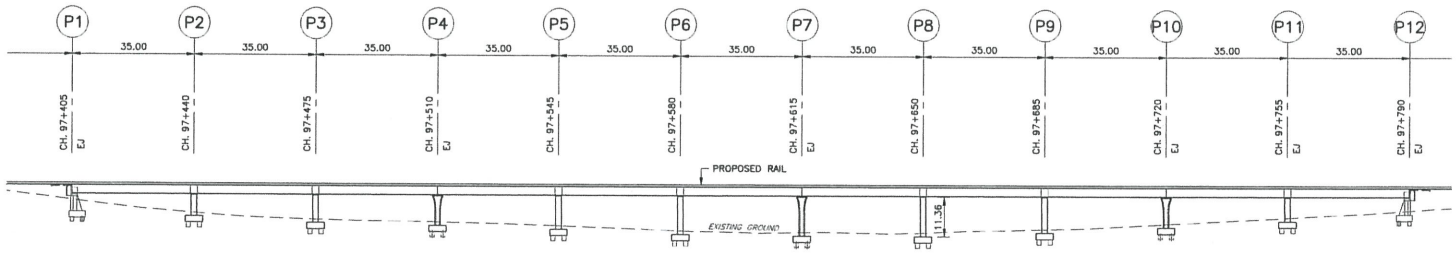
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MASTER KEY PLAN

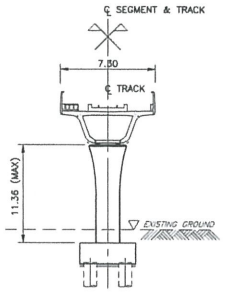




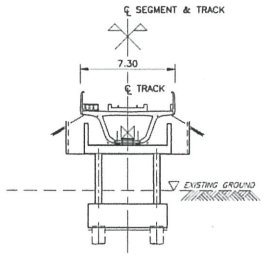
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

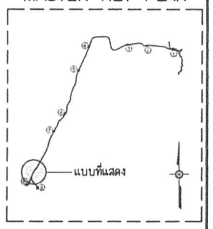


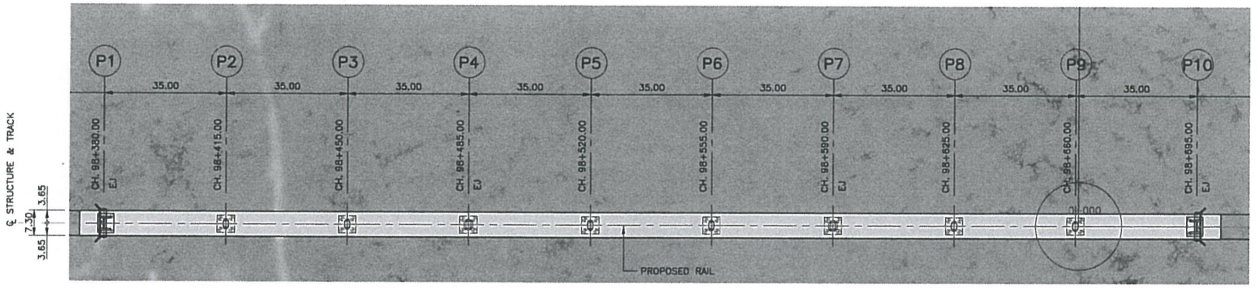
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 97+405 TO 97+790	DATE : Feb-18 SCALE : AS SHOWN DWG. NO. : SCR-RB-LA-049 SHEET NO. : 93

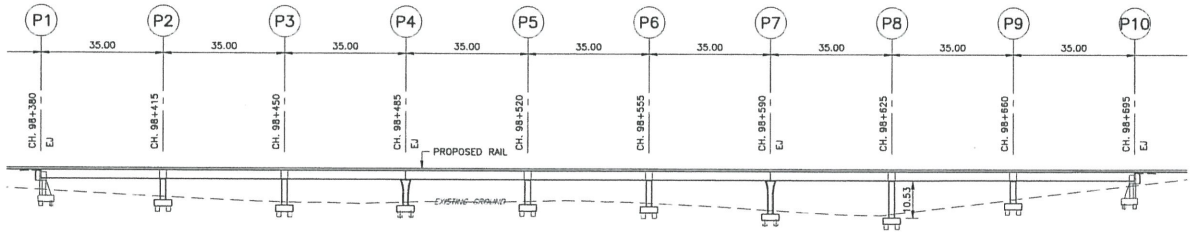
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MASTER KEY PLAN

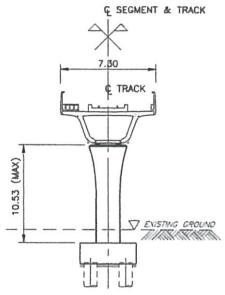




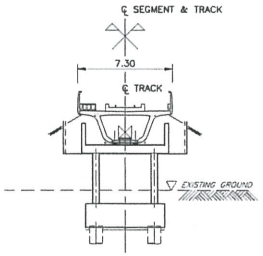
P L A N
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

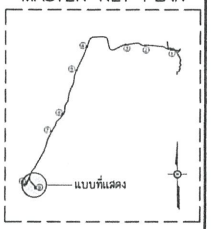


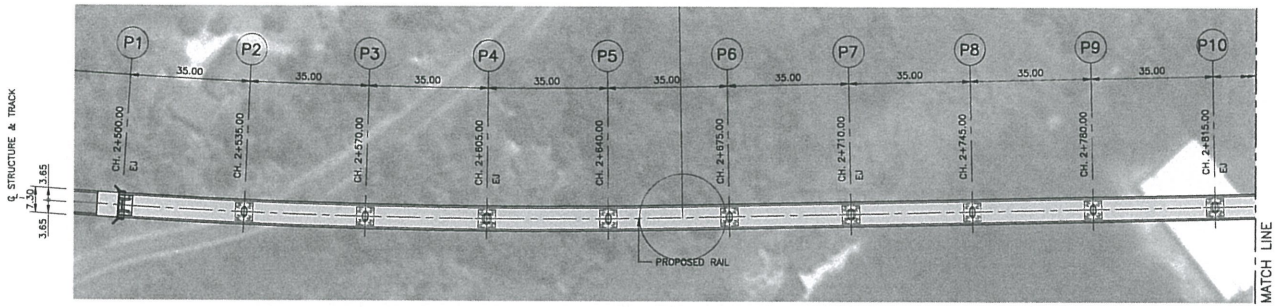
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 98+380 TO 98+695	DATE : Feb-18 DWG. NO. : SCR-RB-LA-050	SCALE : AS SHOWN SHEET NO. : 94

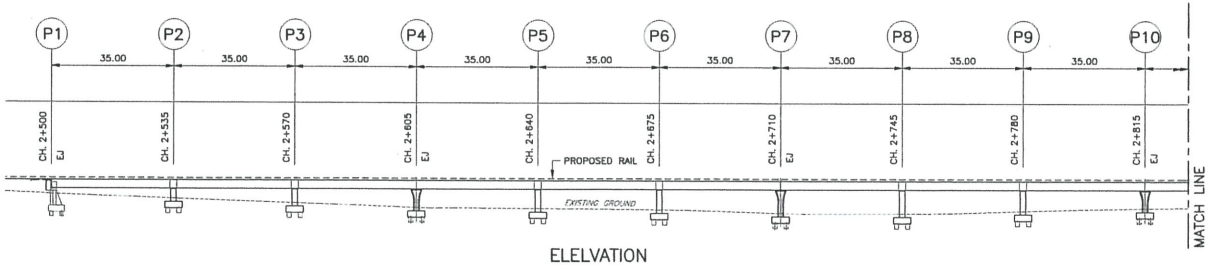
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MASTER KEY PLAN

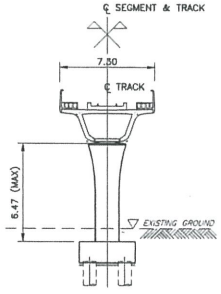




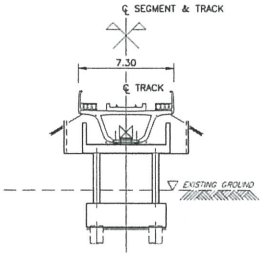
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

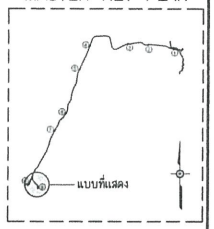


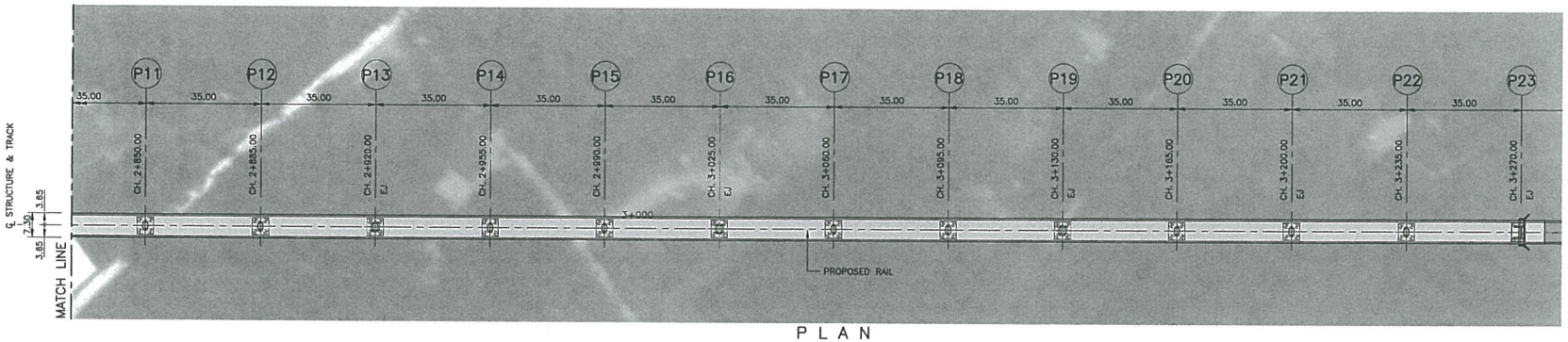
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 2+500 TO 3+270 SHEET 1/2	DATE: Feb-18 DWG. NO.: SCR-RB-LA-051/1	SCALE: AS SHOWN SHEET NO.: 95

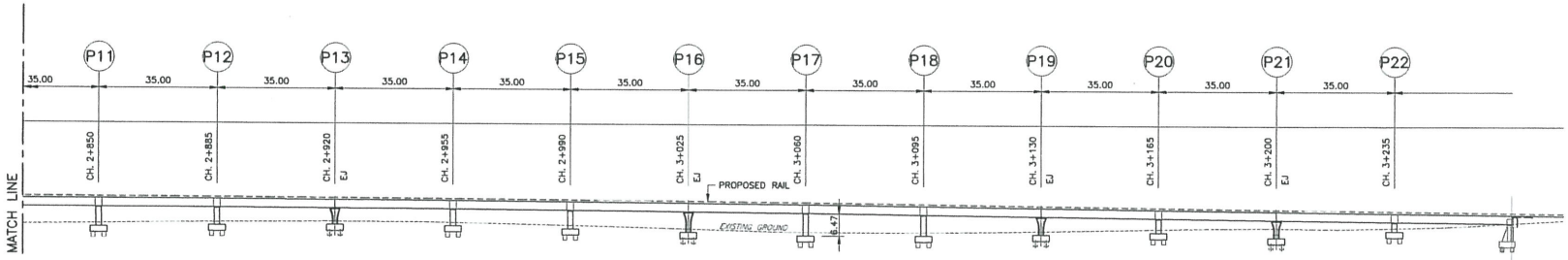
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MASTER KEY PLAN

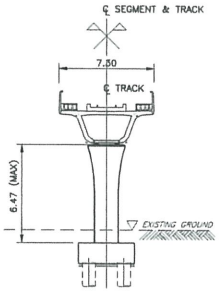




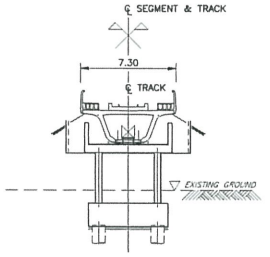
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400



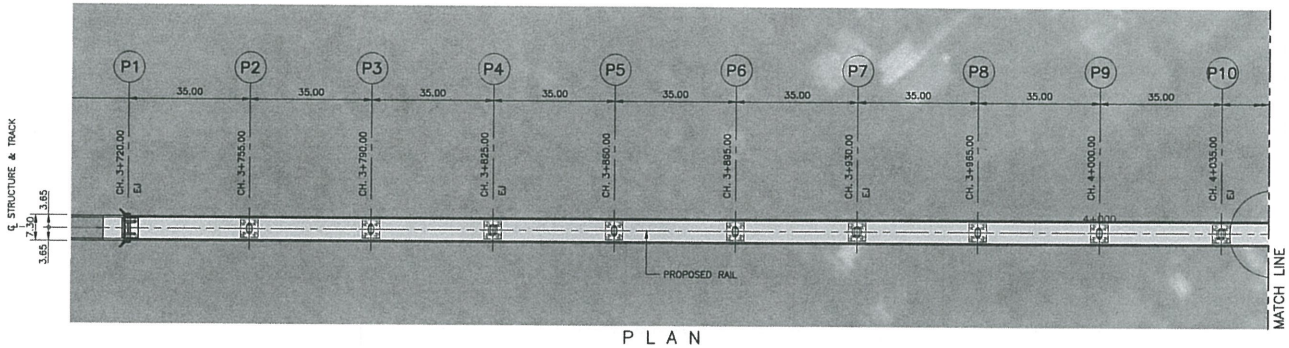
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 2+500 TO 3+270 SHEET 2/2	DATE : Feb-18 DWG. NO. : SCR-RB-LA-051/2	SCALE : AS SHOWN SHEET NO. : 96

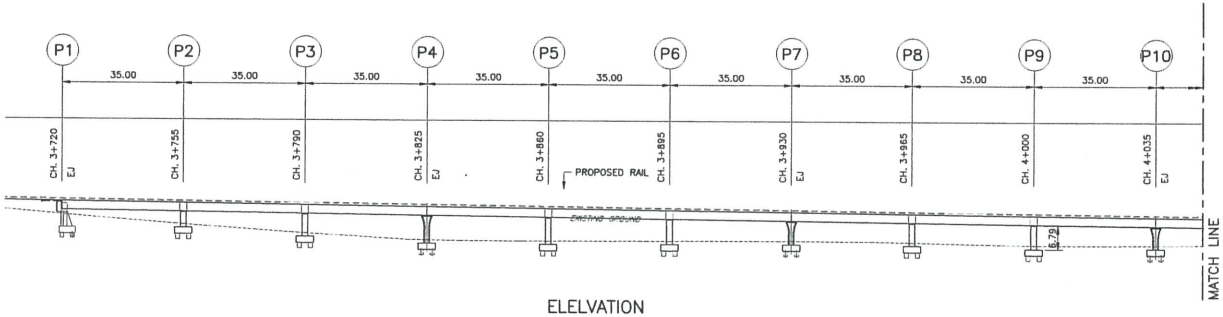
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MASTER KEY PLAN

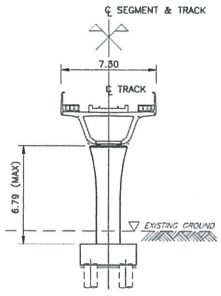




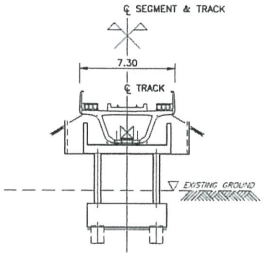
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



SECTION BRIDGE
SCALE A1=1:200
A3=1:400

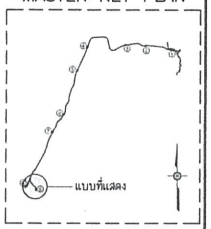


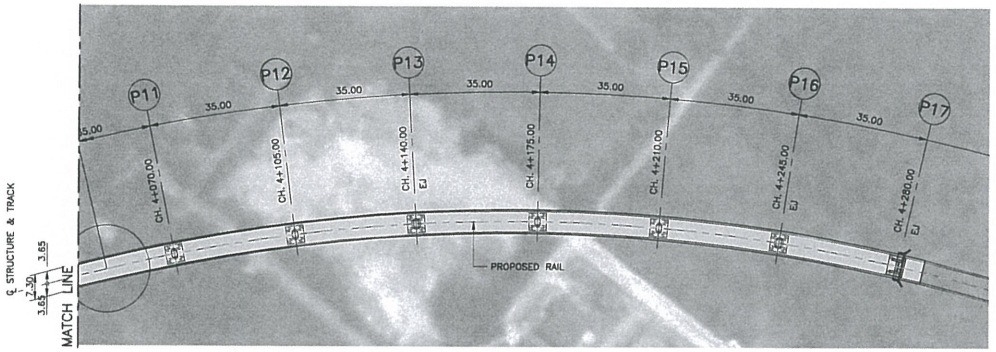
SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 3+720 TO 4+280 SHEET 1/2	DATE: Feb-18 SCALE: AS SHOWN DWG. NO.: SCR-RB-LA-052/1 SHEET NO.: 97

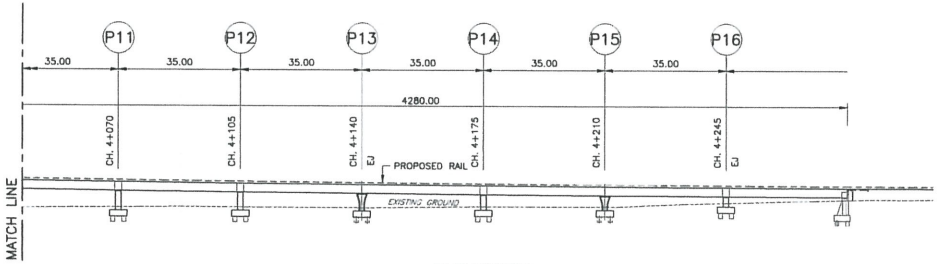
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MASTER KEY PLAN

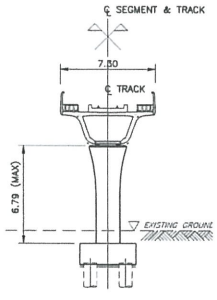




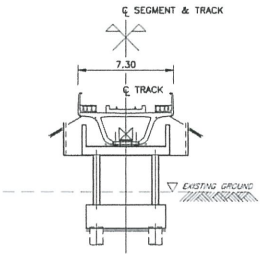
PLAN
SCALE A1=1:750
A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



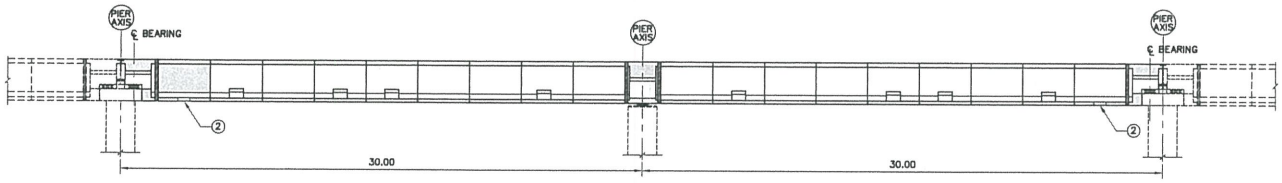
SECTION BRIDGE
SCALE A1=1:200
A3=1:400



SECTION ABUTMENT
SCALE A1=1:200
A3=1:400

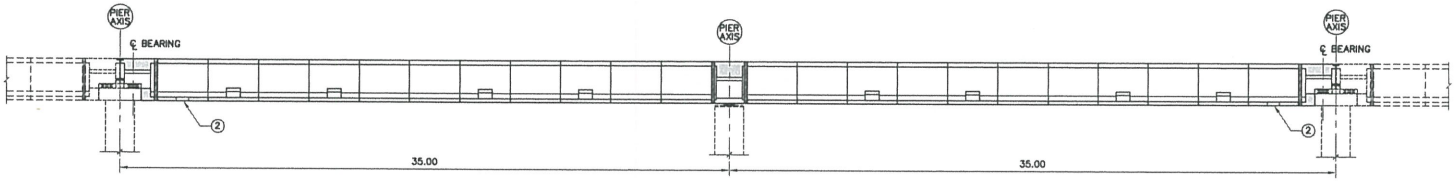
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE LAOUT PLANS PLAN AND ELEVATION STA. 3+720 TO 4+280 SHEET 2/2	DATE: Feb-18 DWG. NO.: SCR-RB-LA-052/2	SCALE: AS SHOWN SHEET NO.: 98

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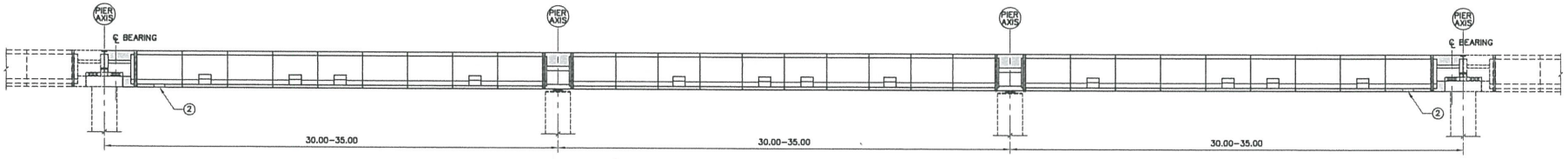
30+30 SPAN

SCALE A1 = 1:150
A3 = 1:300



35+35 SPAN

SCALE A1 = 1:150
A3 = 1:300



35+35+35 SPAN

SCALE A1 = 1:150
A3 = 1:300

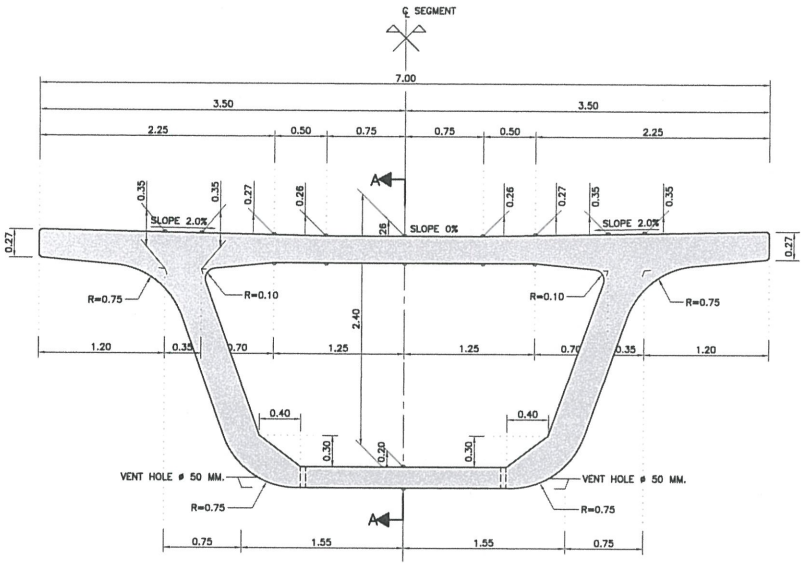
NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.

② SOFFIT ACCESS

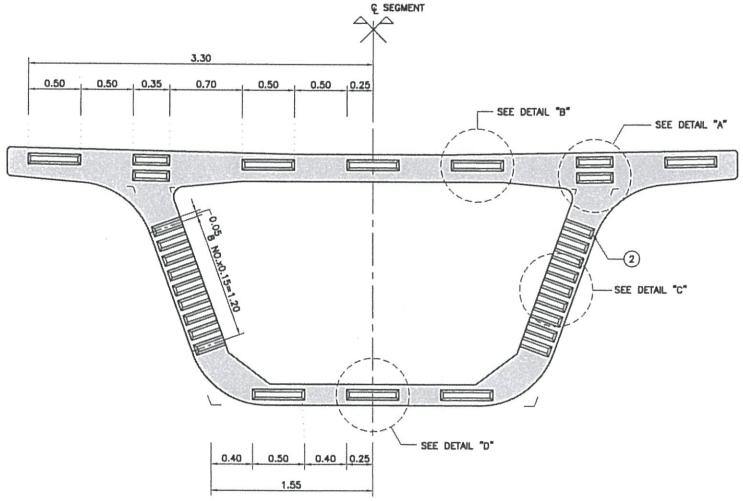
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE SEGMENTAL BOX GIRDER (BG01) SPAN ASSEMBLY	DATE : Feb 18 DWG. NO. : SCR-RB-ST-401	SCALE : AS SHOWN SHEET NO. : 99



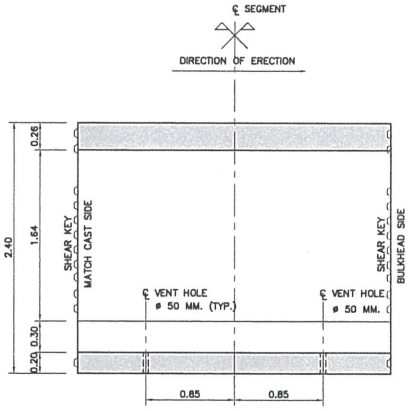
TYPICAL SECTION

SCALE A1 = 1:25
A3 = 1:50



TYPICAL SHEAR KEY LAYOUT

SCALE A1 = 1:25
A3 = 1:50



SECTION A–A

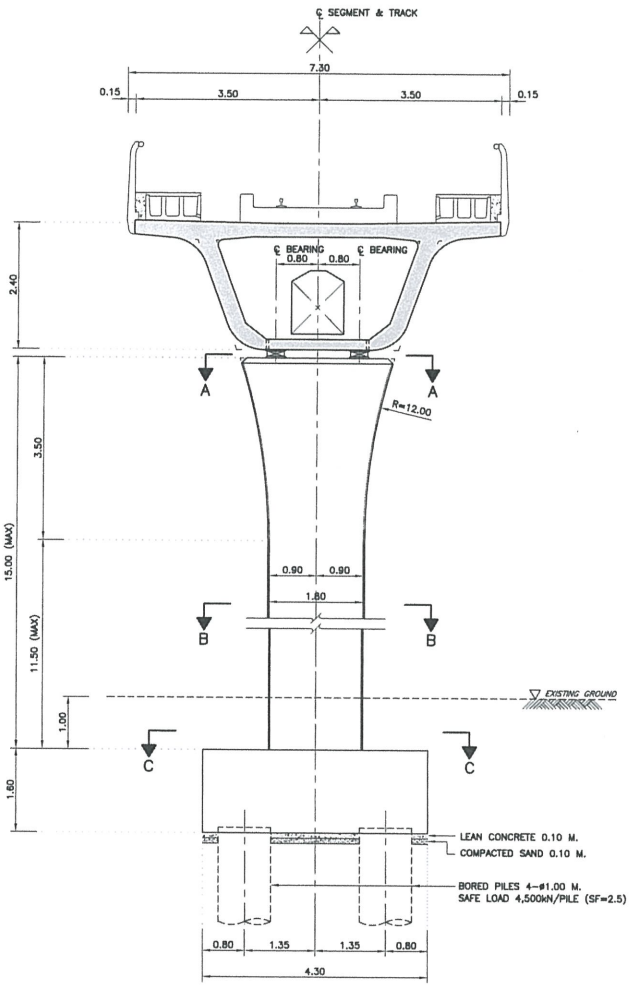
SCALE A1 = 1:25
A3 = 1:50

NOTES :

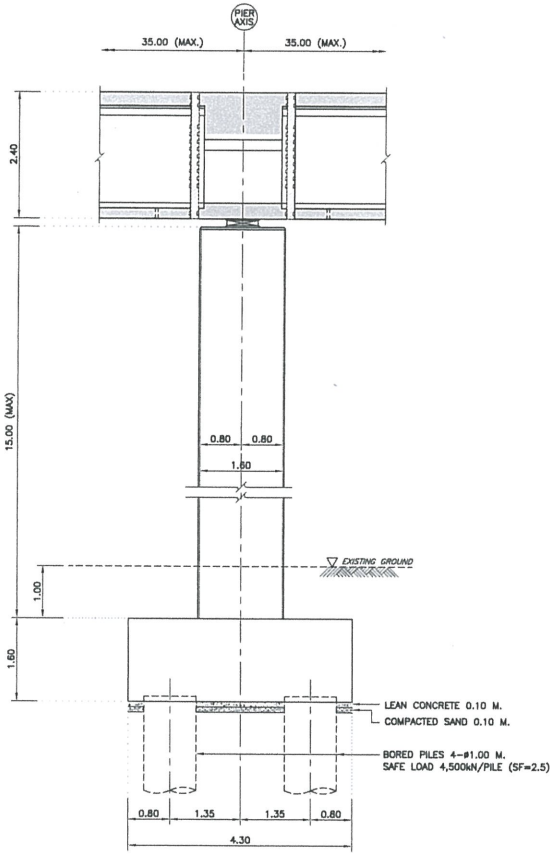
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED ON THE DRAWING.
2. SHEAR KEYS ARE APPLIED TO ALL SEGMENT TYPES.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE SEGMENTAL BOX GIRDER (BG01) TYPICAL DETAILS OF SEGMENTAL BOX GIRDER	DATE: Feb 18 DWG. NO.: SCR-RB-ST-501	SCALE: AS SHOWN SHEET NO.: 100

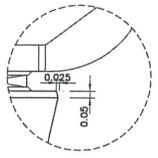
S:\WORKING_CAD\1465-SCRYZ_WORKING\1_RAILWAY BRIDGE\SUBMITT ON 2018\2019\CAD\SCR-RB-ST-501.DWG



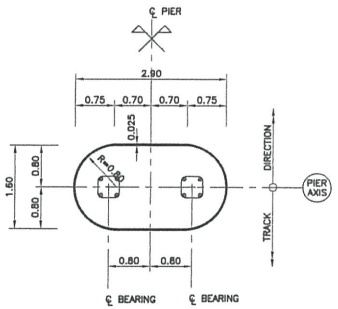
FRONT ELEVATION
SCALE A1 = 1:50
A3 = 1:100



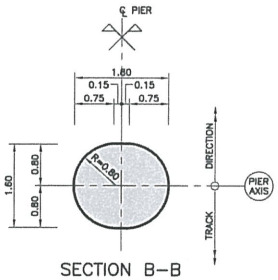
SIDE VIEW
SCALE A1 = 1:50
A3 = 1:100



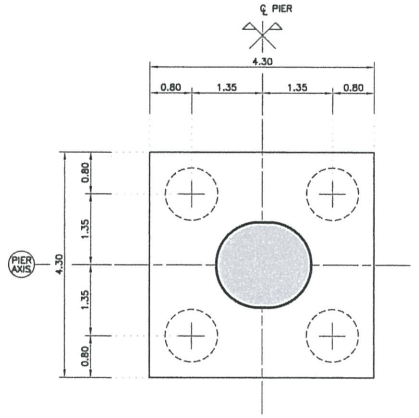
DETAIL "1"
SCALE 1:20



SECTION A-A
SCALE A1 = 1:50
A3 = 1:100



SECTION B-B
SCALE A1 = 1:50
A3 = 1:100



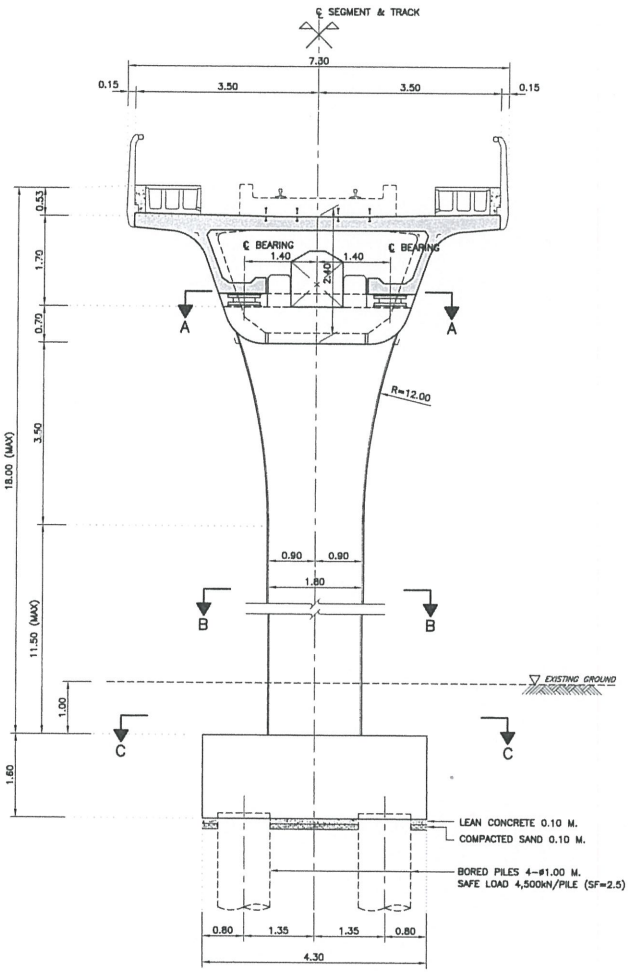
SECTION C-C
SCALE A1 = 1:50
A3 = 1:100

NOTES :

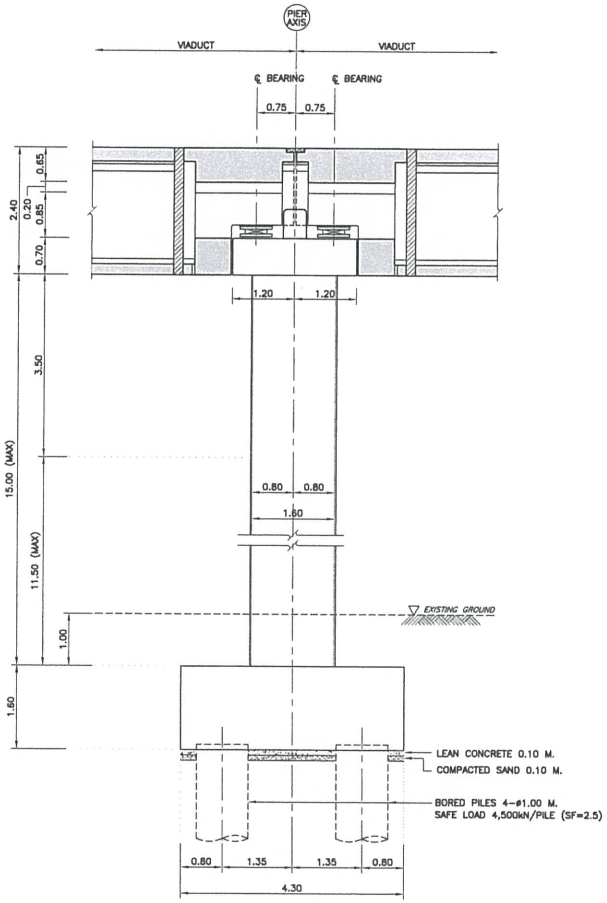
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED ON THE DRAWING.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE SEGMENTAL BOX GIRDER (BG01) TYPICAL DETAILS OF PIER TYPE "VD3"	DATE: Feb 18 DWG. NO.: SCR-RB-ST-601	SCALE: AS SHOWN SHEET NO.: 101

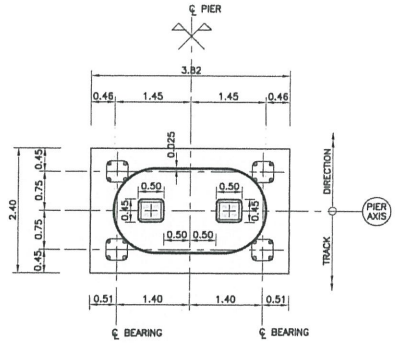
S:\WORKING_CAD\1465-SCH2_WORKING\1_RAILWAY BRIDGE\SUBMITT ON 2018\02\19\CAD\SCR-RB-ST-601.DWG



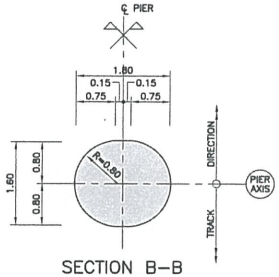
FRONT ELEVATION
SCALE A1 = 1:50
A3 = 1:100



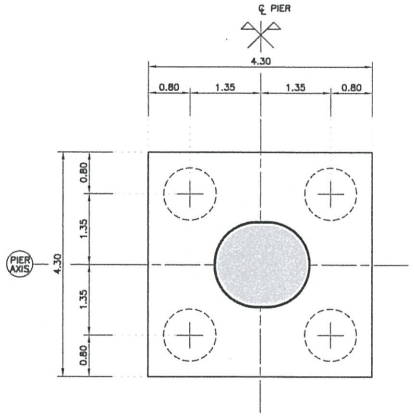
SIDE VIEW
SCALE A1 = 1:50
A3 = 1:100



SECTION A-A
SCALE A1 = 1:50
A3 = 1:100



SECTION B-B
SCALE A1 = 1:50
A3 = 1:100



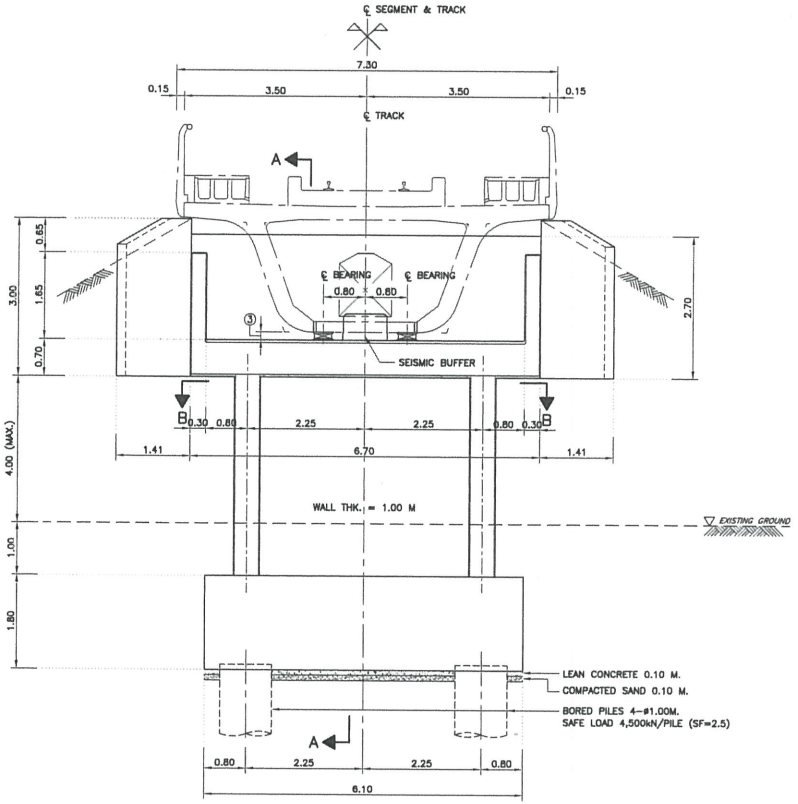
SECTION C-C
SCALE A1 = 1:50
A3 = 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED ON THE DRAWING.

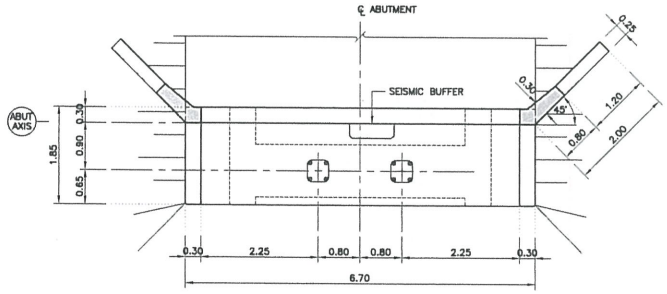
S:\WORKING_CAD\1465-SCN12_WORKING\1_RAILWAY BRIDGE\4_SEGMENTAL BOX GIRDER (BG02)\SCR-RB-ST-602-FEB2018.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE SEGMENTAL BOX GIRDER (BG01) TYPICAL DETAILS OF PIER TYPE "VD3E"	DATE: Feb 18 DWG. NO.: SCR-RB-ST-602	SCALE: AS SHOWN SHEET NO.: 102



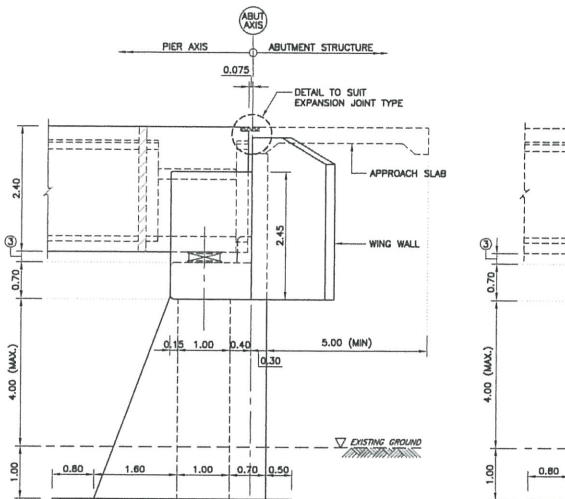
FRONT ELEVATION

SCALE A1 = 1:50
A3 = 1:100



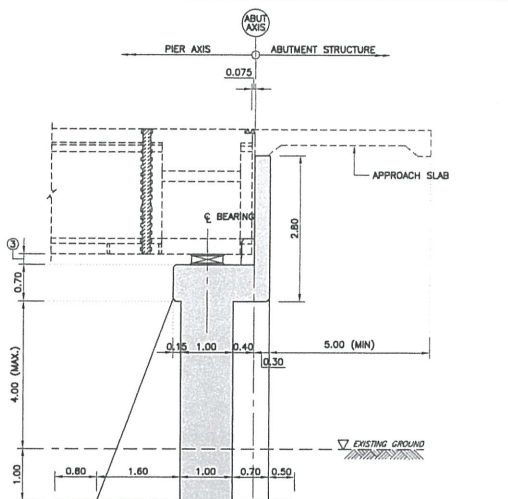
ABUTMENT PLAN

SCALE A1 = 1:50
A3 = 1:100



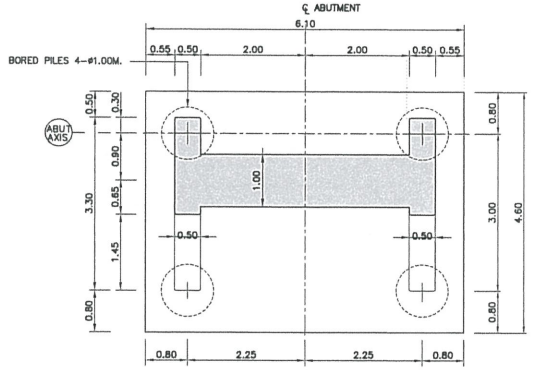
SIDE ELEVATION

SCALE A1 = 1:50
A3 = 1:100



SECTION A–A

SCALE A1 = 1:50
A3 = 1:100



SECTION B–B

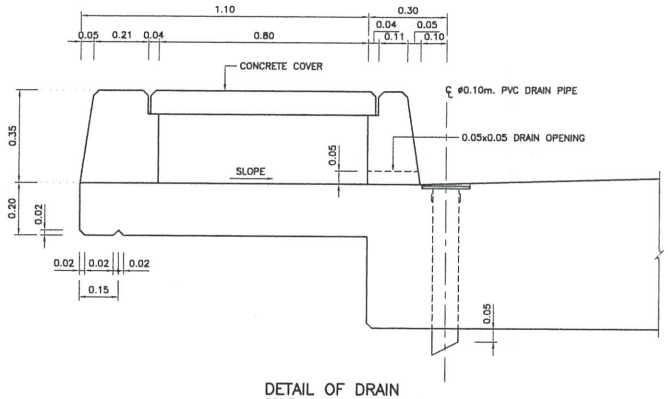
SCALE A1 = 1:50
A3 = 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED ON THE DRAWING.
2. ALL CORNERS SHALL BE CHAMFERED 0.02x0.02
3. DEPENDS ON BEARING SIZE.

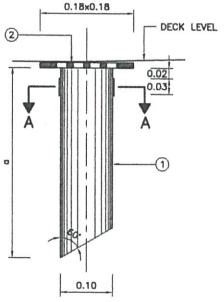
S:\WORKING_CAD\1465-SCR\2_WORKING\1_RAILWAY BRIDGE\SUBMITT ON 2018\2019\CAD\SCR-RB-ST-701.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE SEGMENTAL BOX GIRDER (BG01) TYPICAL DETAILS OF ABUTMENT TYPE "BG01"	DATE: Feb 18 / SCALE: AS SHOWN DWG. NO.: SCR-RB-ST-701 / SHEET NO.: 103

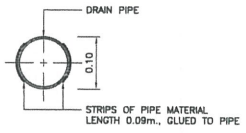


DETAIL OF DRAIN
SCALE 1:10

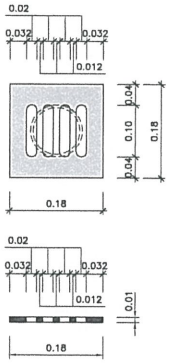
LIST OF MATERIAL									
MATERIAL NO.	DESCRIPTION	BRIDGE SPAN							REMARKS
		6.00	8.00	10.00	15.00	20.00	25.00	30.00	35.00	
①	PVC PIPE DIAMETER	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	
	NUMBER OF PVC PIPE	4	4	4	4	6	6	6	6	
	LENGTH (m.) (a)	0.70	0.75	0.90	0.90	0.90	0.90	0.90	0.90	
	TOTAL LENGTH (m.)	2.80	3.00	3.60	3.60	5.40	5.40	5.40	5.40	
②	CAST IRON GRATING	← 0.18x0.18x0.10 →								
	TOTAL NO.	4	4	4	4	6	6	6	6	



PVC DRAIN PIPE
SCALE 1:5



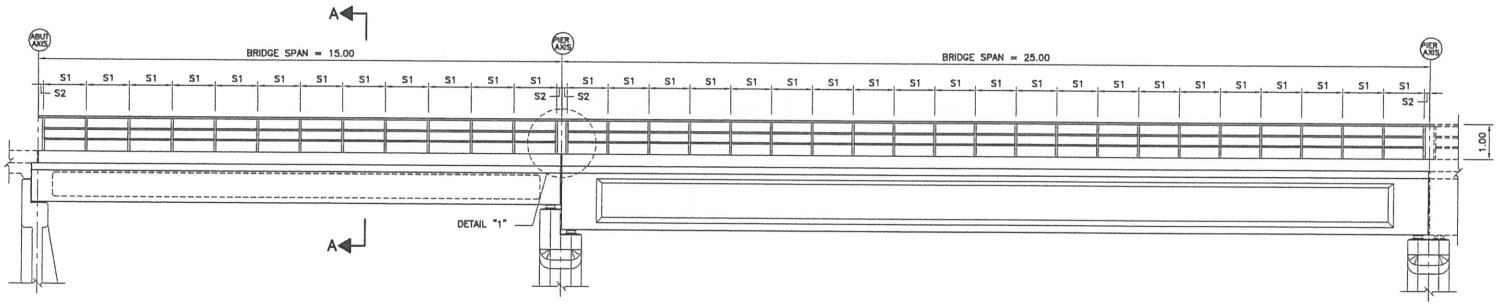
SECTION A–A
SCALE 1:5



CAST IRON GRATING
SCALE 1:5

S:\WORKING_CAD\1465-SCR\2_WORKINGS\1_RAILWAY BRIDGE\7_MISCELLANEOUS\SCR-RB-MI-011.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE MISCELLANEOUS TYPICAL DETAILS OF DRAIN PIPES AND GRATINGS	DATE: Feb 18 DWG. NO.: SCR–RB–MI–011	SCALE: AS SHOWN SHEET NO.: 104

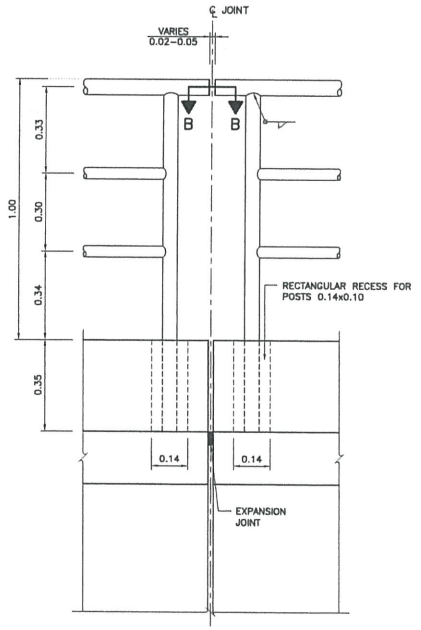


ELEVATION
SCALE 1:75

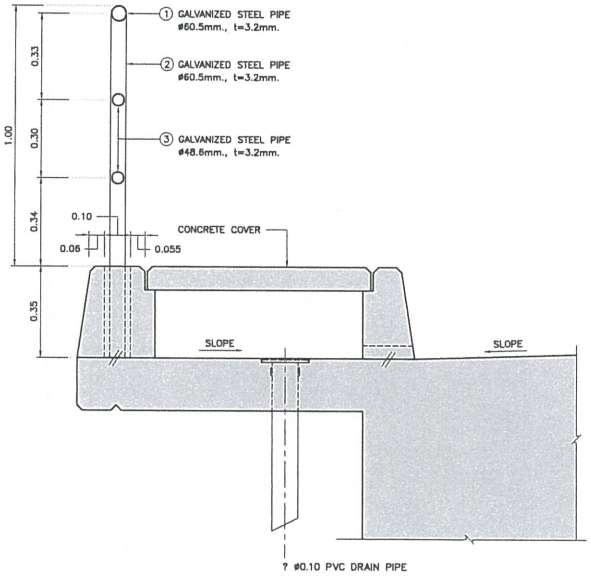
DIMENSIONS

BRIDGE SPAN (M.)	SPACING OF POST (M.)	
	S1	S2
6.00	1.140	0.150
8.00	1.283	0.150
10.00	1.213	0.150
15.00	1.225	0.150
20.00	1.231	0.150
25.00	1.176	0.150
30.00	1.238	0.150

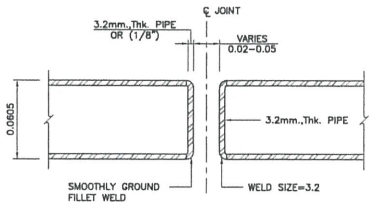
MEMBER	DESCRIPTION	BRIDGE SPAN (M.)						
		6.00	8.00	10.00	15.00	20.00	25.00	30.00
①	PIPE SIZE, O.D. (MM.)	60.5	60.5	60.5	60.5	60.5	60.5	60.5
	NUMBER	1	1	1	1	1	1	1
	LENGTH (M.)	5.98	7.98	9.98	14.98	19.95	24.95	29.95
	TOTAL LENGTH (M.)	5.98	7.98	9.98	14.98	19.95	24.95	29.95
	TOTAL WEIGTH (kg) (4.52 kg/m)	27.03	36.07	45.11	67.71	90.17	112.77	135.37
②	PIPE SIZE, O.D. (MM.)	60.5	60.5	60.5	60.5	60.5	60.5	60.5
	NUMBER	6	7	9	13	17	22	25
	LENGTH (M.)	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	TOTAL LENGTH (M.)	7.92	9.24	11.88	17.16	22.44	29.04	33.00
	TOTAL WEIGTH (kg) (4.52 kg/m)	35.80	41.76	53.70	77.56	101.43	131.26	149.16
③	PIPE SIZE, O.D. (MM.)	48.6	48.6	48.6	48.6	48.6	48.6	48.6
	NUMBER	10	12	16	24	32	42	48
	LENGTH (M.)	1.10	1.25	1.18	1.19	1.20	1.14	1.20
	TOTAL LENGTH (M.)	11.04	14.97	18.82	28.54	38.25	47.89	57.67
	TOTAL WEIGTH (kg) (3.56 kg/m)	39.30	53.29	67.01	101.59	136.16	170.48	205.31
TOTAL	LENGTH @60.5 (M.)	13.90	17.22	21.86	32.14	42.39	53.99	62.95
	LENGTH @48.6 (M.)	11.04	14.97	18.82	28.54	38.25	47.89	57.67
	WEIGTH (kg.)	102.13	131.12	165.82	246.86	327.77	414.52	489.85



DETAIL "1"
SCALE 1:10



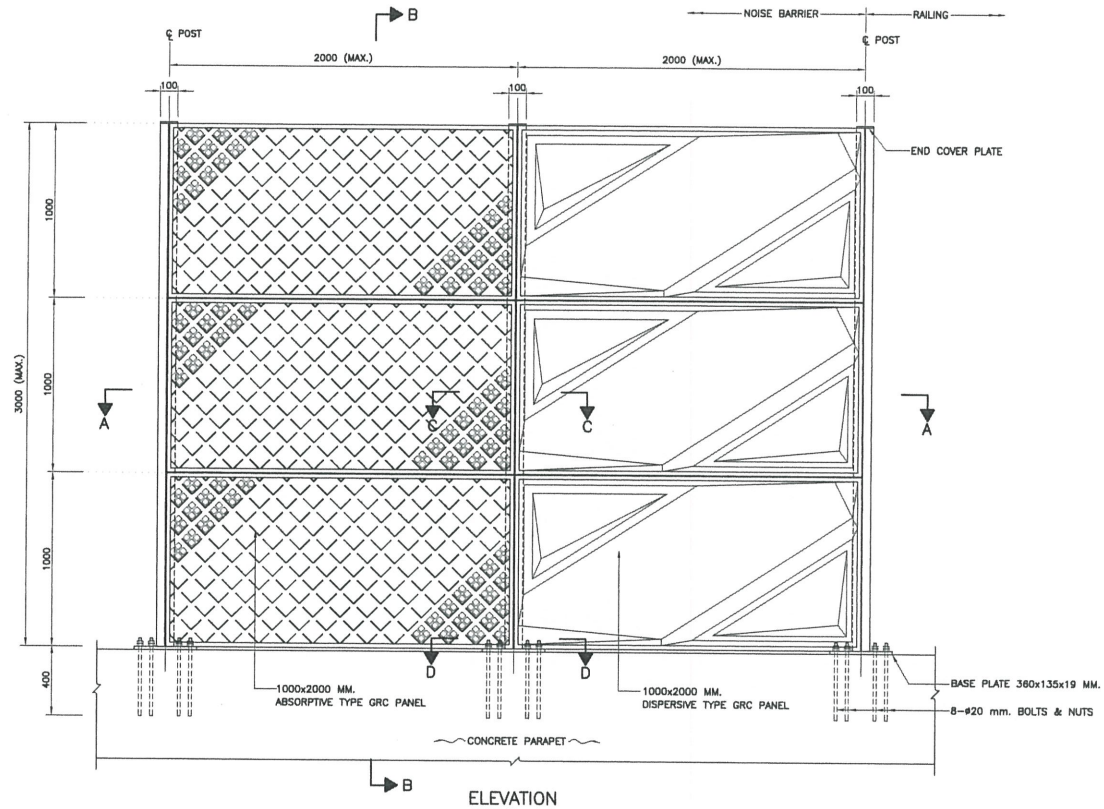
SECTION A–A
SCALE 1:10



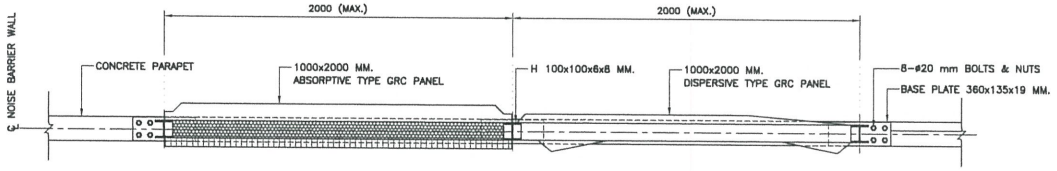
SECTION B–B
SCALE 1:2

S:\WORKING_CAD\1465-SCR\2_WORKING\1_RAILWAY BRIDGE\7_MISCELLANEOUS\SCR-RB-MI-012.DWG

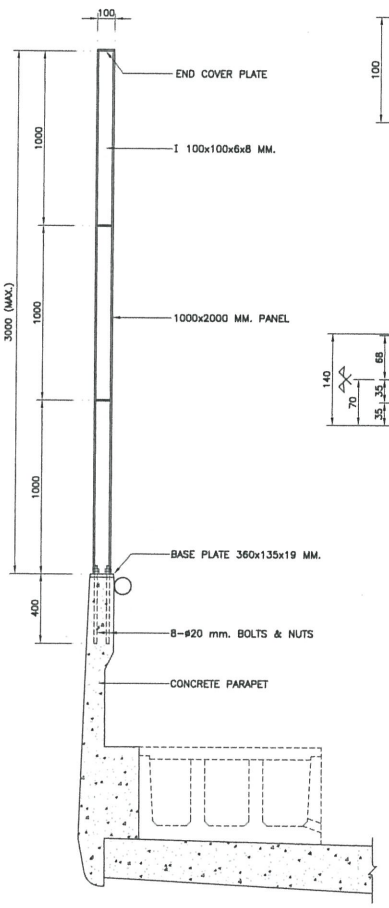
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE MISCELLANEOUS TYPICAL DETAILS OF HANDRAIL	DATE: Feb 18 SCALE: AS SHOWN DWG. NO.: SCR-RB-MI-012 SHEET NO.: 105



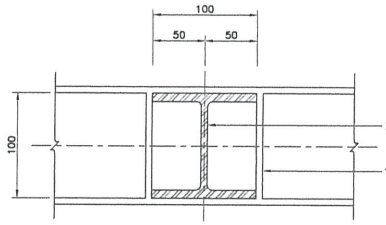
ELEVATION
SCALE A1 = 1:15
A3 = 1:30



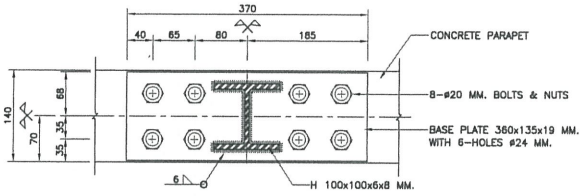
SECTION A-A
SCALE A1 = 1:15
A3 = 1:30



SECTION B-B
SCALE A1 = 1:15
A3 = 1:30



SECTION C-C
SCALE A1 = 1:2.5
A3 = 1:5



SECTION D-D
SCALE A1 = 1:4
A3 = 1:8

MATERIALS :

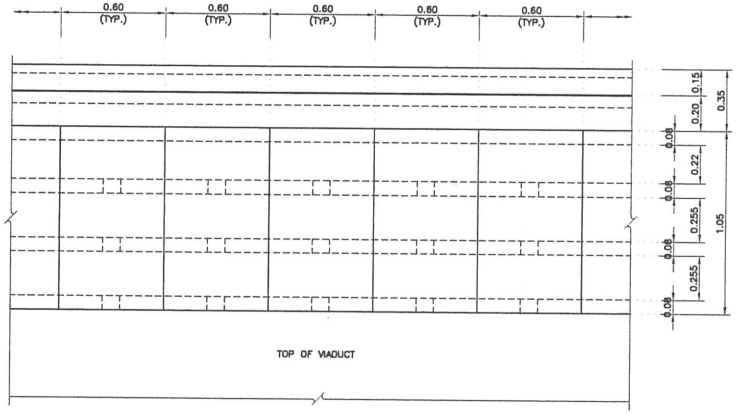
1. THE STRUCTURAL STEEL SHALL CONFORM TO TIS 107-1974 STANDARD, GRADE HS 41 AND TIS 116-1974 STANDARD, GRADE Fs 24.
2. GRC-GLASS FIBER REINFORCED CONCRETE
3. ALL STEEL FRAMES AND BASE PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ENISO1461 OR EQUIVALENT AND ALL EXPOSED PARTS SHALL BE PHOSPHATE TREATED AND FOLLOWED BY TWO COATS OF PAINT AS DIRECTED BY THE ENGINEER.

NOTES :

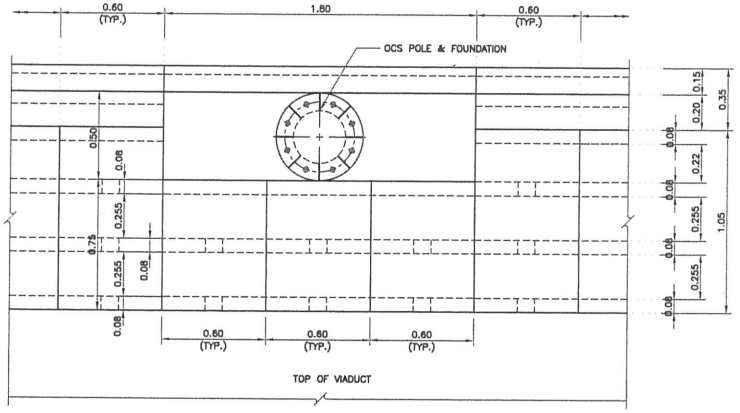
1. ALL DIMENSIONS ARE IN MILLIMETERS OTHERWISE INDICATED.
2. THIS DRAWING SHOWS THE DETAILS OF DISPERSIVE AND ABSORPTIVE TYPES GRC PANEL NOISE BARRIER TYPE 1 AND TYPE 2 RESPECTIVELY.
3. THE NOISE BARRIER WALL ARE DESIGNED TO RESIST THE WIND PRESSURE AT 150 KG/M.^{2}
4. TOP OF COLUMN SHALL BE ENCLOSED WITH COVER PLATE.
5. DETAILS OF NOISE BARRIER WILL SHOW FOR GUIDELINE ONLY, PROPOSED NOISE BARRIER MUST BE SUBMITTED BY ENGINEER FOR APPROVAL.

S:\WORKING_CAD\1465-SCR\2_WORKINGS\1_RAILWAY BRIDGE\7_MISCELLANEOUS\SCR-RB-MI-013.DWG

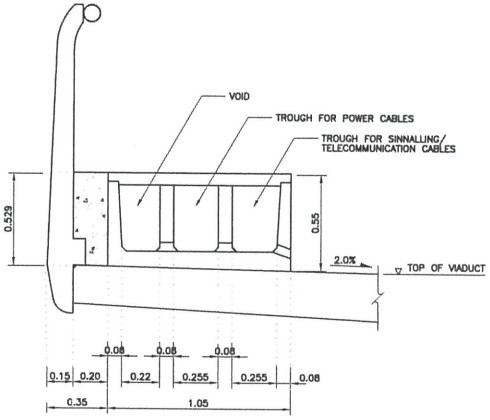
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE MISCELLANEOUS TYPICAL DETAILS OF PARAPET AT NOISE BARRIER	DATE: Feb 18 DWG. NO.: SCR-RB-MI-013	SCALE: AS SHOWN SHEET NO.: 106



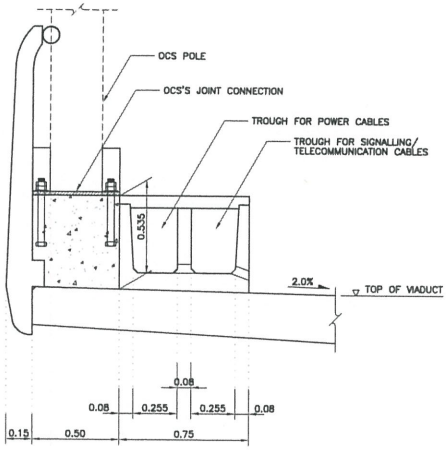
TYPICAL PLAN
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A3 = 1:30



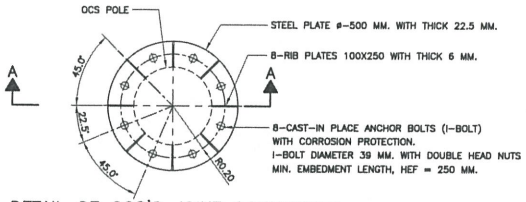
PLAN AT OCS POLE
SCALE A1 = 1:15
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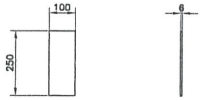
TYPICAL SECTION
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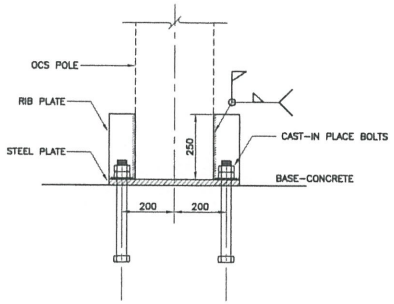
SECTION AT OCS POLE
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A3 = 1:30



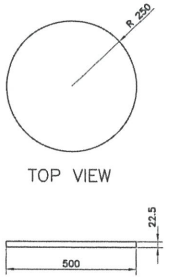
DETAIL OF OCS'S JOINT CONNECTION
SCALE 1:10



RIB PLATE DETAILS
SCALE 1:10



SECTION A-A
SCALE A1 = 1:10
A3 = 1:20



BASE PLATE DETAILS
SCALE 1:10

OCS POLE

NOTES :

1. ALL DIMENSIONS ARE IN METERS OTHERWISE INDICATED.
2. COMPRESSIVE STRENGTH OF FILLED CONCRETE AT 28 DAY, f'c = 35 MPa.
3. ALL STEEL PLATES SHALL CONFORM TO ASTM A36 OR Q235 OR EQUIVALENT.
4. CONCRETE COVER SHALL BE 40 MM.
5. WELDING ELECTRODES SHALL BE ACCORDING TO GRADE E70.
6. ALL BOLTS SHALL CONFORM TO ASTM A325 OR EQUIVALENT.
7. CORROSION PROTECTION FOR BOLT SHALL BE ACCORDING TO ISO-8044.
8. LOCATIONS OF THE OCS POLE AND THE OCS POLE SIZE SHALL BE VERIFIED BY THE CONTRACTOR OF E&M WORK.
9. BASE PLATE DETAILS OF OCS POLE ARE FOR REFERENCE ONLY. E&M CONTRACTOR SHALL DESIGN THE BASE PLATE DETAILS BASED ON THE ACTUAL OCS SYSTEM AND SUBMIT TO ENGINEER FOR APPROVAL.

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY BRIDGE MISCELLANEOUS TYPICAL DETAILS OF CABLE TROUGH AND OCS BASE	DATE: Feb 18 SCALE: AS SHOWN DWG. NO.: SCR-RB-MI-014 SHEET NO.: 107

RAILWAY CROSSING

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON-RANONG RAILWAY PROJECTS
LIST OF DRAWINGS

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TYPICAL DETAILS OF PC. PLANK GIRDER	SCR-RC-ST-001	121
TYPICAL DETAILS OF PC. I-GIRDER FOR SPAN LENGTH 30.00 M.	SCR-RC-ST-011	122
TYPICAL DETAILS OF SLAB AND DIAPHRAGM FOR PC. I-GIRDER	SCR-RC-ST-012	123
TYPICAL DETAILS OF EXPANSION JOINTS AND LINKED SLAB	SCR-RC-ST-013	124
TYPICAL DETAILS OF PIER TYPE "A1" HEIGHT ≤ 10.00 M. AND EXPANSION JOINT	SCR-RC-ST-101	125
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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: RAILWAY CROSSING
LIST OF DRAWINGS FOR RAILWAY CROSSINGS

DATE: Feb 18
SCALE: AS SHOWN
DWG. NO.: SCR-RC-GN-001
SHEET NO.: 108

A. GENERAL

DESIGN STANDARD

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5th EDITION, 2010
AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17th EDITION, 2002
ACI318M-08 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY (APPENDIX C. ADOPTED), 2008

DESIGN LOADING

VEHICLE : HIGHWAY LOADING HL-93 ACCORDING TO AASHTO LRFD
SIDEWALK : LIVE LOAD SHALL BE 500 KG/M.^{2}
WEARING SURFACE : A 50 MM. ASPHALTIC TOPPING OVER THE CONCRETE DECK IS PROVIDED. NO ADDITIONAL WEARING SURFACE WILL BE ALLOWED.
SEISMIC : HORIZONTAL ACCELERATION COEFFICIENT OF 0.175 WITH SOIL PROFILE TYPE II.

CONCRETE

CYLINDER COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS:

PRESTRESSED CONCRETE PILES	= 350 KG/CM.^{2}
PRESTRESSED CONCRETE PLANK & I-GIRDER	= 350 KG/CM.^{2}
CAST IN-SITU REINFORCED CONCRETE BRIDGE PIERS, FOOTINGS, ABUTMENT STRUCTURE AND APPROACH SLABS.	= 250 KG/CM.^{2}
CAST IN-SITU REINFORCED CONCRETE BRIDGE DECKS, BARRIERS, PARAPETS AND BEARING UNITS.	= 250 KG/CM.^{2}
LEAN CONCRETE	= 150 KG/CM.^{2}

UNLESS OTHERWISE NOTED, REQUIRED CYLINDER COMPRESSIVE STRENGTH AT TIME OF TRANSFER OF PRESTRESSED CONCRETE STRUCTURE SHALL BE AT LEAST 0.8 OF CYLINDER COMPRESSIVE STRENGTH AT 28 DAYS.

PRESTRESSING

1. THE PRESTRESSING SYSTEM TO BE USED IN THIS PROJECT SHALL BE SUBMITTED BY THE ENGINEER FOR APPROVAL.
2. PRESTRESSING STRANDS SHALL CONFIRM TO ASTM A416 GRADE 270 OR TIS 420, 7 WIRES STRANDS, LOW RELAXATION.
3. PRESTRESSING BAR SHALL CONFIRM TO ASTM A722 GRADE 150 WITH TENSILE STRENGTH OF AT LEAST 1,000 MPa.
4. TENDONS PROFILES ARE SPECIFIED TO THE CENTRE OF SHEATHING/DUCTING.
5. DUCTING FOR INTERNAL TENDONS SHALL BE RIGIDLY SUPPORTED AT NO MORE THAN 1000 MM. CENTRE AND SET OUT TO PROVIDE A SMOOTH PROFILE THROUGHOUT.
6. GROUT VENTS OR INLETS TO THE APPROVAL OF THE ENGINEER SHALL BE PROVIDED AT
   A. ALL ANCHORAGE.
   B. ALL LOW POINTS.
   C. ALL HIGH POINTS.
   D. AT ALL DEVIATORS.
7. PROPERTIES OF PRESTRESSING STRAND

PARAMENTER	INTERNAL
COEF. OF FRICTION (μ). /RAD.	0.3
WOBBLE FACTOR (K). /M.	0.0033 (IN SITU) 0.0033 (SEGMENTAL)
MAX. DRAG-IN, MM.	6
RELATIVE HUMIDITY	80 %

TYPE OF REINFORCING STEEL

HIGH YIELD DEFORMED BARS GRADE SD 40 ACCORDING TO TIS 24 SHALL BE USED FOR ALL BARS WITH DIAMETER 12 MM. TO 32 MM. UNLESS NOTED OTHERWISE.
MILD STEEL ROUND BARS GRADE SR 24 ACCORDING TO TIS 20 SHALL BE USED FOR BARS WITH DIAMETER 9 MM. OR SMALLER UNLESS NOTED OTHERWISE.

CUTTING

BARS SHALL BE SHEARED. FLAME CUTTING SHALL NOT BE PERMITTED UNLESS APPROVED BY THE ENGINEER.

ANCHORAGE LENGTH

THE ANCHORAGE LENGTH OF STRAIGHT DEFORMED BARS SHALL BE AT LEAST 40 BAR DIAMETERS, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

SPLICING OR LAP

REINFORCING BARS SHALL BE SPLICED BY LAPS UNLESS SHOWN OTHERWISE ON THE DRAWINGS.
LAP LENGTH SHALL BE EQUAL TO 40 DIAMETERS OF LARGER BAR OR EQUAL, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.
SPLICING OF BARS, NOT SHOWN IN THE DRAWINGS, SHALL BE APPROVED BY THE ENGINEER.
BARS DRAWN IN FULL LENGTH (ALSO CALLED CONTINUOUS BARS) SHALL HAVE AS FEW SPLICES AS POSSIBLE.
NO MORE THAN 50% OF REINFORCEMENT SHALL BE SPLICED WITHIN REQUIRED LAP LENGTH, EXCEPT WHERE SHOWN ON THE DRAWINGS.

BENDING & HOOKS

BEND & HOOKS DETAILS SEE DRAWING NO. ST-005.

SPACING

CLEAR HORIZONTAL DISTANCE BETWEEN BARS OR PAIRS OF BARS SHALL BE AT LEAST 40 MM.
CLEAR VERTICAL DISTANCE BETWEEN INDIVIDUAL BARS SHALL BE AT LEAST 25 MM.
CLEAR VERTICAL DISTANCE BETWEEN PAIRS OF BARS SHALL BE AT LEAST 40 MM.

CONCRETE COVER

UNLESS NOTED ON THE DRAWINGS THE FOLLOWING MINIMUM CONCRETE COVER (FROM FACE OF CONCRETE TO FACE OF BAR) SHALL BE PROVIDED:

BOTTOM OF ALL PILE CAPS	7.5 CM.
SIDE AND TOP OF PILE CAPS	5 CM.
SIDE AND TOP OF ALL COLUMNS, PIERS, ABUTMENTS AND WALLS	5 CM.
ALL FACES OF BOX CULVERTS AND CHANNEL TRANSITIONS	5 CM.
TOP OF ALL DECK SLABS	5 CM.
BOTTOM OF ALL DECK SLABS	2.5 CM.
ALL FACES OF BARRIERS, CURBS AND PARAPETS	3 CM.
TOP OF STAIRS AND STAIR SLABS	3.5 CM.
SIDE AND BOTTOM OF STAIRS AND STAIR SLABS	2.5 CM.
ALL FACES OF BEAMS, GIRDERS AND DIAPHRAGMS	4 CM.
TOP AND BOTTOM OF TRANSITION SLABS	5 CM.
ALL FACES OF MANHOLES	3.5 CM.

CHAMFERING

ALL EXPOSED CONCRETE CORNERS SHALL HAVE A 2.0 CM. CHAMFER UNLESS NOTED OTHERWISE.

CONCRETE EXPOSED TO SALINE OR ALKALINE

1. PILES, FOUNDATIONS AND PIERS EXPOSED TO SALINE SHALL BE PRODUCED BY USING CEMENT TYPE V . THE CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO THE NEAREST FACE OF REINFORCEMENT (CLEAR COVER) SHALL NOT BE LESS THAN 10 CM. CONSTRUCTION JOINTS SHALL NOT BE PERMITTED WITHIN THE RANGE OF SALINE LEVEL FLUCTUATION BETWEEN LOWEST AND HIGHEST LEVEL AS DETERMINED BY THE ENGINEER. SALINE SHALL NOT COME IN DIRECT CONTACT WITH CONCRETE EARLIER THAN 30 DAYS AT THIS PORTION.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL SHAPES AND PLATES, UNLESS SPECIFIED ON THE DRAWINGS, SHALL BE OF STRUCTURAL STEEL GRADE CONFORMING TO THE REQUIREMENTS STATED IN THE SPECIFICATIONS, WITH A MINIMUM YIELD STRENGTH OF 2400 KG/CM.^{2}
2. ALL STRUCTURAL STEEL PREFABRICATED WORKS INCLUDING THEIR FASTENERS SHALL BE GALVANIZED AS MENTIONED IN THE SPECIFICATIONS. THE WEIGHT OF ZINC COATING SHALL NOT BE LESS THAN 1,100 GRAMS/M.^{2}
3. ALL ANCHOR BOLTS SHALL BE GALVANIZED ONLY AT THE EXPOSED PORTIONS.
4. ALL WELDING SYMBOLS ARE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS).
5. SIZE, INCREMENT LENGTH AND PITCH OF WELD SHOWN ARE IN MILLIMETERS.

BEARING & EXPANSION JOINT

1. BEARING PAD FOR STRUCTURE SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH REQUIREMENTS OF EITHER AASHTO OR BS.5400 OR AUSROADS. THE LOADS, TRANSLATIONS AND ROTATIONS ARE AS SHOWN ON THE DRAWINGS.
2. EXPANSION JOINT SHALL CONFORM TO AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES 1996 DIVISION II SECTION 19.3.
3. THE CONTRACTOR SHALL PROVIDE A PRODUCTION GUARANTEE AT LEAST 15 YEARS FOR BEARING AND EXPANSION JOINTS.

STRUCTURAL SYMBOLS

- STRESSING END ANCHORAGE OF PRESTRESSING TENDON (AS SEEN ON ELEVATION)
- DEAD END ANCHORAGE OF PRESTRESSING TENDON (AS SEEN ON ELEVATION)
- STRESSING END ANCHORAGE OF PRESTRESSING TENDON WITH COUPLER (AS SEEN ON ELEVATION)
- SECTION THROUGH REINFORCED CONCRETE (W OR W/O REINFORCEMENT INDICATED)
- SECTION THROUGH PLAIN CONCRETE.
- SECTION THROUGH STRUCTURAL STEEL.
- SECTION THROUGH ASPHALTIC CONCRETE SURFACING.
- SECTION THROUGH SAND.
- BAR AS SEEN ON CROSS SECTION OR PLAN.
- BAR BENT PERPENDICULAR TO OR FROM READER.
- BAR LAP (CHOICE OF EITHER SYMBOL DEPENDS ON PARTICULAR CIRCUMSTANCES.)
- BREAK ON BAR.

BAR IDENTIFICATION

2x30-XX-2DB12 @ 0.20 (T)

- BAR LOCATION OR TYPE: T, B, NS, FS, HORZ, VERT, STIR,..etc.
- BAR SPACING IN METER C/C (ES=EQUAL SPACING)
- DIAMETER OF BAR IN MM.
- DB = DEFORMED BAR, RB = ROUND BAR
- NO. OF BARS IN BUNDLE (LEAVE BLANK IF NO BUNDLE) OR NO OF STIRRUPS.
- BAR MARK
- NO. OF BUNDLES OR BARS
- NO. OF LAYERS

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B. CONCRETE BRIDGE WORK

GENERAL NOTES ON DRAWINGS

BEFORE BRIDGE CONSTRUCTION BEGINS THE CONTRACTOR MUST CARRY OUT THE WORK AND REPORT THE FOLLOWING ITEMS TO THE ENGINEER FOR APPROVAL ;

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE NOTED.
2. CHECK THE PLAN AND PROFILE OF THE EXISTING ROAD, INCLUDING AT LEAST 300 M OF BRIDGE APPROACH PROFILE.
3. SURVEY OF WATERWAY CROSS SECTION, AT LEAST 3 LOCATIONS. THE FIRST ONE IS ALONG THE BRIDGE ALIGNMENT, AND THE OTHERS ARE AT APPROXIMATELY 50 M OF THE LEFT AND THE RIGHT OF THE BRIDGE. THE SURVEYED DATA SHALL BE PLOTTED FOR THE CORRECTION OF WATERWAY AND FOR APPROPRIATE LOCATION AND SIZE OF THE BRIDGE.
4. IN CASE THERE IS A DIFFERENT OF SKEW ANGLE FROM THE DESIGN DRAWINGS, OR THE BRIDGE IS SITUATED NEAR A WATERWAY BEND WHERE EROSION MAY OCCUR BUT THERE IS NO EROSION PROTECTION METHOD SPECIFIED IN THE DRAWINGS, REMEDIES MUST BE CONSIDERED.
5. CHECK THE CONSTRUCTION PROFILE AND TRANSFER THE LEVEL FROM THE BENCHMARK TO THE CONSTRUCTION SITE. IN CASE WHERE THERE ARE SEVERAL BENCHMARKS, THE CONTRACTOR SHALL INVESTIGATE AND FIND THE CORRELATION OF THESE BENCHMARKS, AND THEY MUST BE CORRELATED.
6. COMPARE ALL THE PREVIOUSLY OBTAINED INFORMATION OF THE DRAWINGS, E.G., BRIDGE DECK, PROFILE, BRIDGE LENGTH, HIGH WATER LEVEL, LOW WATER LEVEL, CLEARANCE, SKEW ANGLE, EROSION, BRIDGE SPAN AND APPROPRIATE LOCATION OF EACH FOUNDATION. IF THEY ARE NOT APPROPRIATE, FOR EXAMPLE, LENGTH IS SHORT, AND CLEARANCE IS NOT ENOUGH, THEY SHALL BE ADJUSTED TO SUIT THE ACTUAL FIELD CONDITIONS. IF THE DIFFERENCES ON IMPORTANT ITEMS ARE FOUND, THE ENGINEER SHALL REPORT THEM TO THE PROJECT'S OWNER.
7. THE CONTRACTOR SHALL INSTALL TRAFFIC REGULATING DEVICES DURING CONSTRUCTION ACCORDING TO THE SPECIFICATIONS FOR HIGHWAY CONSTRUCTION OF THE DEPARTMENT OF ROAD.
8. IN CASE THE BRIDGE TO BE CONSTRUCTED IS ON THE EXISTING ROAD WHICH IS OPEN TO TRAFFIC, THE CONTRACTOR SHALL BUILD A DETOUR BRIDGE OR DETOUR ROAD TO FACILITATE THE TRAFFIC AS FOLLOWS ;
   (a) THE CONTRACTOR MUST DESIGN AND BE RESPONSIBLE FOR CAUSING DAMAGES TO THE DETOUR BRIDGE. BEFORE DETOUR BRIDGE IS CONSTRUCTED, THE CONTRACTOR MUST SUBMIT THE DESIGN WHICH IS SIGNED BY ENGINEER TO THE ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL COMPLY TO THE RECOMMENDATIONS MADE BY THE ENGINEER FOR THE CHANGES OR ALTERATIONS OF THE DESIGN AS DEEMED APPROPRIATE. THESE CHANGES, HOWEVER, WILL NOT RELIEVE OR LESSEN THE CONTRACTOR FROM RESPONSIBILITY RESULTING FROM ANY DAMAGES THAT MAY OCCUR. WHEN DESIGNING THE DETOUR BRIDGE THE CONTRACTOR MUST DESIGN TO SUPPORT VEHICLE LOAD NOT LESS THAN HL-03.
   (b) BEFORE CLOSING THE TRAFFIC ON THE EXISTING ROAD TO USE THE DETOUR BRIDGE, PERMISSION IN WRITTEN FROM THE DEPARTMENT OF ROAD MUST BE ISSUED.
   (c) THE STANDARD OF THE DETOUR ROAD SURFACE MUST NOT BE LOWER THAN THAT OF PARTICULAR ROAD UNLESS CONCRETE PAVEMENT ASPHALT SURFACE CAN BE PROVIDED THROUGHOUT THE OPERATING PERIOD.
   (d) THE CONTRACTOR MUST TAKE CARE, MONITOR AND MAINTAIN DETOUR BRIDGE AND DETOUR ROAD IN GOOD CONDITION AND SAFE FOR USERS THROUGHOUT THE OPERATING PERIOD.
9. ALL CONSTRUCTION MATERIALS SHALL BE TESTED.
10. CHECK THE AMOUNT OF CONSTRUCTION MATERIALS ACCORDING TO THEIR NEEDS. THE CONTRACTOR IS NOT PERMITTED TO USE CONSTRUCTION MATERIAL WHICH THE RESULT OF TESTING IS NOT YET PASSED.
11. CHECK THE CONDITIONS, AMOUNTS AND TYPES OF NECESSARY TOOLS AND EQUIPMENT FOR CONSTRUCTION, INCLUDING THE AMOUNT OF LABOR WHETHER THEY ARE SUFFICIENT FOR THE WORKS.
12. WHEN THE CONTRACTOR PROPOSES TO DISMANTLE THE EXISTING BRIDGE, THE ENGINEER MUST CHECK THE STRUCTURAL MEMBERS AND PARTS THAT STILL CAN BE USED, LISTED, AND HANDED TO DEPARTMENT OF ROAD. DO NOT ALLOW THE CONTRACTOR TO TAKE THEM FOR USING UNLESS OTHERWISE SPECIFIED IN THE CONTRACT.
13. THE SPECIFIED PROFILE GRADE AND ELEVATIONS OF THE BRIDGE MAY BE MODIFIED TO SUIT THE FIELD CONDITIONS SUBJECT TO THE APPROVAL OF THE DEPARTMENT OF ROAD.
14. IT IS THE NECESSITY TO ADJUST THE SKEW ANGLE OF THE BRIDGE IF THE SKEW ANGLE SHOWN ON THE DRAWINGS DEVIATES FROM THE ACTUAL SKEW ANGLE.
15. THE METHOD OF CONSTRUCTION AND THE MAINTENANCE OF SAFETY DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR. IF ANY STRUCTURAL ELEMENT PRESENTS DIFFICULY IN RESPECT OF CONSTRUCTABILITY OR SAFETY, THE MATTER SHALL BE REFERRED TO THE PROJECT MANAGER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
16. DURING CONSTRUCTION THE STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERLOADED. TEMPORARY BRACING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR IN ORDER TO KEEP THE BRIDGE WORKS AND EXCAVATIONS MUST STABLE AT ALL TIMES.
17. ANY TECHNICALLY OBVIOUS DISCREPANCIES ON THE DRAWINGS SHALL BE ADJUSTED OR CORRECTED AND SUBJECT TO THE PROJECT MANAGER BEFORE PROCEEDING WITH THE WORK.
18. PRIOR TO THE COMMENCEMENT OF WORK, CONTRACTOR SHALL FIELD VERIFY ALL PIER LOCATIONS AND FINISH LEVEL OF BRIDGE.
19. ALL NESCESSARY MODIFICATION OF BRIDGE SHALL BE THE RESPONSIBILITY OF CONTRACTOR. THE CALCULATION DUE TO MODIFICATION SHALL BE SUBMIT TO THE PROJECT MANAGER FOR APPROVAL.
20. CONTRACTOR SHALL SUBMIT METHOD STATEMENTS OF ALL COFFERDAM CONSTRUCTIONS FOR APPROVAL BY THE ENGINEERS BEFORE THE BEGINNING OF FOUNDATION WORK.
21. CONTRACTOR TO REFER CONSTRUCTION SPECIFICATION.

C. PROCEDURES FOR FOUNDATION WORKS

PREPARATION

1. BEFORE THE FOUNDATION IS CONSTRUCTED, THE CONTRACTOR MUST SURVEY AND STUDY GEOLOGICAL CHARACTERISTICS TO CONFIRM THE SUITABLE TYPE OF FOUNDATION AS APPROVAL FROM THE ENGINEER.

SPREAD FOOTING

1. SPREAD FOOTING IS SUITABLE FOR HARD GROUND, GRAVELLY SOIL OR ROCK.
2. THE SOIL UNDERNEATH THE FOUNDATION MUST BE ABLE TO BEAR LOAD NOT LESS THAN THAT SPECIFIED IN DRAWINGS, WHICH APPROVAL IN WRITTEN FROM THE ENGINEER IS REQUIRED.
3. THE TOP OF THE FOOTING IN THE WATERWAY MUST BE EMBEDED AT LEAST 2.50 M BELOW THE GROUND, OR RIVER BED. ITS BASE SHELL BE FOUNDED IN THE SUB SOIL AT THE ELEVATION THAT THE RIVER SCOUR AND EROSION WILL NOT AFFECT TO THE BEARING CAPACITY. FOUNDATIONS NEAR THE BANKS SHALL BE LOCATED AS CLOSE TO THE DEPTH OF ADJACENT FOUNDATION IN THE WATERWAY AS POSSIBLE TO AVOID EROSION IN THE FUTURE OR AS DIRECTED BY ENGINEER.
4. IN CASE THE CONTRACTOR CANNOT EXCAVATE TO THE REQUIRED DEPTH, REPORT MUST BE SUBMITTED TO THE ENGINEER. IN CASE LOAD BEARING CAPACITY TEST IS NECESSARY, THE CONTRACTOR MUST BE RESPONSIBLE FOR ALL COSTS INCURRED.
5. THE LAYERS OF ALL INVESTIGATED SOIL STRATA AT EVERY FOUNDATIONS MUST BE CLEARY SHOWN.
6. LISTED THE ELEVATION OF ALL FINISHED FOUNDATIONS ON THE DRAWINGS.
7. THE DESIGN BEARING CAPACITY OF SOIL SHOWN ON DRAWINGS SHELL BE VERIFIED BY STATIC LOAD TEST BY CONTRACTOR IN EVERY LOCATION OF PIER. TEST METHOD TO BE APPROVED BY ENGINEER.

DRIVEN PILE

1. DRIVEN PILE IS SUITABLE FOR SOFT GROUND, OR WHERE THE FIELD CONDITION IS NOT SUITABLE FOR SPREAD FOOTING, SUCH AS IN DEEP WATER AND UNDRIED POND.
2. PILE THAT HAS BEEN DRIVEN AND CAN CARRY LOAD AS REQUIRED MUST HAVE PENETRATION DEPTH AT LEAST 1/3 OF THE DISTANCE FROM THE TIP OF THE PILE TO THE UNDERSIDE LEVEL OF THE CAP BEAM, AND MUST NOT LESS THAN 3.50 M.
3. WHEN THE PILE BEING DRIVEN DOES NOT HAVE ENOUGH LENGTH, THE CONTRACTOR MUST LENGTHEN TO THE REQUIRED LENGTH SPECIFIED IN THE DRAWINGS. WHEN THE EXTENDED SECTION HAS DEVELOPED ENOUGH STRENGTH, DRIVING MAY RESUME BY GENTLY DRIVING AT FIRST UNTIL THE PILE BEGINS TO SINK THEN NORMAL PILING OPERATION MAY CONTINUE UNTIL FINISH.
4. CONTRACTOR TO REFER TO PILE CONSTRUCTION SPECIFICATIONS.

D. PROCEDURE FOR PILE CAP, BEAM, SLAB AND OTHER STRUCTURES

PREPARATION

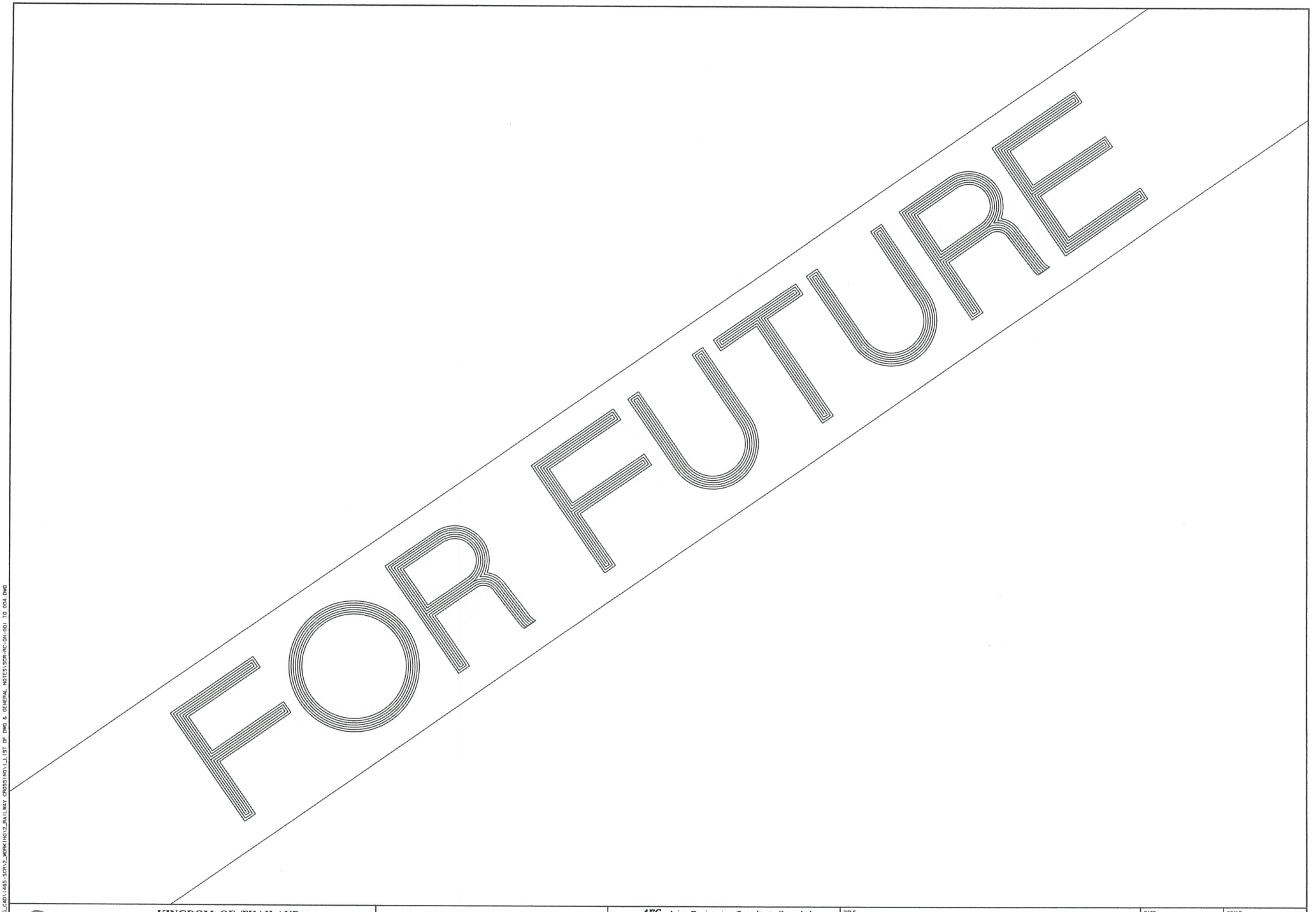
1. BEFORE STARTING OF PILE CAP CONSTRUCTION ALL SPANS LENGTH AND PILE SPACING MUST BE CHECKED. IF THEY ARE SOME ERRORS, THEY MUST BE CORRECTED. IF THEY CANNOT BE DONE BY SITE ENGINEER, THE ENGINEER MUST REPORT TO DEPARTMENT OF ROAD.
2. BEFORE STARTING OF BEAM CONSTRUCTION, THE SIZES AND PROFILES OF CAP BEAM AND OF BRACING MUST BE CHECKED AS SPECIFIED IN THE DRAWINGS
3. BEFORE STARTING OF DECK SLAB CONSTRUCTION, PROFILES OF SLABS AND THE LEVEL AND THE POSITIONS OF LOCATIONS OF DRAINAGE MUST BE LOCATED TO SUIT TOPOGRAPHY OF THE AREA.

AS-BUILT DRAWINGS AND RECORDS

UPON COMPLETION OF THE CONSTRUCTION, THE ENGINEER SHALL SUBMIT AS-BUILT DRAWINGS TO THE DEPARTMENT OF ROADS. A SET OF AS-BUILT DRAWINGS SHALL SHOW ANY CHANGES MADE TO THE CONTRACT DRAWINGS INCLUDING ACTUAL PILE TIP ELEVATIONS AND/OR FOOTING BASE ELEVATION.

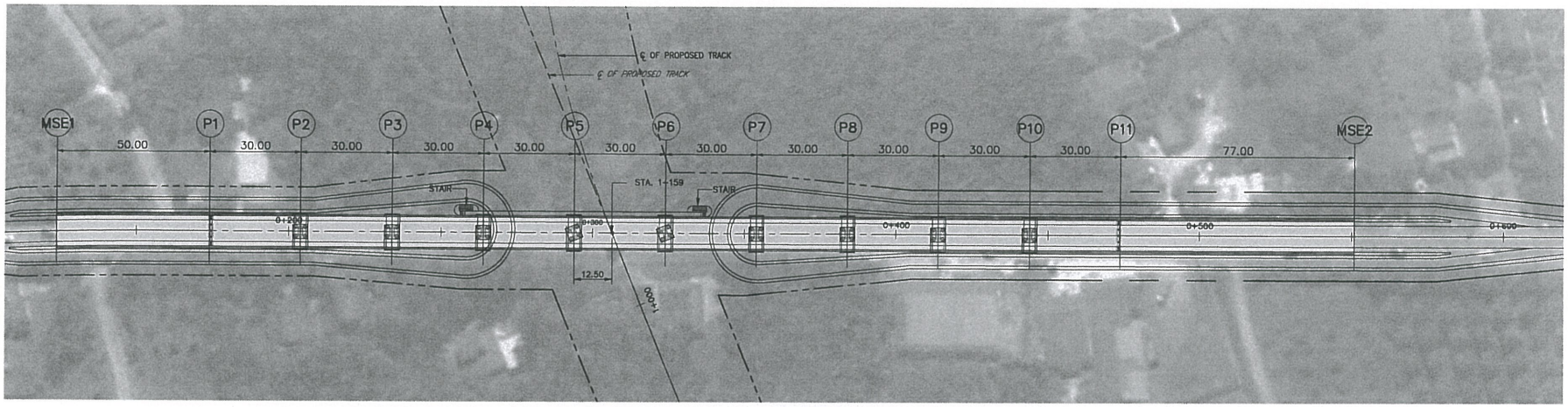
THE FOLLOWING DATA SHALL ALSO BE RECORDED

CONSTRUCTION COST KIP :_____
CONSTRUCTION COMMENCEMENT DATE :_____
CONSTRUCTION COMPLETION DATE :_____

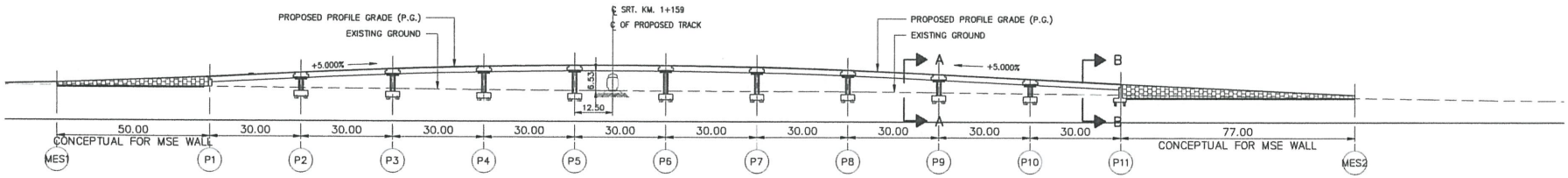


S:\WORKING_CAD\1465-SCR\2_WORKING\2_RAILWAY CROSSING\1_1ST OF DWG & GENERAL NOTES\SCR-RC-GN-001 TO 004.DWG

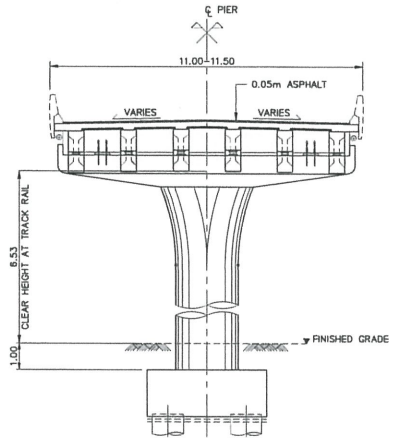
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING GENERAL NOTES FOR RAILWAY CROSSINGS SHEET 3	DATE: Feb 18 DWG. NO.: SCR-RC-GN-004	SCALE: AS SHOWN SHEET NO.: 111



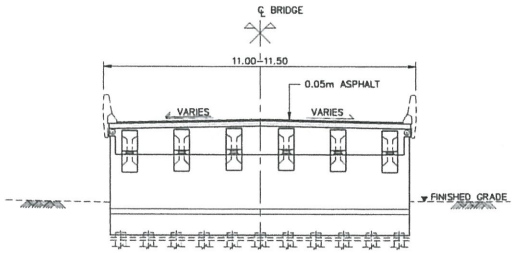
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A3=1:1500



ELELVATION
SCALE A1=1:750
A3=1:1500



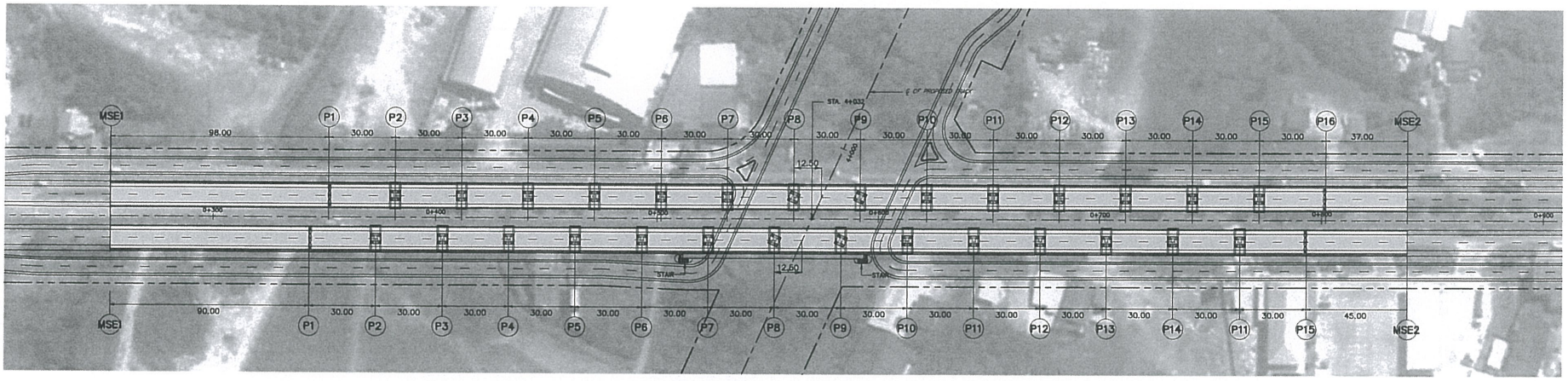
SECTION A–A
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A3=1:200



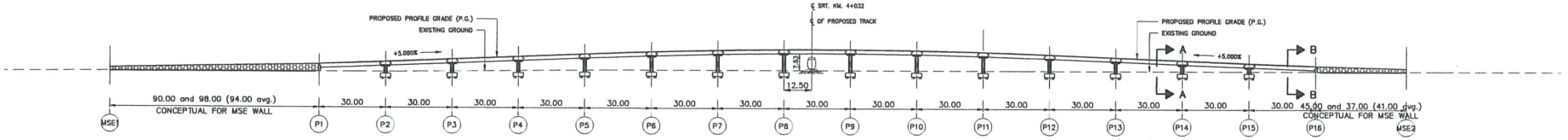
SECTION B–B
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A3=1:200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING OVERPASS BRIDE PLAN AND ELEVATION KM.1+159	DATE: Feb-18 DWG. NO.: SCR-RC-OP-LA-001	SCALE: AS SHOWN SHEET NO.: 112

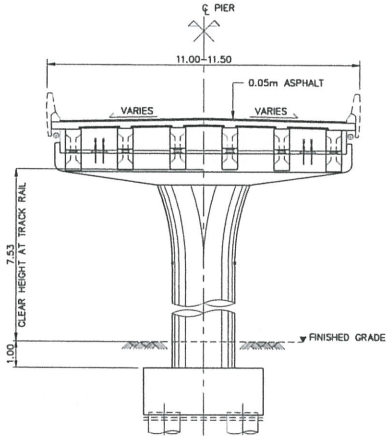
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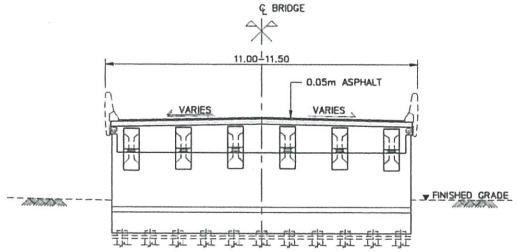
PLAN
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A3=1:2000



ELELVATION
SCALE A1=1:1000
A3=1:2000



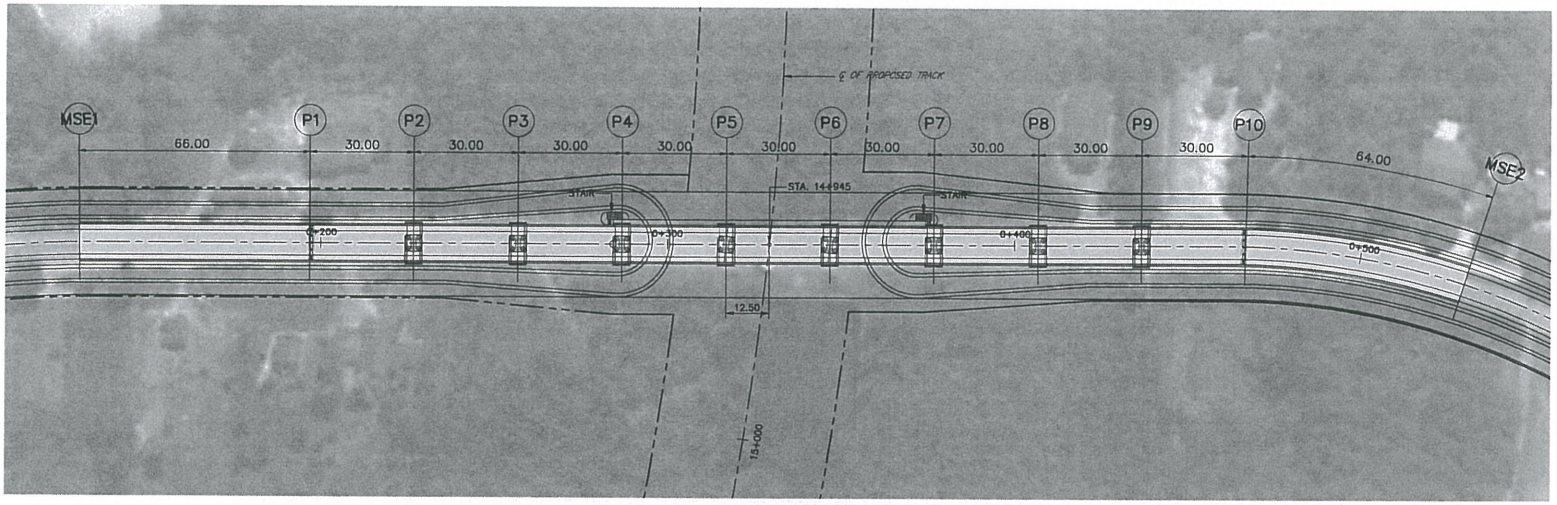
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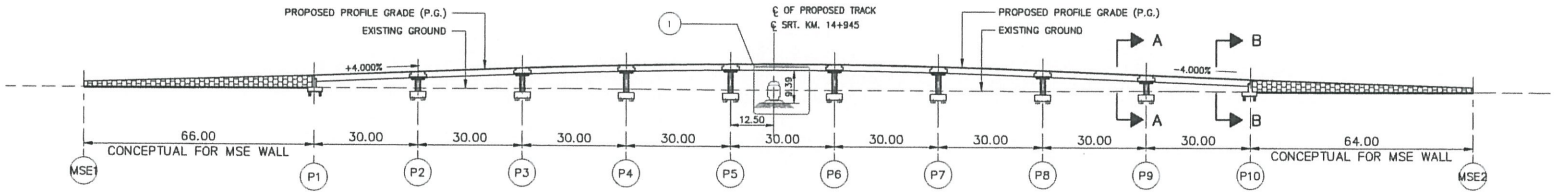
SECTION B–B
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING OVERPASS BRIDE PLAN AND ELEVATION KM.4+032	DATE: Feb-18 DWG. NO.: SCR-RC-OP-LA-002	SCALE: AS SHOWN SHEET NO.: 113

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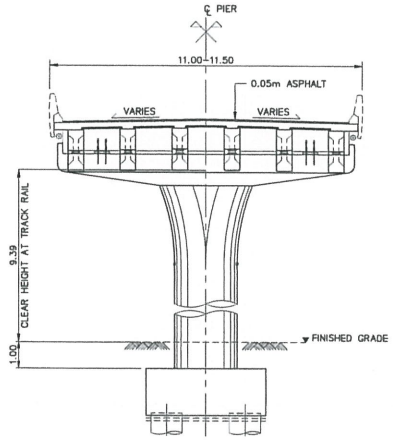
PLAN
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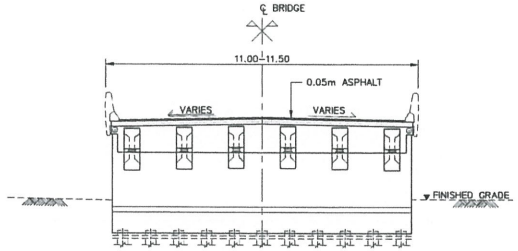
ELELVATION
SCALE A1=1:750
A3=1:1500

IMPORTANT NOTE :

(1) THE TRACK LINE AND EARTH WORKS SHALL BE CONFIRMED BY THE TRACK ENGINEER, HIGHWAY ENGINEER AND SOIL ENGINEER.



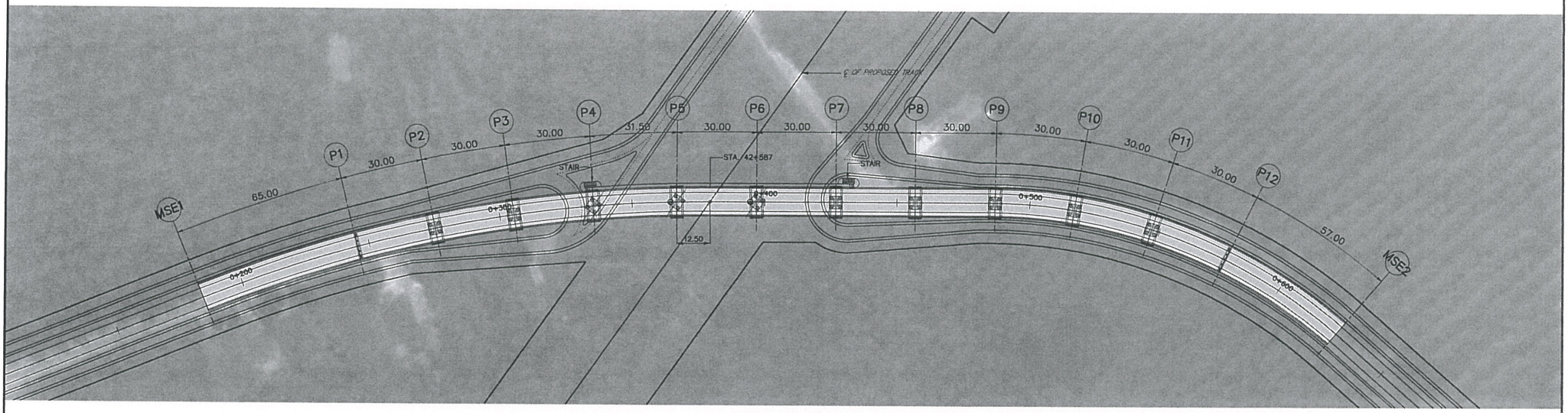
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SECTION B-B
SCALE A1=1:100
A3=1:200

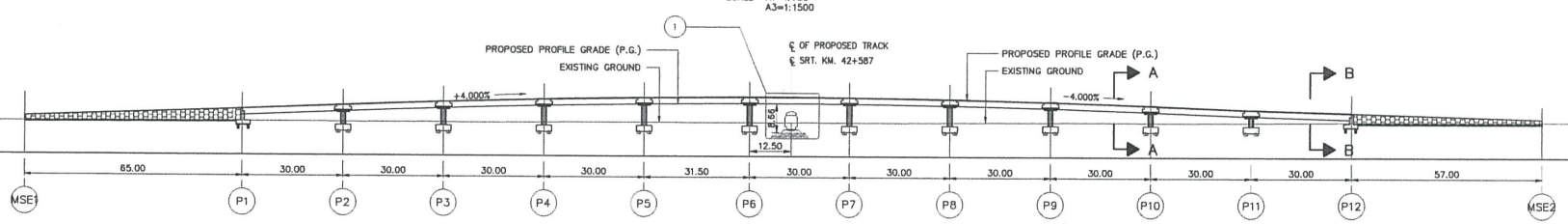
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING OVERPASS BRIDE PLAN AND ELEVATION KM.14+945	DATE : Feb-18 DWG. NO. : SCR-RC-OP-LA-003	SCALE : AS SHOWN SHEET NO. : 114

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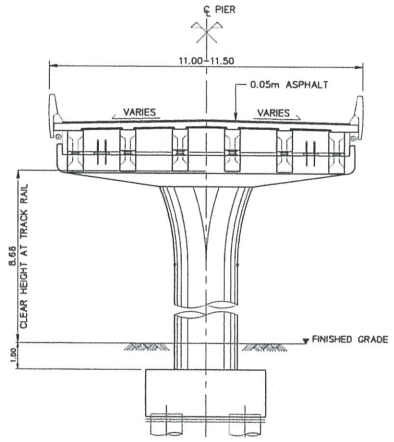
P L A N

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A3=1:1500



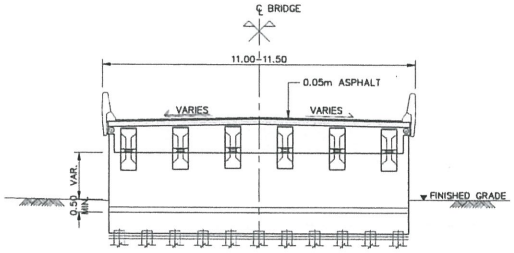
ELELVATION

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SECTION A–A

SCALE A1=1:100
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SECTION B–B

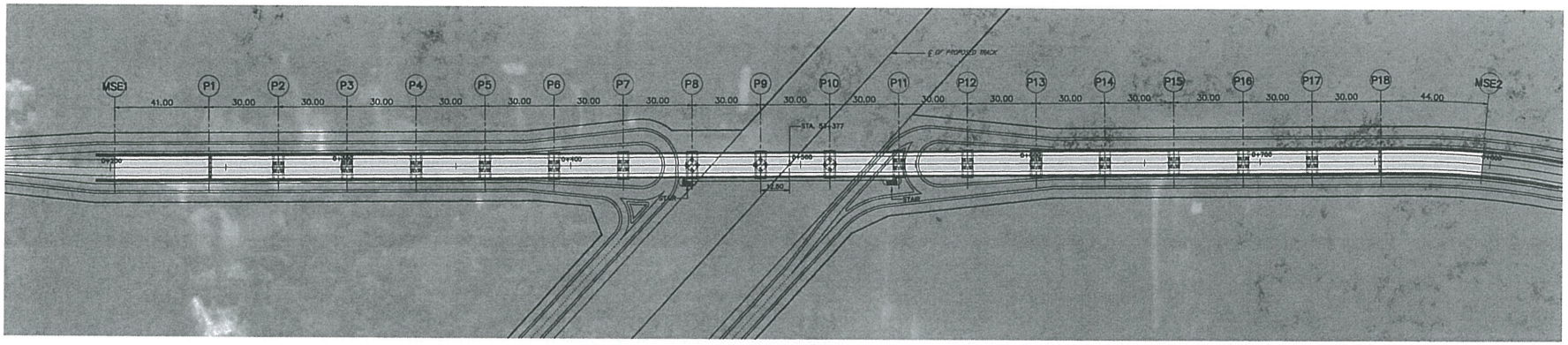
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IMPORTANT NOTE :

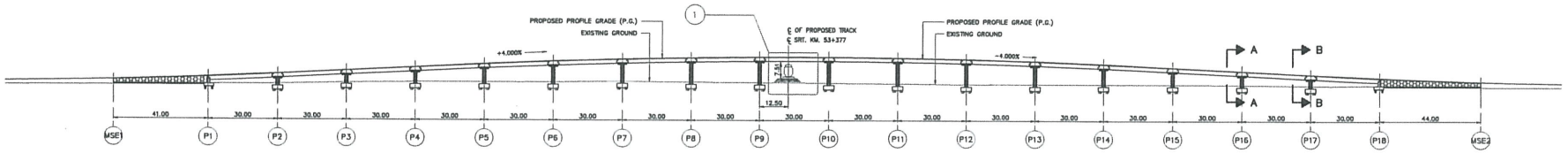
(1) THE TRACK LINE AND EARTH WORKS SHALL BE CONFIRMED BY THE TRACK ENGINEER, HIGHWAY ENGINEER AND SOIL ENGINEER.

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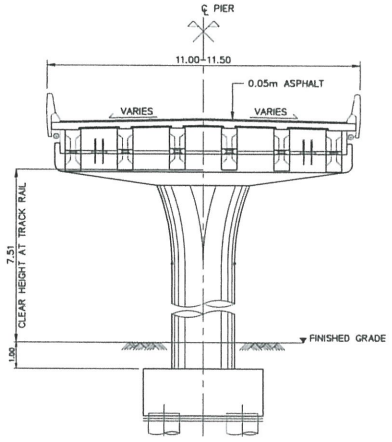
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING OVERPASS BRIDE PLAN AND ELEVATION KM.42+587	DATE : Feb-18 DWG. NO. : SCR-RC-OP-LA-004	SCALE : AS SHOWN SHEET NO. : 115



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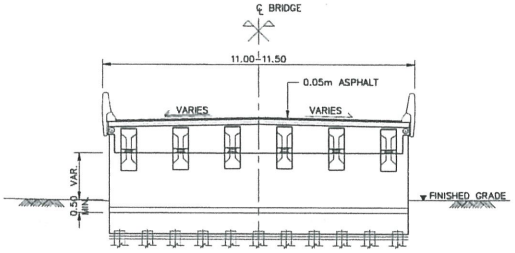
ELELVATION
SCALE A1=1:1000
A3=1:2000



SECTION A–A
SCALE A1=1:100
A3=1:200

IMPORTANT NOTE :

(1) THE TRACK LINE AND EARTH WORKS SHALL BE CONFIRMED BY THE TRACK ENGINEER, HIGHWAY ENGINEER AND SOIL ENGINEER.

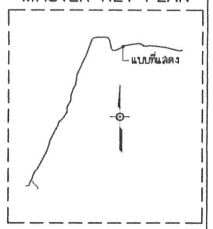


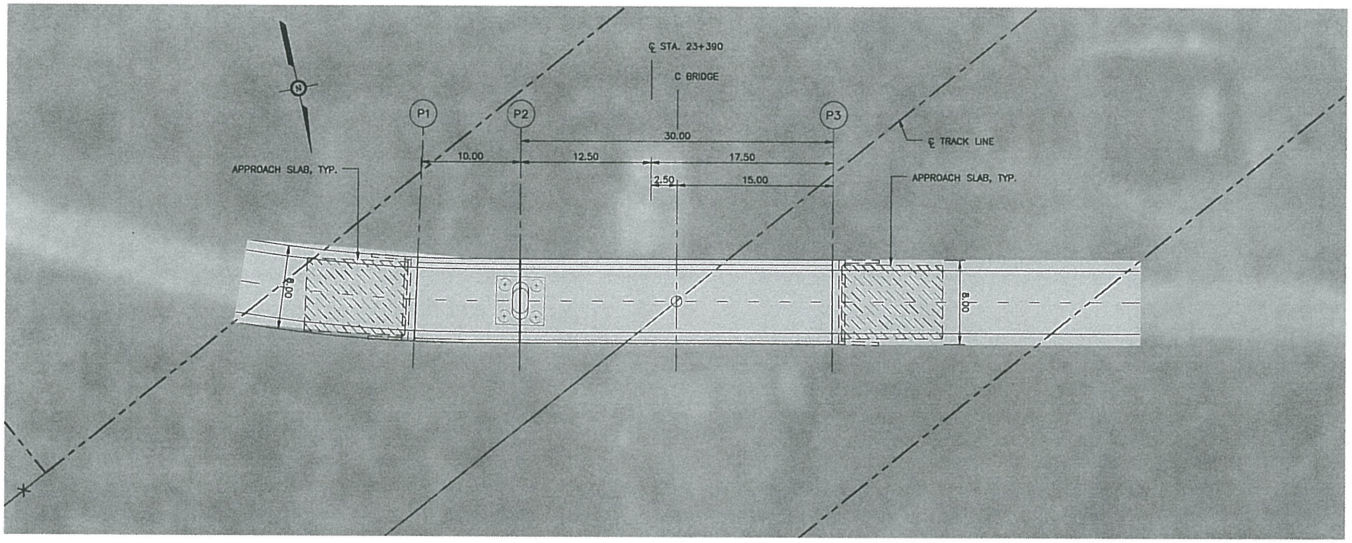
SECTION B–B
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A3=1:200

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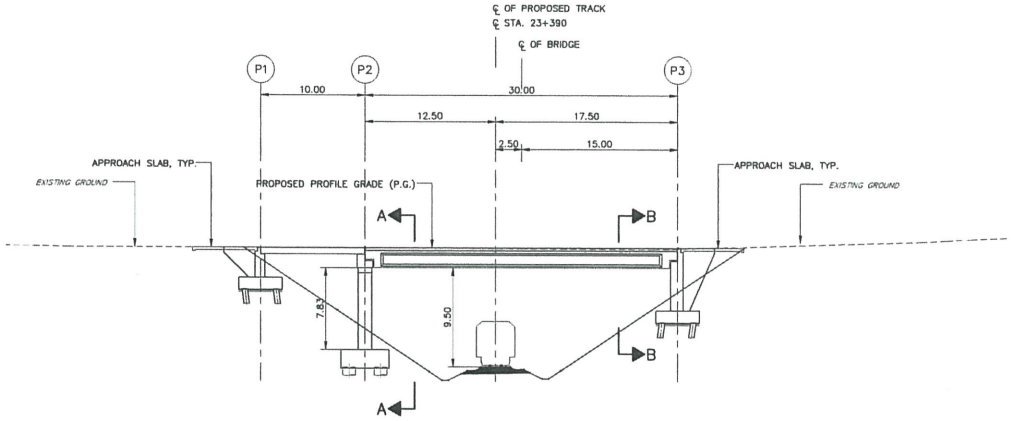
otp KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING OVERPASS BRIDE PLAN AND ELEVATION KM.53+377	DATE: Feb-18 DWG. NO.: SCR-RC-OP-LA-005	SCALE: AS SHOWN SHEET NO.: 116

MASTER KEY PLAN

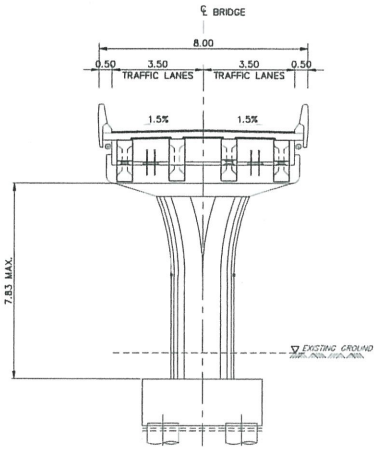




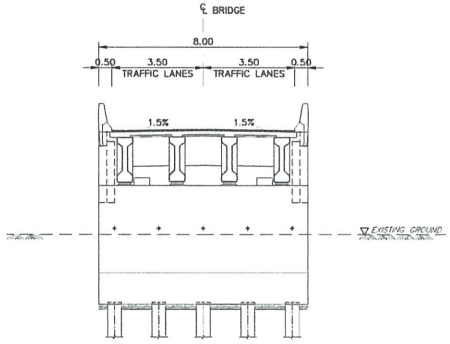
PLAN
SCALE A1=1:250
A3=1:500



ELELVATION
SCALE A1=1:250
A3=1:500



SECTION A–A
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A3=1:200



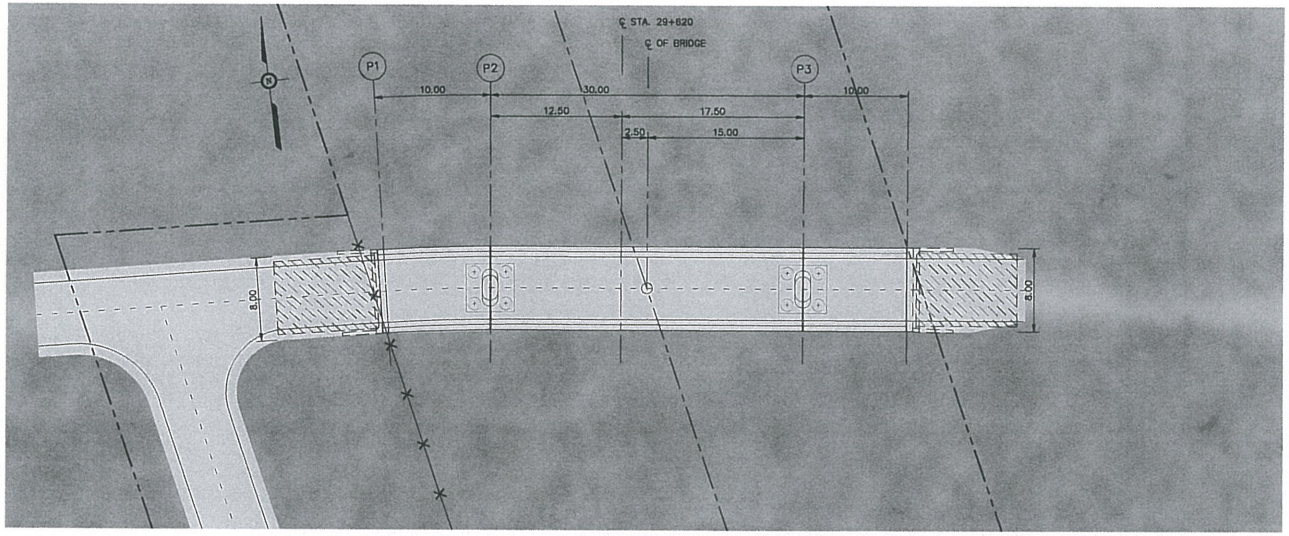
SECTION B–B
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A3=1:200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING CROSSING BRIDE PLAN AND ELEVATION KM.23+390	DATE : Feb-18 DWG. NO. : SCR-RC-CB-LA-001	SCALE : AS SHOWN SHEET NO. : 117

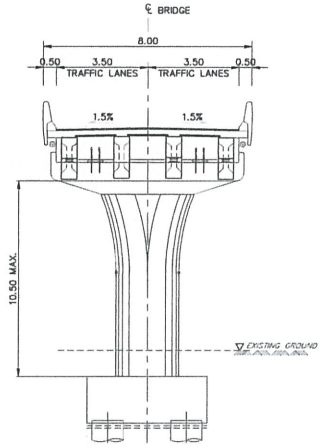
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MASTER KEY PLAN

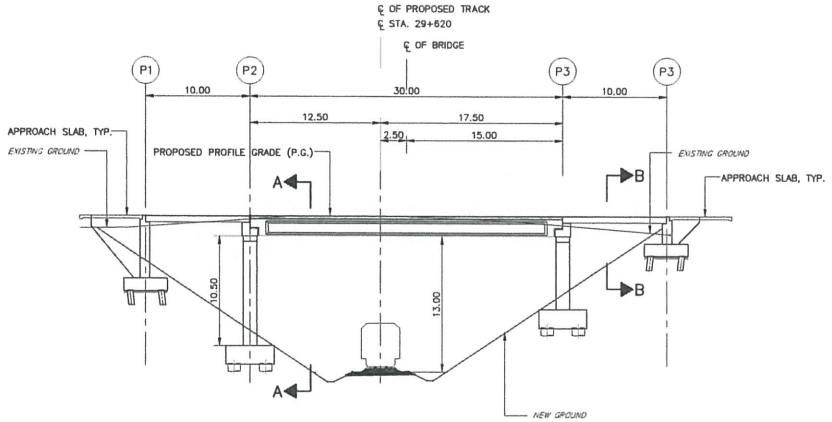




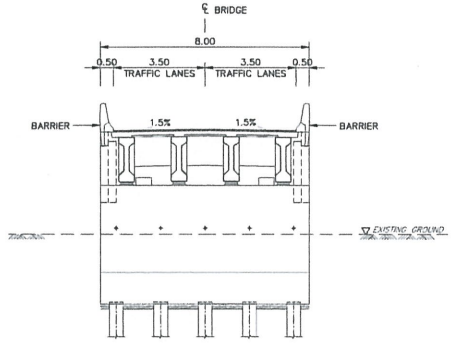
PLAN
SCALE A1=1:250
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SECTION A–A
SCALE A1=1:100
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ELELVATION
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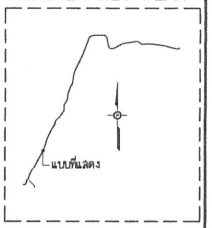


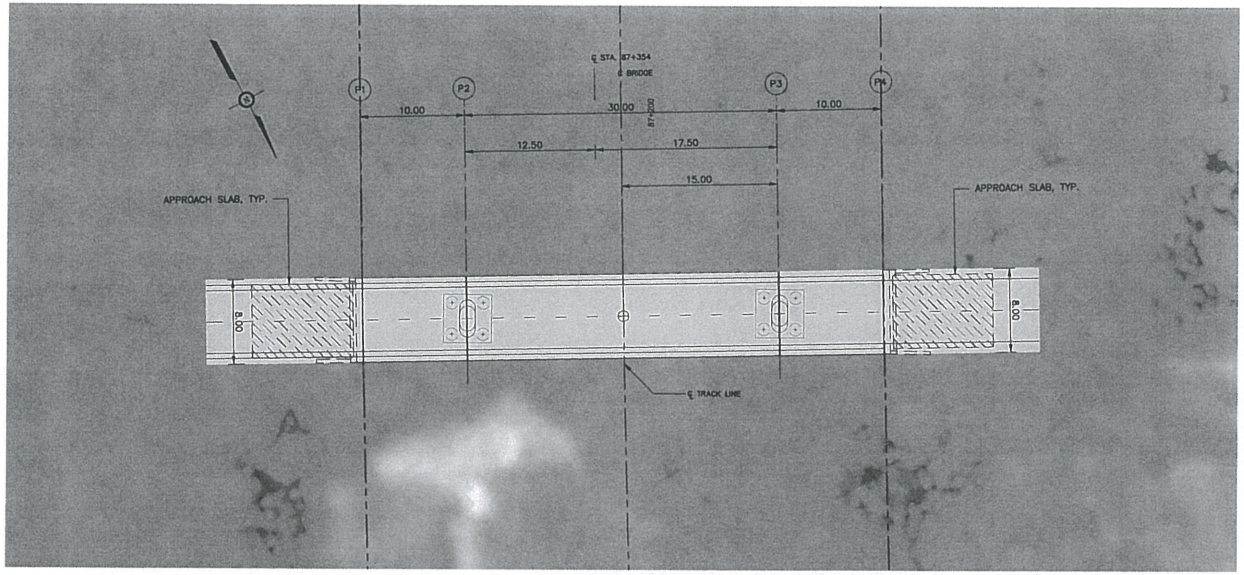
SECTION B–B
SCALE A1=1:100
A3=1:200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING CROSSING BRIDE PLAN AND ELEVATION KM.29+620	DATE : Feb-18 DWG. NO. : SCR-RC-CB-LA-002	SCALE : AS SHOWN SHEET NO. : 118

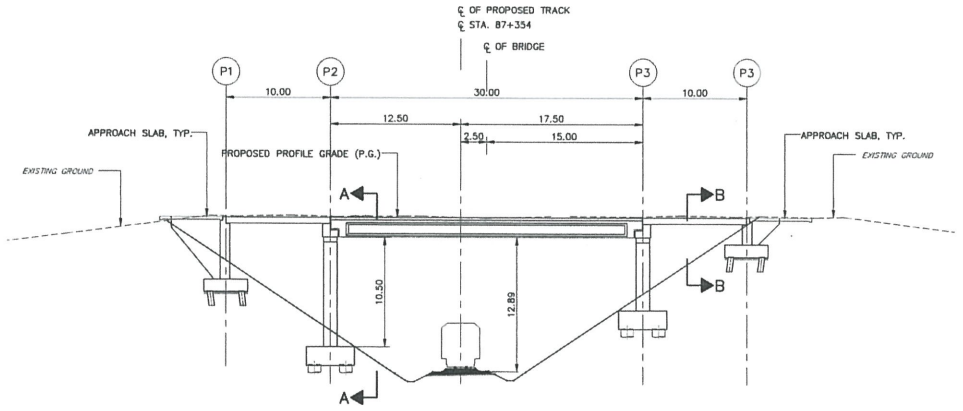
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MASTER KEY PLAN

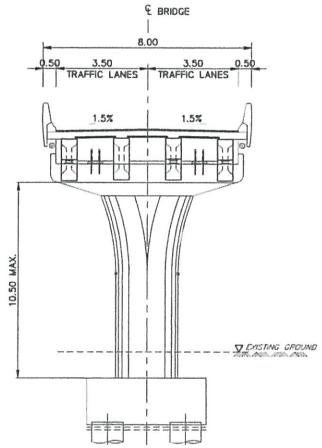




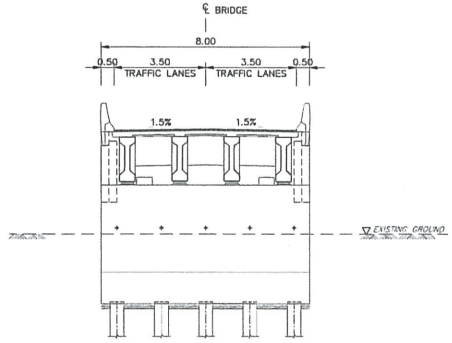
P L A N
SCALE A1=1:250
A3=1:500



ELELVATION
SCALE A1=1:250
A3=1:500



SECTION A–A
SCALE A1=1:100
A3=1:200

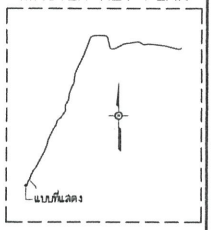


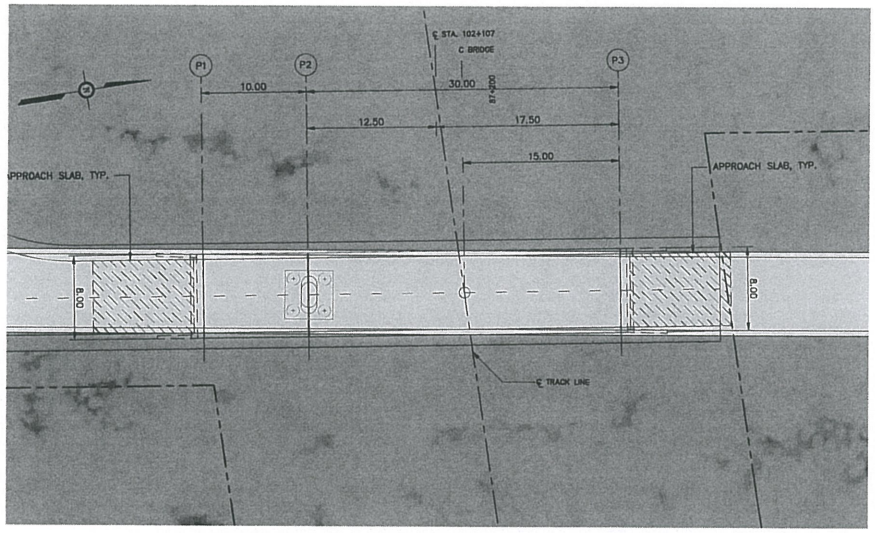
SECTION A–A
SCALE A1=1:100
A3=1:200

E:\WORKING_CAD\1465_SPR2_WORKING_2_RAILWAY CROSSING\SUBMITT ON 20180210 RAILWAY CROSSING\CAD\SCR-RC-CB-LA-003.DWG

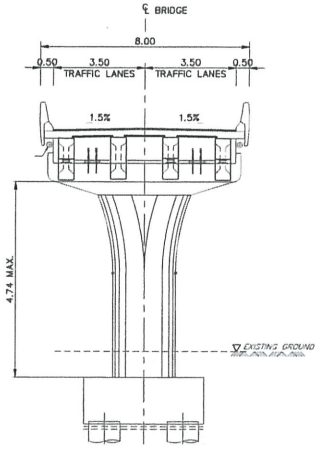
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING CROSSING BRIDE PLAN AND ELEVATION KM.87+354	DATE: Feb-18 DWG. NO.: SCR-RC-CB-LA-003	SCALE: AS SHOWN SHEET NO.: 119

MASTER KEY PLAN

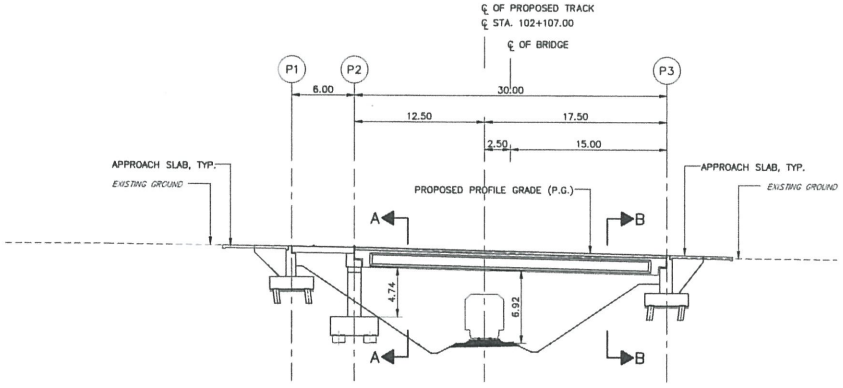




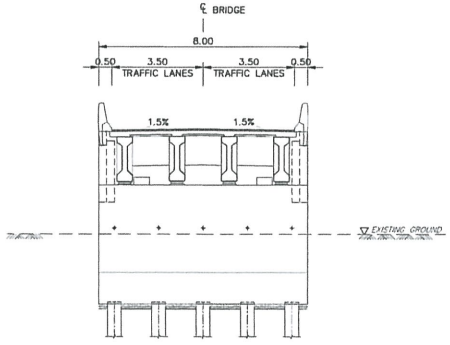
PLAN
SCALE A1=1:250
A3=1:500



SECTION A–A
SCALE A1=1:100
A3=1:200



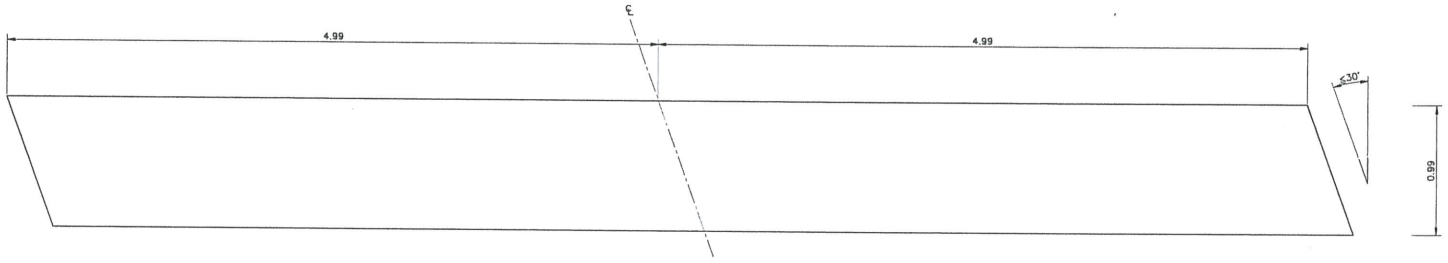
ELELVATION
SCALE A1=1:250
A3=1:500



SECTION B–B
SCALE A1=1:100
A3=1:200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING CROSSING BRIDE PLAN AND ELEVATION KM.102+107	DATE: Feb-18 DWG. NO.: SCR-RC-CB-LA-004	SCALE: AS SHOWN SHEET NO.: 120

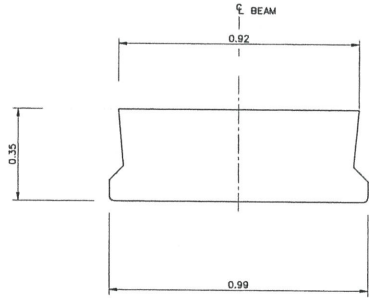
S:\WORKING_CAD\1465 SCR\2_WORKING\C_RAILWAY CROSSING\SUBMITT ON 20180219 RAILWAY CROSSING\CAD\SCR-RC-CB-LA-004.DWG



ROW 3

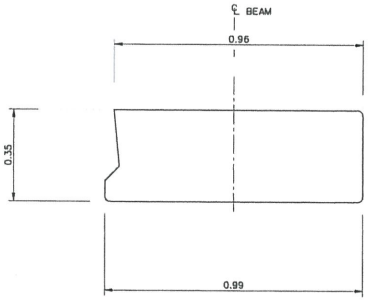
PLANK GIRDER PLAN

SCALE A1 = 1:20
A3 = 1:40



MIDSPAN VIEW OF INTERIOR GIRDER

SCALE A1 = 1:10
A3 = 1:20



MIDSPAN VIEW OF EXTERIOR GIRDER

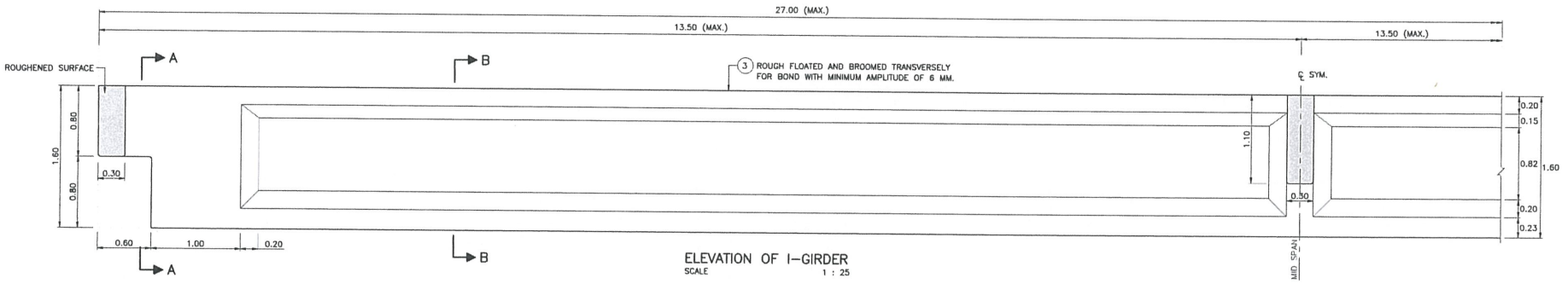
SCALE A1 = 1:10
A3 = 1:20

NOTES :

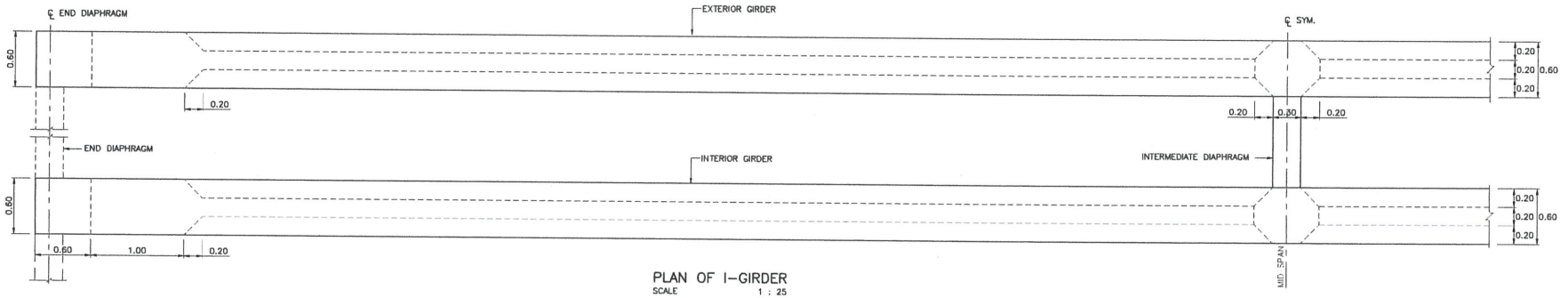
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED ON THE DRAWING.

S:\WORKING_CAD\1455-SCR_2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-001.DWG

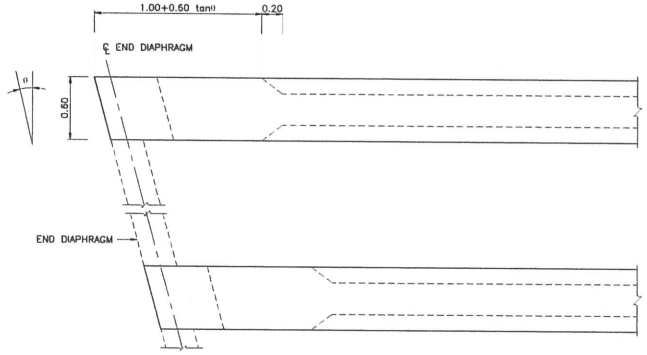
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL DETAILS OF PC. PLANK GIRDER	DATE: Feb 18 DWG. NO.: SCR-RC-ST-001	SCALE: AS SHOWN SHEET NO.: 121



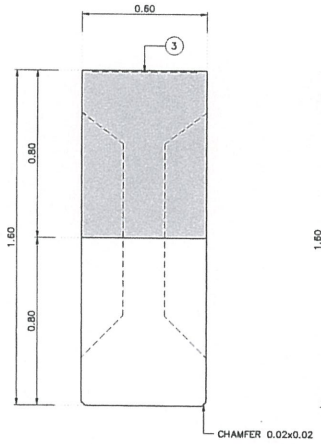
ELEVATION OF I–GIRDER
SCALE 1 : 25



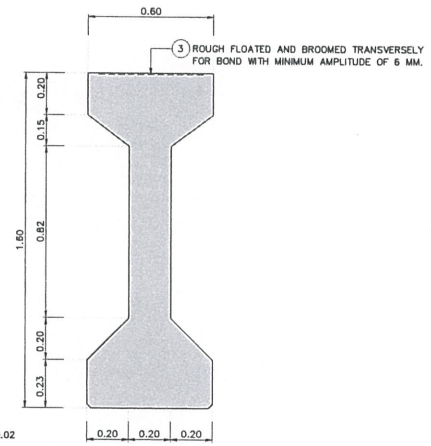
PLAN OF I–GIRDER
SCALE 1 : 25



PLAN OF SKEW I–GIRDER
SCALE 1 : 25



SECTION A–A
SCALE 1 : 12.5



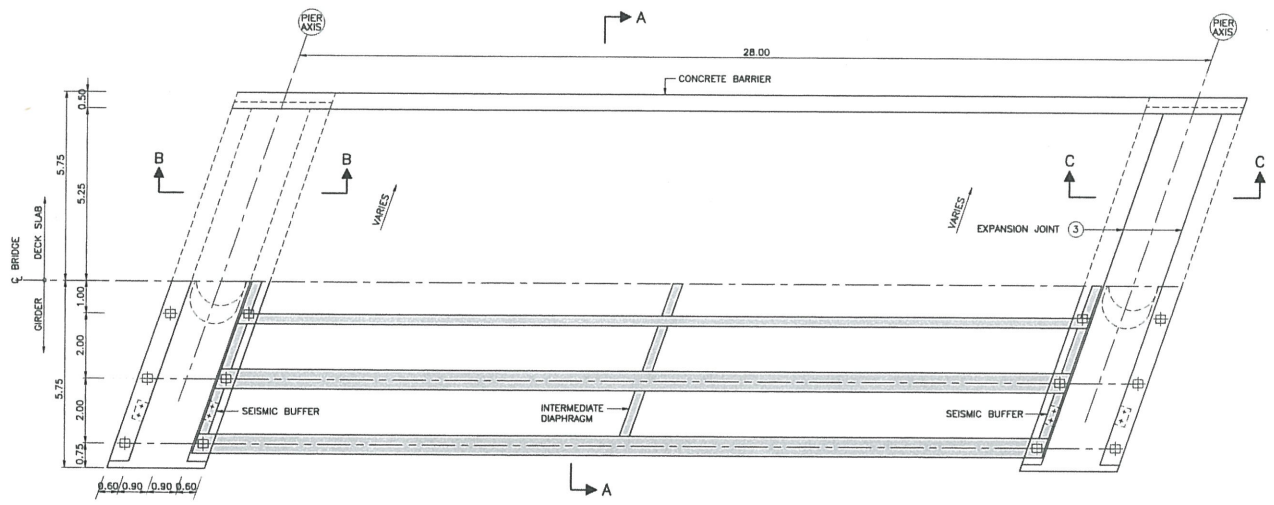
SECTION B–B
SCALE 1 : 12.5

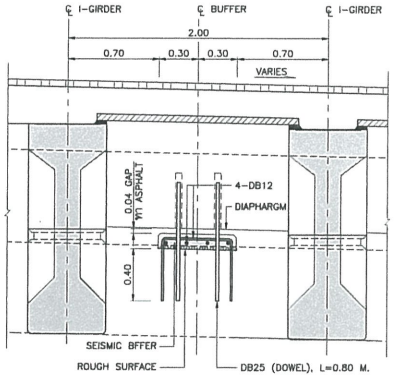
NOTE :

1. ALL DIMENSION ARE IN METRES UNLESS OTHERWISE INDICATED ON THE DRAWING.
2. ALL EXPOSED SHALL BE CHAMFERED 0.02x0.02 M. UNLESS OTHERWISE INDICATED.
3. TOP SURFACES SHALL BE INTENTIONALLY ROUGHENED TO MINIMUM AMPLITUDE OF 6 MM. BEFORE CONCRETING OF DECK SLAB.

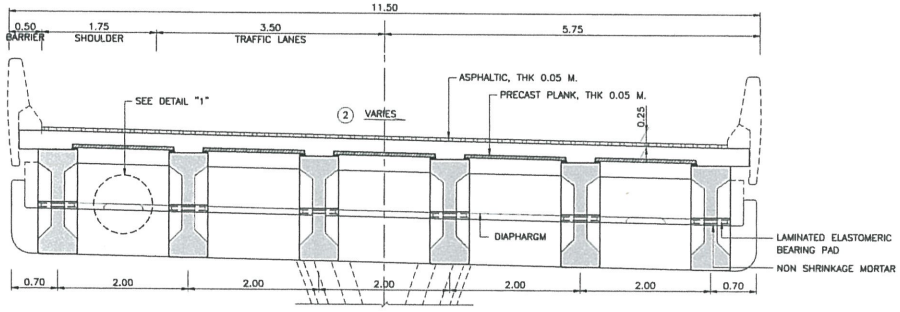
S:\WORKING_CAD\1465-SCR\2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-011.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF PC. I–GIRDER FOR SPAN LENGTH 30.00 M.	DATE: Feb 18 DWG. NO.: SCR–RC–ST–011	SCALE: AS SHOWN SHEET NO.: 122

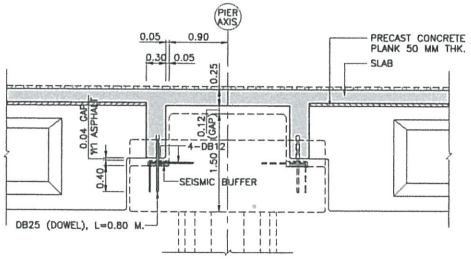




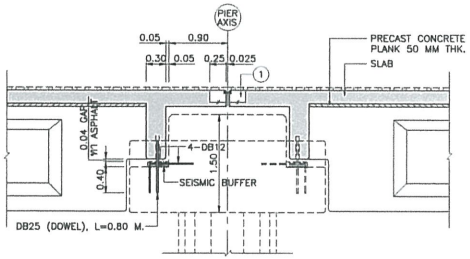
DETAIL "1", SEISMIC BUFFER
SCALE 1 : 20



SECTION A – A
SCALE 1 : 40



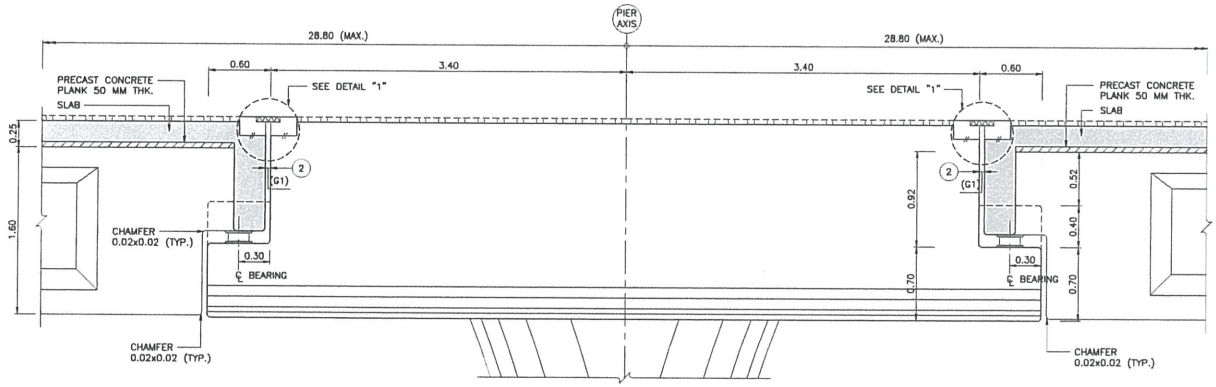
SECTION B – B
SCALE 1 : 40



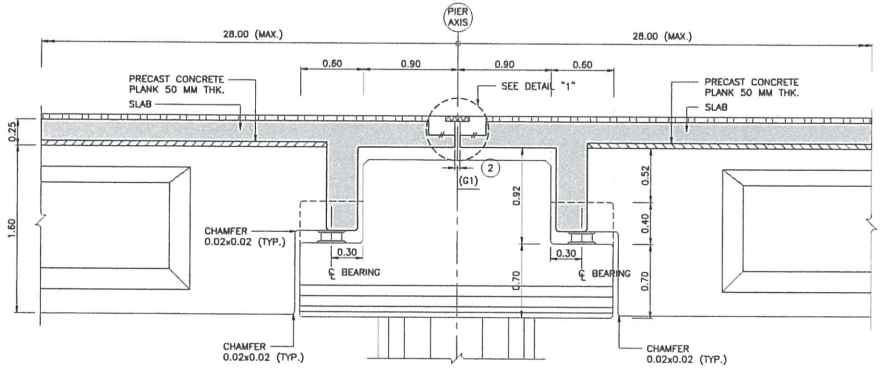
SECTION C – C
SCALE 1 : 40

S:\WORKING_CAD\1455-SCR_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-012.DWG

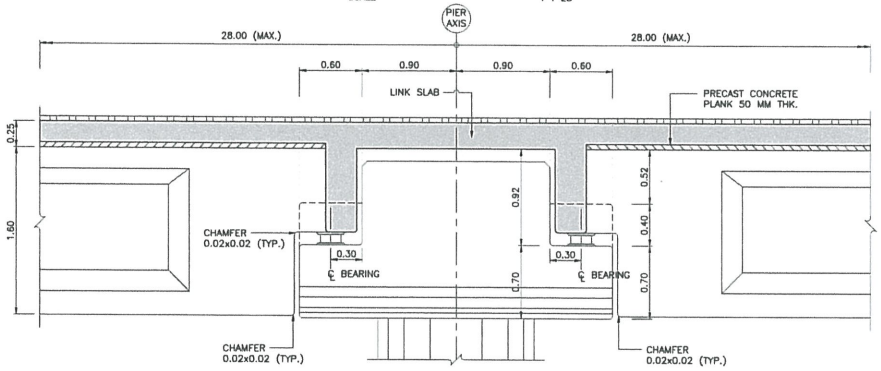
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF SLAB AND DIAPHRAGM FOR PC. I-GIRDER	DATE: Feb 18 DWG. NO.: SCR-RC-ST-012	SCALE: AS SHOWN SHEET NO.: 123



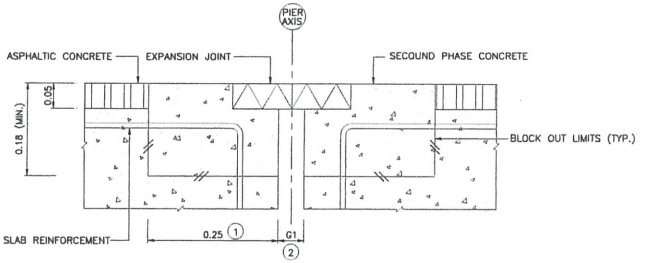
EXPANSION JOINT 2 (EXP.2)
SCALE 1 : 25



EXPANSION JOINT 1 (EXP.1)
SCALE 1 : 25



LINK SLAB (LK.)
SCALE 1 : 25

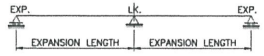


DETAIL "1", EXPANSION JOINT DEVICE
SCALE 1 : 5

NOTE :

(1.) SHAPE DEPEND ON EXPANSION JOINT SIZE.

(2.) EXPANSION JOINT
- INITIAL GAP (G1) = 50 mm
- TOTAL MOVEMENT AND PRE COMPRESSION ARE SHOWN ON THE TABLE.



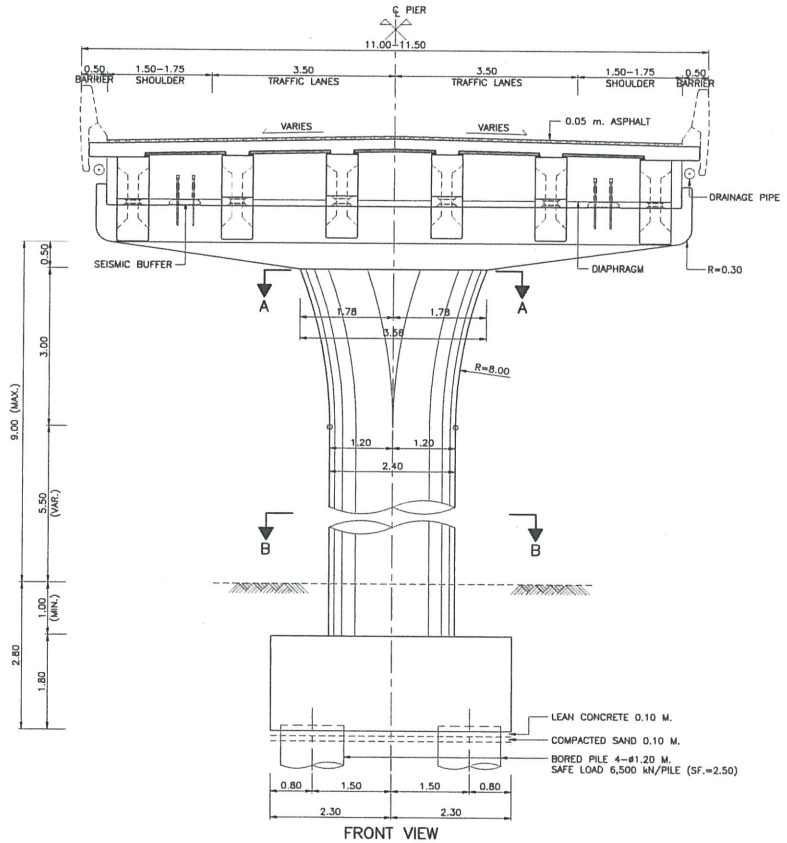
EXPANSION LENGTH (m.)	MOVEMENT (mm.)	TOTAL CAPACITIES (mm.)	PRE-COMPRESSION (mm.)
30	11	30 (±15)	5
60	33	60 (±30)	10

3. EXPANSION JOINT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATION.

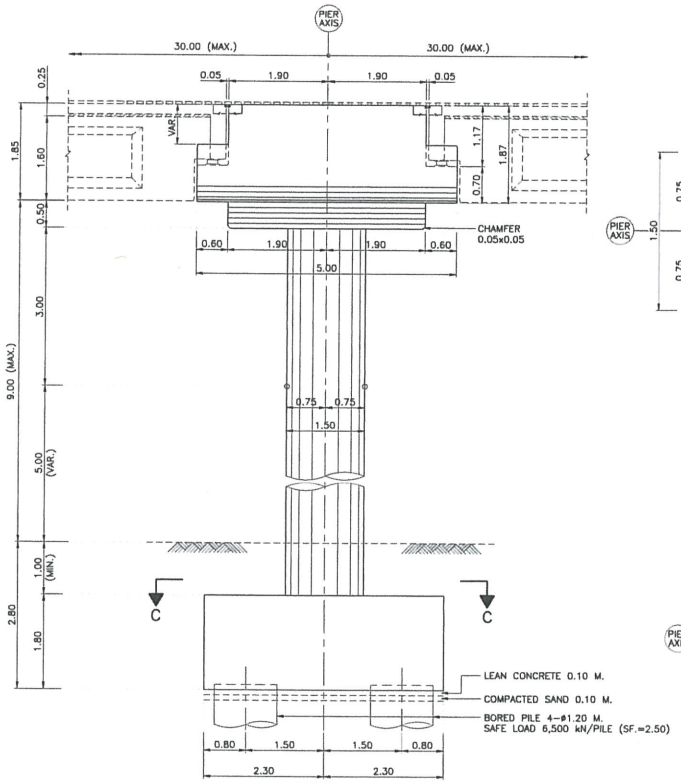
4. REINFORCING BAR ALONG EXPANSION JOINT SHALL BE ARRANGED TO SUIT THE INSTLLATION REQUIREMENTS OF THE EXPANSION DEVICE.

S:\WORKING_CAD\1485-SCR\2_WORKING\12_RAILWAY_CROSSING\3_STRUCTURAL\SCR-RC-ST-013.DWG

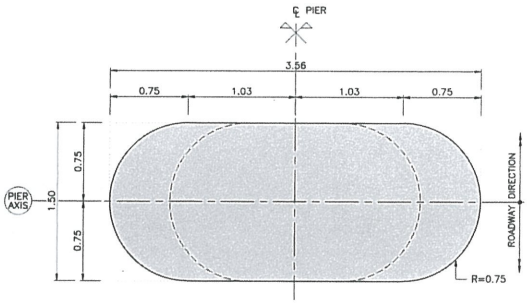
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF EXPANSION JOINTS AND LINKED SLAB	DATE: Feb 18 SCALE: AS SHOWN DWG. NO.: SCR-RC-ST-013 SHEET NO.: 124



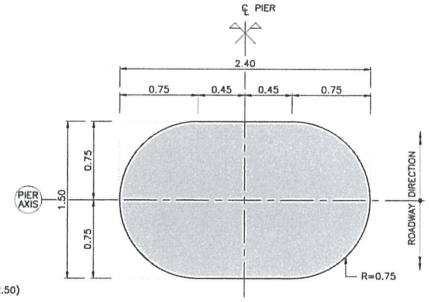
FRONT VIEW
SCALE 1 : 50



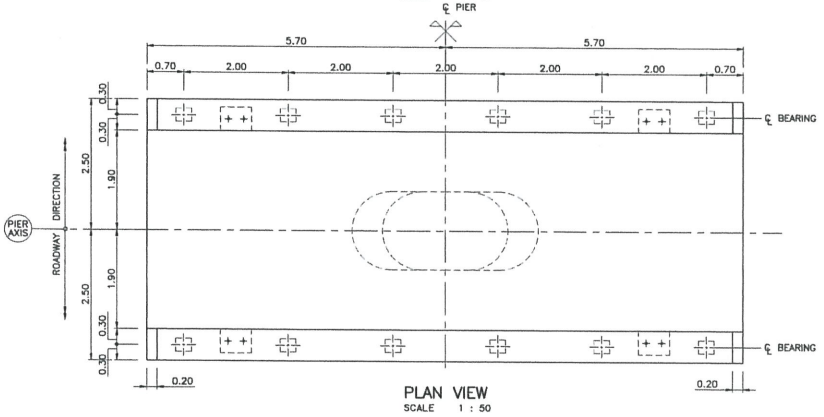
SIDE VIEW
SCALE 1 : 50



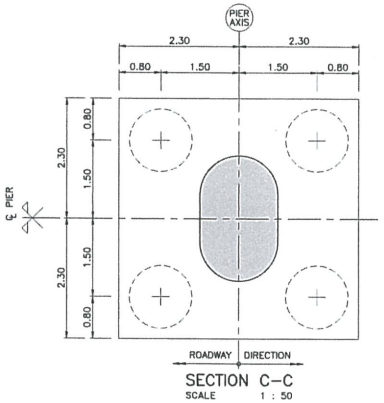
SECTION A–A
SCALE 1 : 25



SECTION B–B
SCALE 1 : 25



PLAN VIEW
SCALE 1 : 50



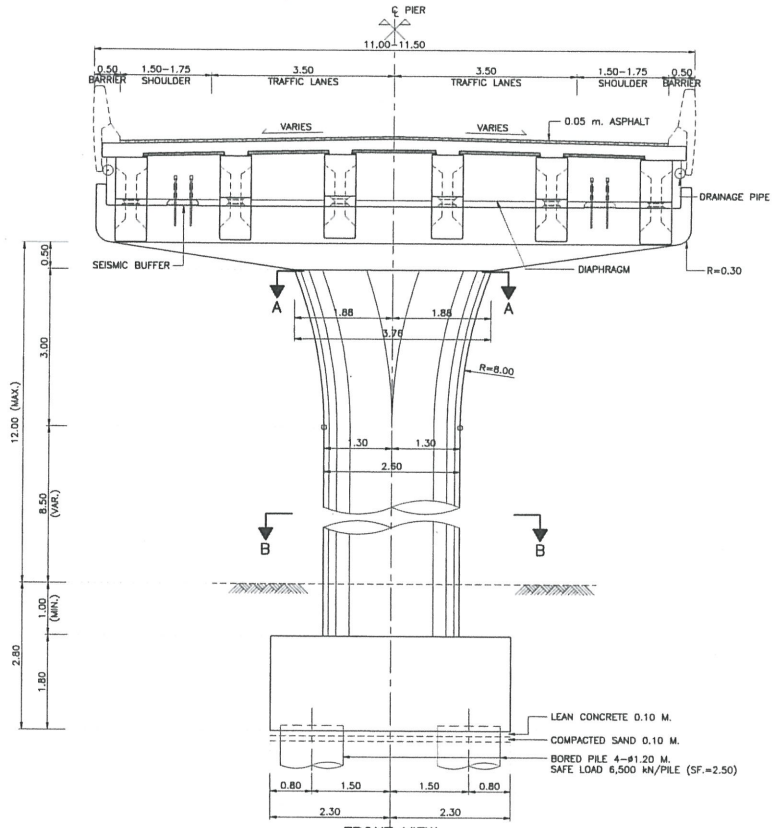
SECTION C–C
SCALE 1 : 50

NOTE :

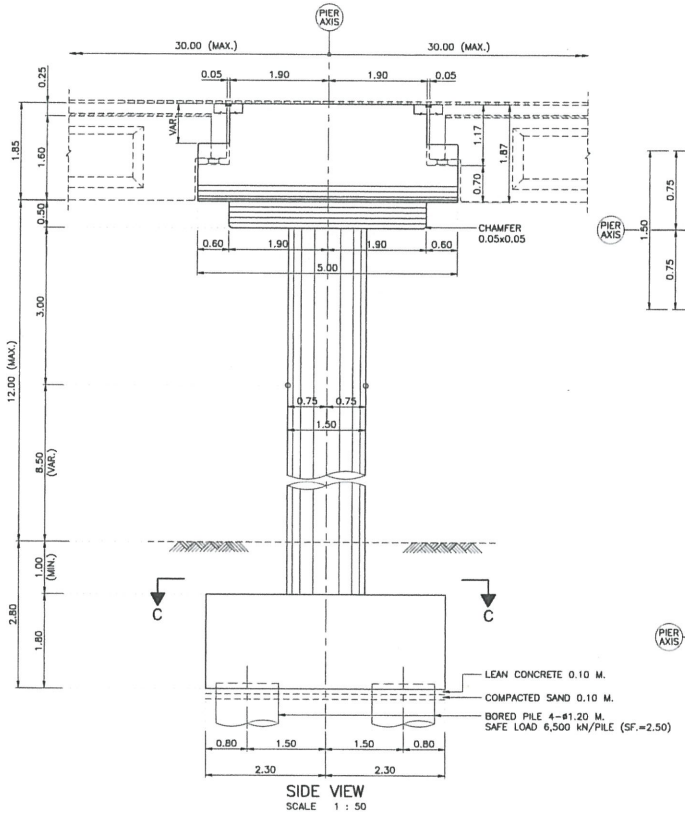
1. COLUMN STATION AND SPAN LENGTH ARE MEASURED ALONG THE CENTER LINE BRIDGE.
2. CROSS FALL SLOPE ACCORDING TO SUPERELEVATION ALONG CONTROL LINE.
3. FOR ADJACENT PIERS SHALL PROVIDED PILE TIP AT SAME LEVEL.

S:\WORKING_CAD\1465-SCR\3_WORKING\3_STRUCTURAL\SCR-RC-ST-101.DWG

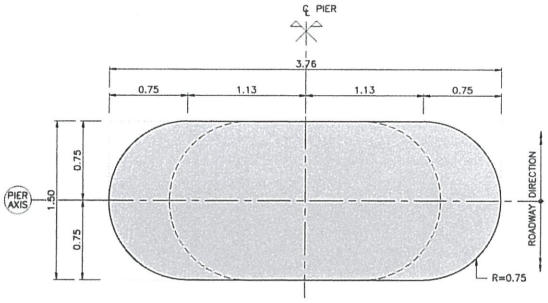
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF PIER TYPE "A1" HEIGHT ≤ 10.00 M. AND EXPANSION JOINT	DATE: Feb 18 SCALE: AS SHOWN DWG. NO.: SCR–RC–ST–101 SHEET NO.: 125



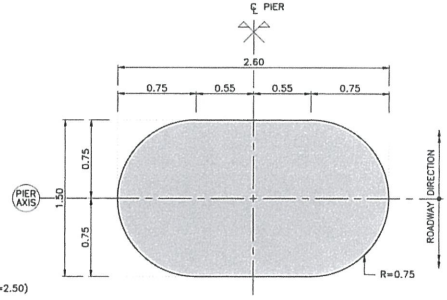
FRONT VIEW
SCALE 1 : 50



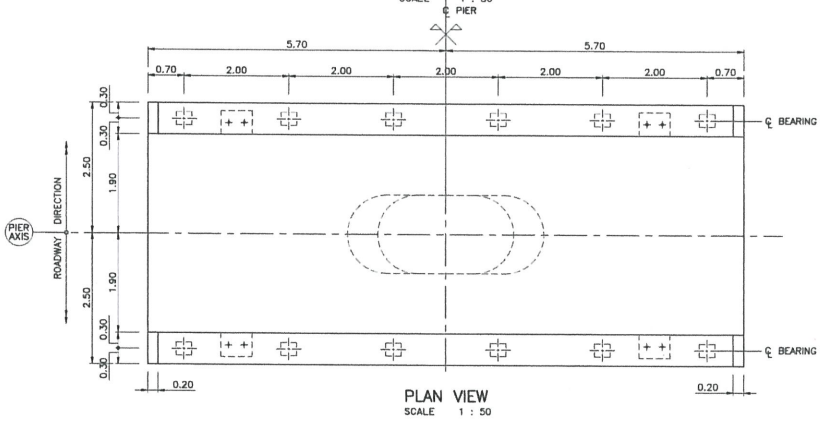
SIDE VIEW
SCALE 1 : 50



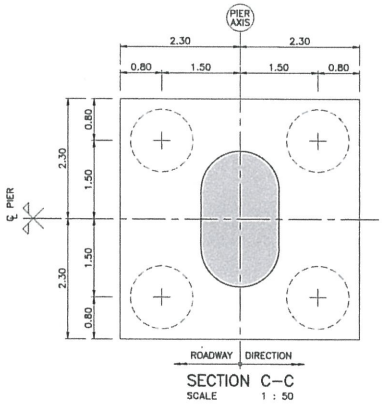
SECTION A–A
SCALE 1 : 25



SECTION B–B
SCALE 1 : 25



PLAN VIEW
SCALE 1 : 50



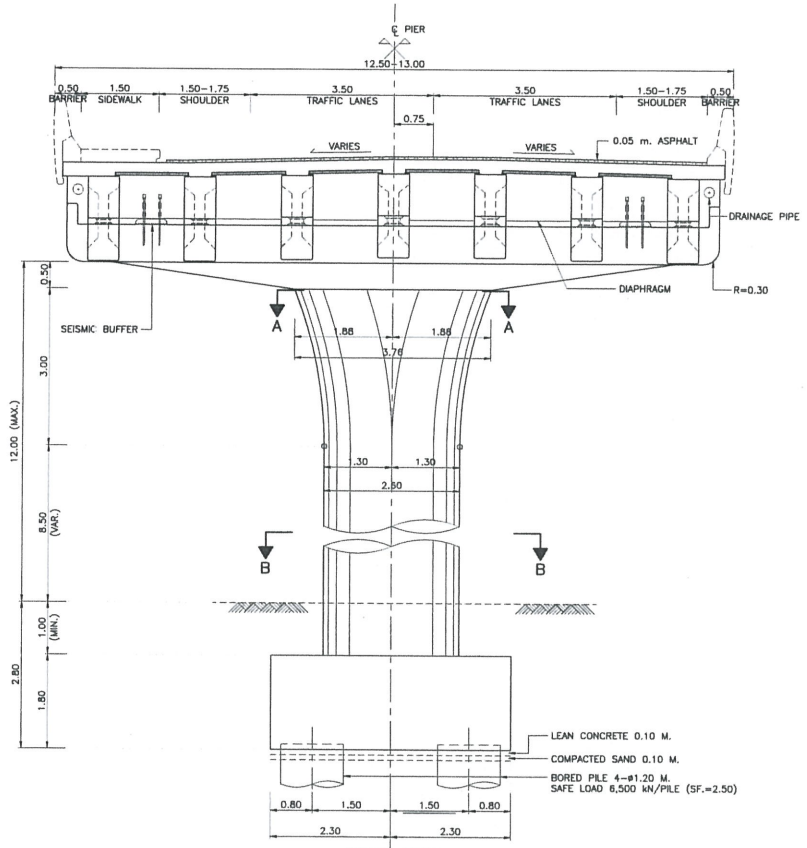
SECTION C–C
SCALE 1 : 50

NOTE :

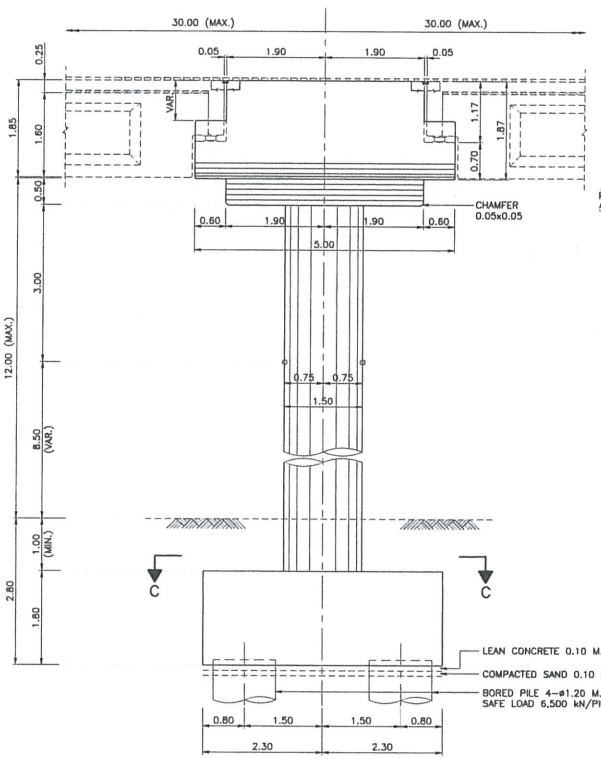
1. COLUMN STATION AND SPAN LENGTH ARE MEASURED ALONG THE CENTER LINE BRIDGE.
2. CROSS FALL SLOPE ACCORDING TO SUPERELEVATION ALONG CONTROL LINE.
3. FOR ADJACENT PIERS SHALL PROVIDED PILE TIP AT SAME LEVEL.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL DETAILS OF PIER TYPE "A2" 10.00 M. ≤ HEIGHT ≤ 13.00 M. AND EXPANSION JOINT	DATE : Feb–18 DWG. NO. : SCR–RC–ST–102	SCALE : AS SHOWN SHEET NO. : 126

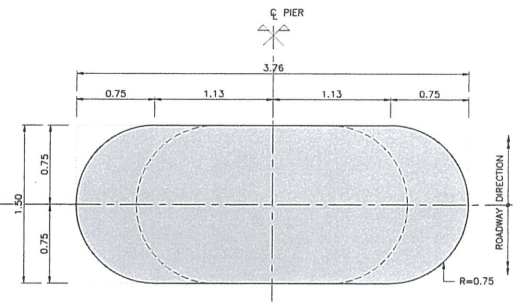
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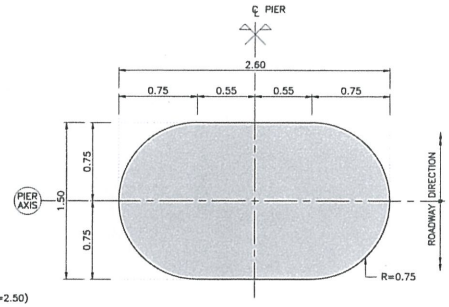
FRONT VIEW
SCALE 1 : 50



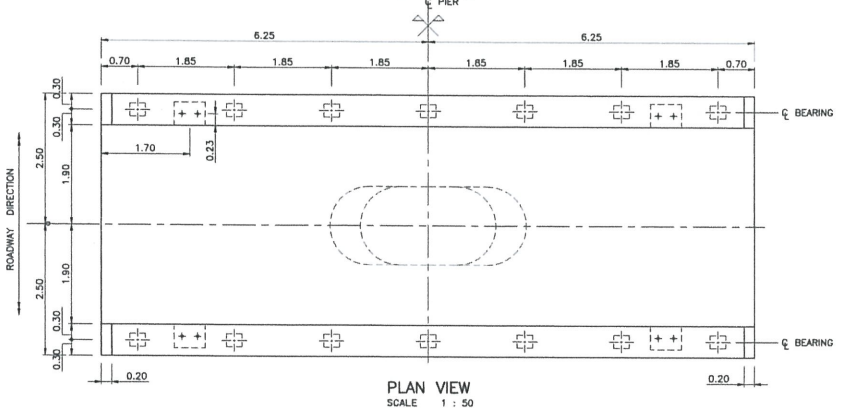
SIDE VIEW
SCALE 1 : 50



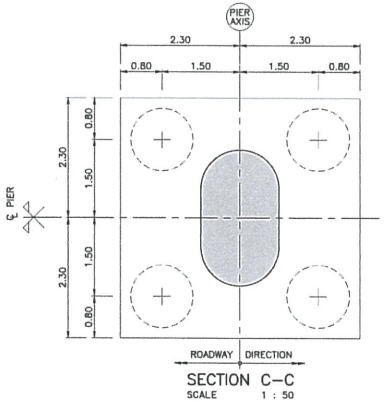
SECTION A-A
SCALE 1 : 25



SECTION B-B
SCALE 1 : 25



PLAN VIEW
SCALE 1 : 50



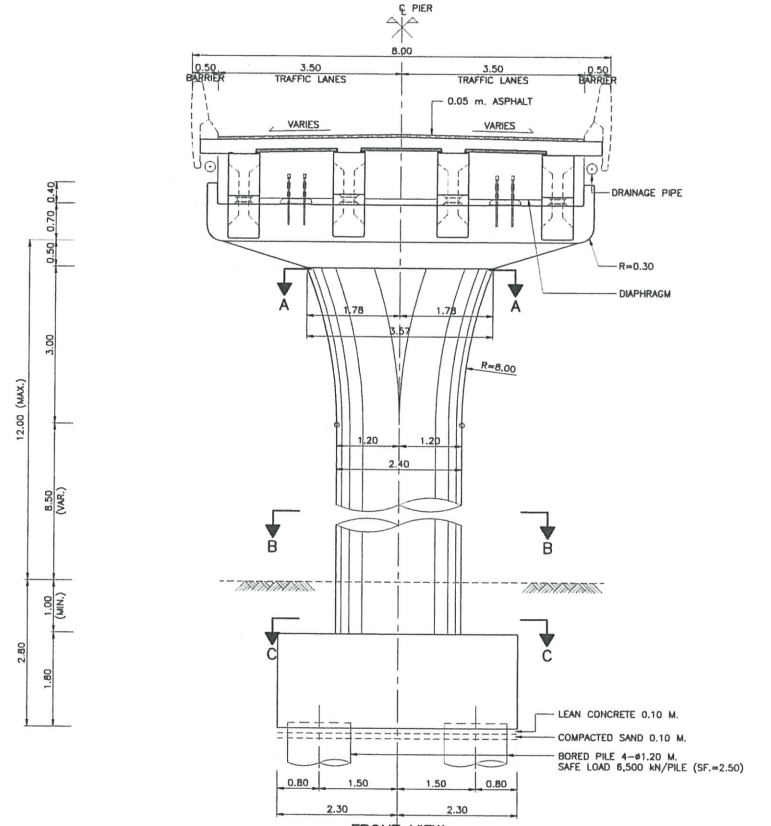
SECTION C-C
SCALE 1 : 50

NOTE :

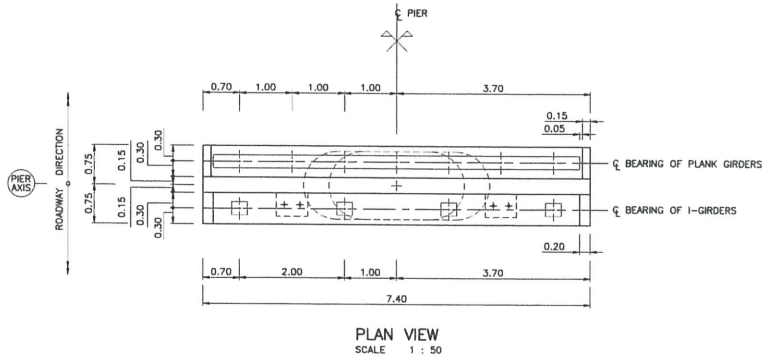
1. COLUMN STATION AND SPAN LENGTH ARE MEASURED ALONG THE CENTER LINE BRIDGE.
2. CROSS FALL SLOPE ACCORDING TO SUPERELEVATION ALONG CONTROL LINE.
3. FOR ADJACENT PIERS SHALL PROVIDED PILE TIP AT SAME LEVEL.

S:\WORKING_CAD\1465-SCR_2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-103.DWG

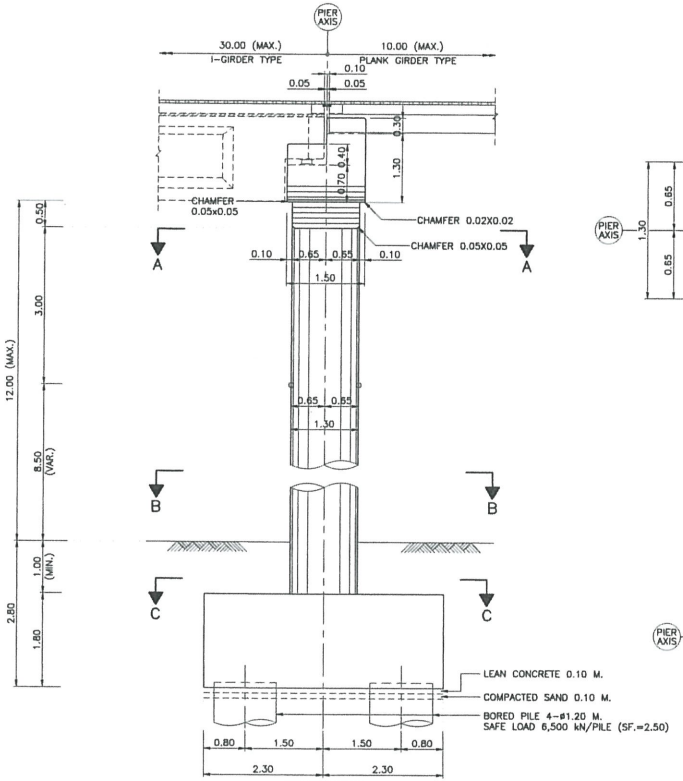
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL DETAILS OF PIER TYPE "A3" WIDTH 11.50M. WITH 1-SIDEWALK 10.00 M. ≤ HEIGHT ≤ 13.00 M. AND EXPANSION JOINT	DATE: Feb 18 DWG. NO.: SCR-RC-ST-103	SCALE: AS SHOWN SHEET NO.: 127



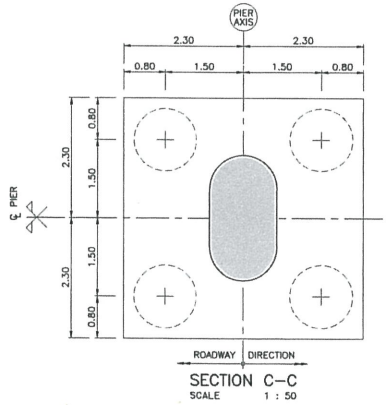
FRONT VIEW
SCALE 1 : 50



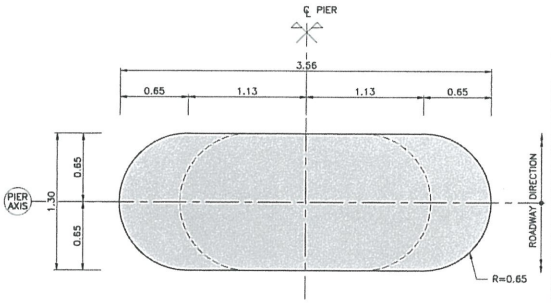
PLAN VIEW
SCALE 1 : 50



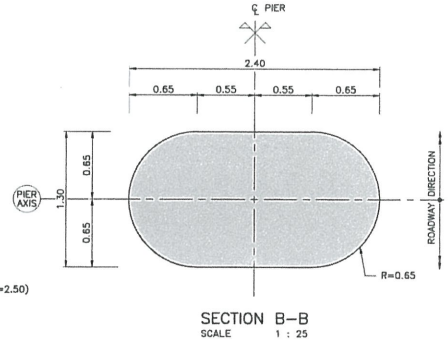
SIDE VIEW
SCALE 1 : 50



SECTION C-C
SCALE 1 : 50



SECTION A-A
SCALE 1 : 25



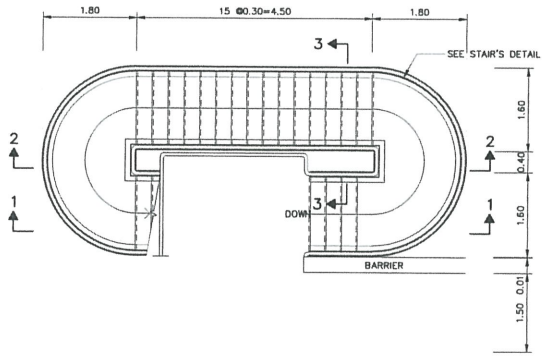
SECTION B-B
SCALE 1 : 25

NOTE :

1. COLUMN STATION AND SPAN LENGTH ARE MEASURED ALONG THE CENTER LINE BRIDGE.
2. CROSS FALL SLOPE ACCORDING TO SUPERELEVATION ALONG CONTROL LINE.
3. FOR ADJACENT PIERS SHALL PROVIDED PILE TIP AT SAME LEVEL.

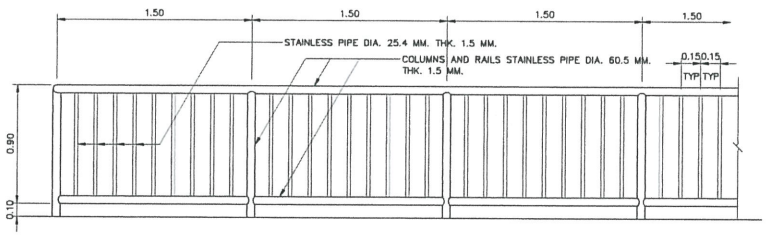
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF PIER TYPE "A4" 8.00 M. ≤ HEIGHT ≤ 13.00 M. AND EXPANSION JOINT	DATE: Feb 18 DWG. NO.: SCR-RC-ST-104	SCALE: AS SHOWN SHEET NO.: 128



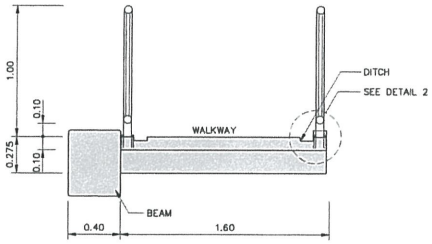
TOP VIEW

SCALE A1 = 1:50
A3 = 1:100



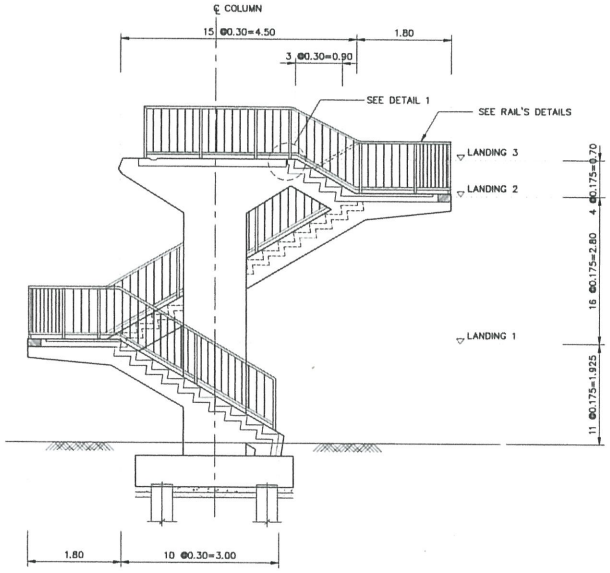
STAIR'S DETAIL

SCALE A1 = 1:20
A3 = 1:40



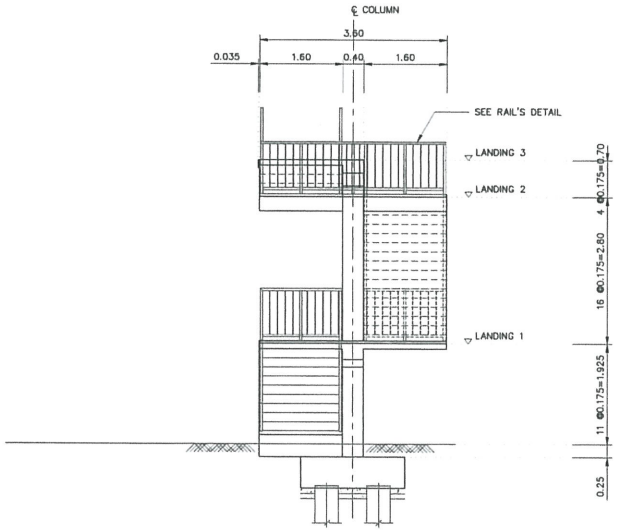
SECTION 3-3

SCALE A1 = 1:20
A3 = 1:40



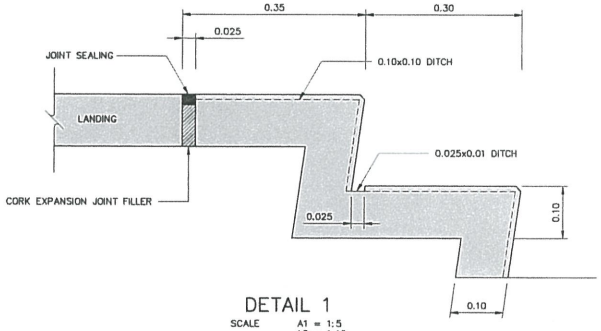
FRONT VIEW

SCALE A1 = 1:50
A3 = 1:100



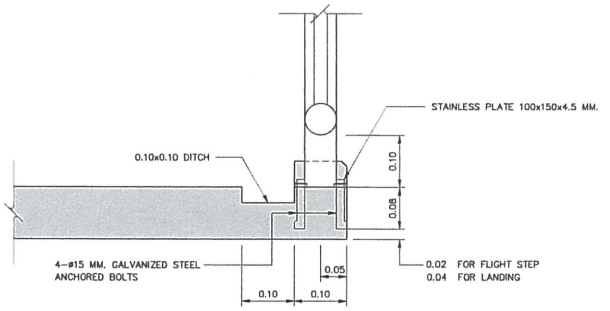
SIDE VIEW

SCALE A1 = 1:50
A3 = 1:100



DETAIL 1

SCALE A1 = 1:5
A3 = 1:10

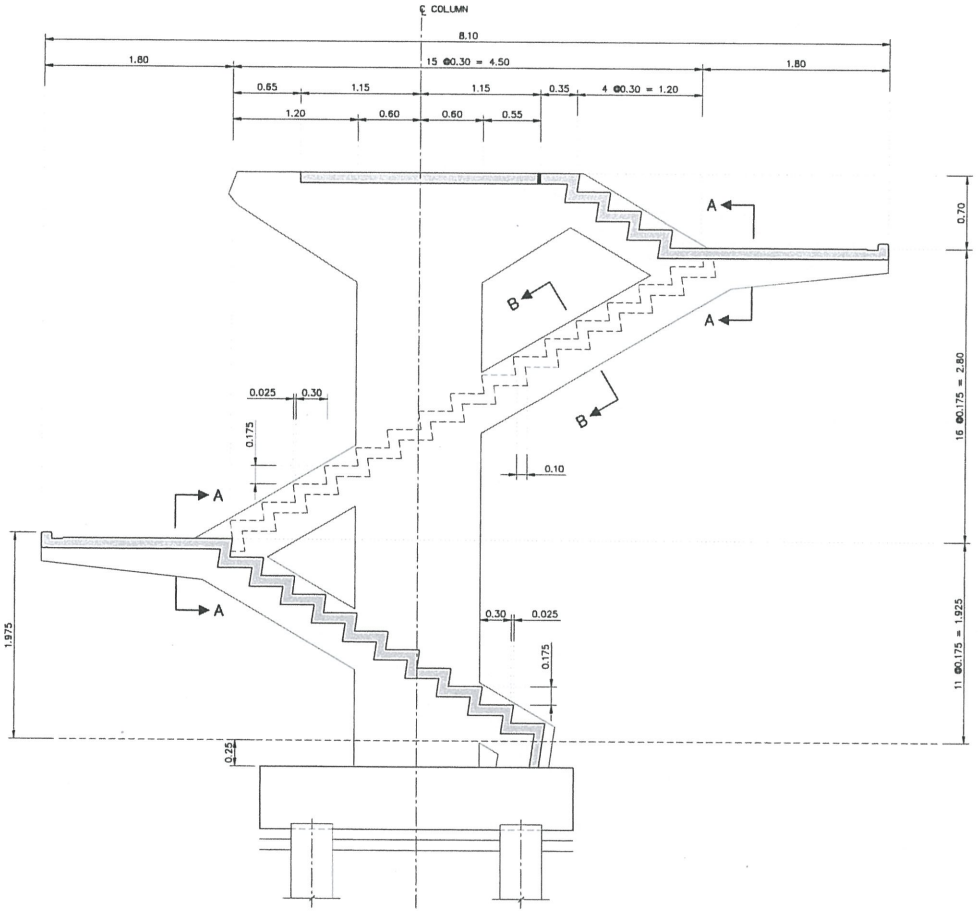


DETAIL 2

SCALE A1 = 1:5
A3 = 1:10

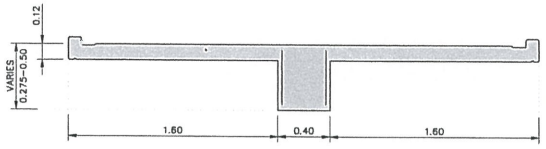
S:\WORKING_CAD\1455-SCH.2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-105STAIR SHEET 1.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING STAIR SHEET 1/2	DATE: Feb-18 DWG. NO.: SCR-RC-ST-105	SCALE: AS SHOWN SHEET NO.: 129



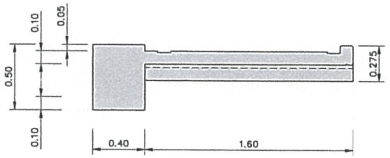
SECTION 1 – 1

SCALE A1 = 1:25
A3 = 1:50



SECTION A–A

SCALE A1 = 1:20
A3 = 1:40

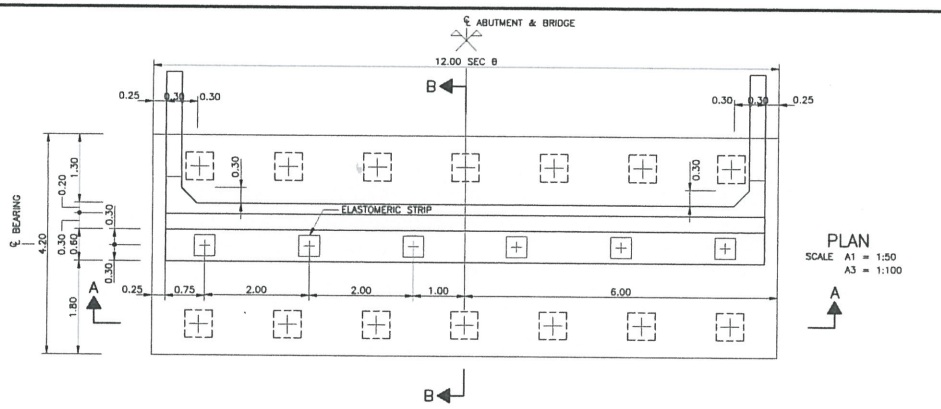


SECTION B–B

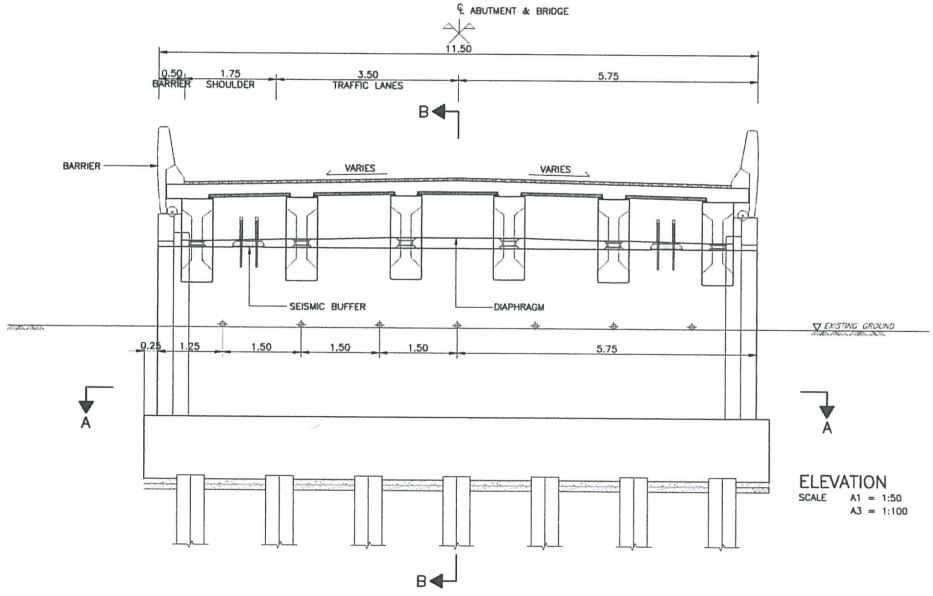
SCALE A1 = 1:20
A3 = 1:40

S:\WORKING_AD\1485-SCR2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-106(STAIR SHEET 2).DWG

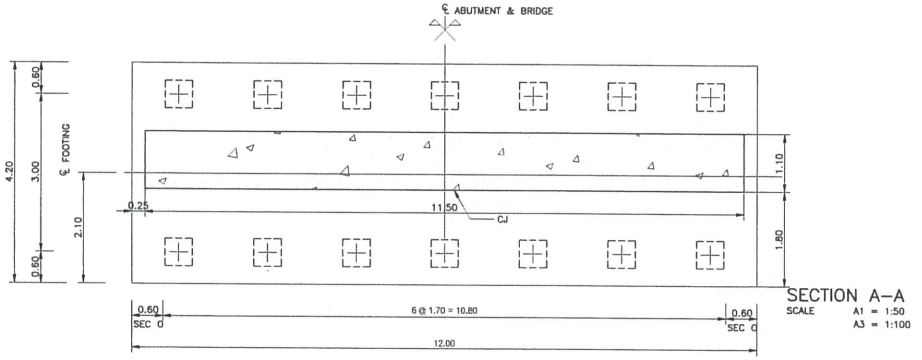
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING STAIR SHEET 1/2	DATE: Feb–18	SCALE: AS SHOWN
				DWG. NO.: SCR–RC–ST–106	SHEET NO.: 130



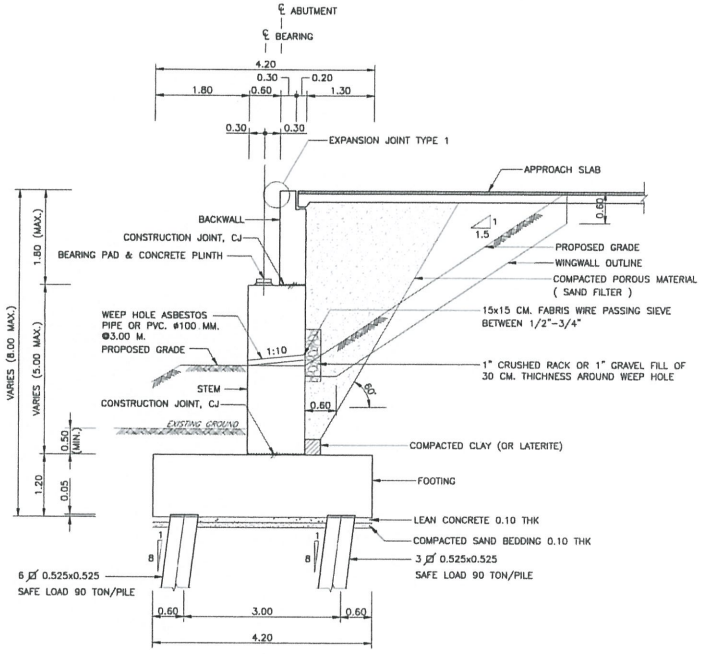
PLAN
SCALE A1 = 1:50
A3 = 1:100



ELEVATION
SCALE A1 = 1:50
A3 = 1:100



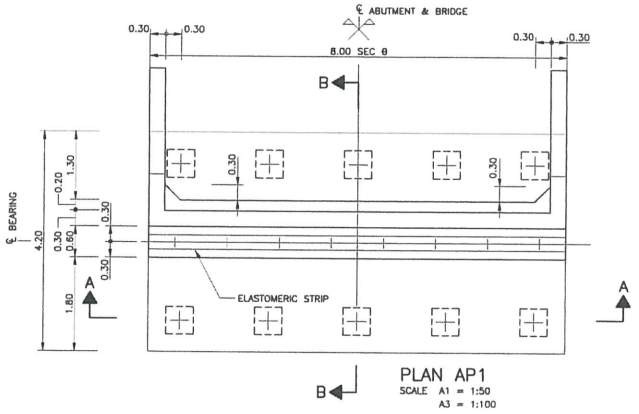
SECTION A–A
SCALE A1 = 1:50
A3 = 1:100



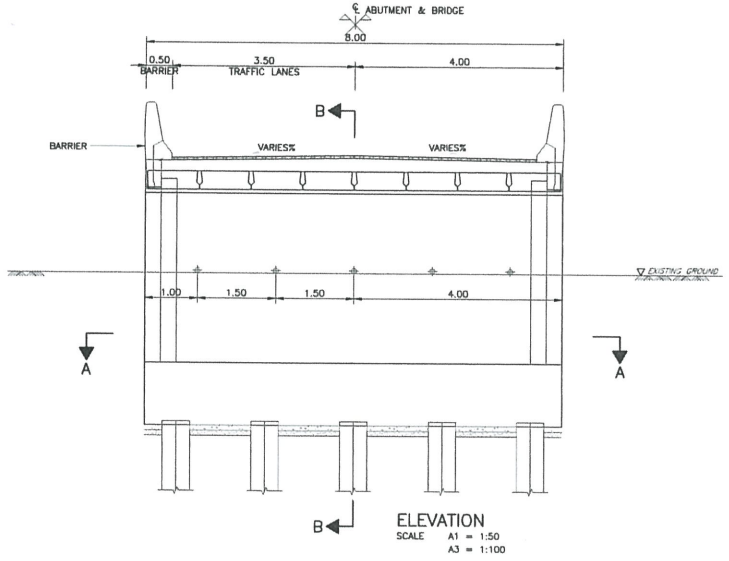
SECTION B–B
SCALE A1 = 1:50
A3 = 1:100

S:\WORKING_CAD\1462-SCR-2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-201.DWG

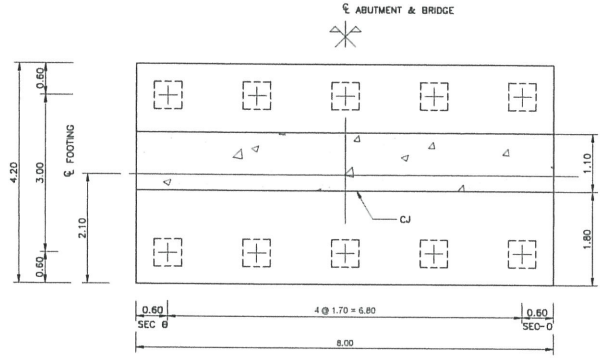
otp **KINGDOM OF THAILAND** MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	**FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT**	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING ABUTMENT TYPE "A" DIMENSION DETAILS	DATE: Feb-18 DWG. NO.: SCR-RC-ST-201	SCALE: AS SHOWN SHEET NO.: 131



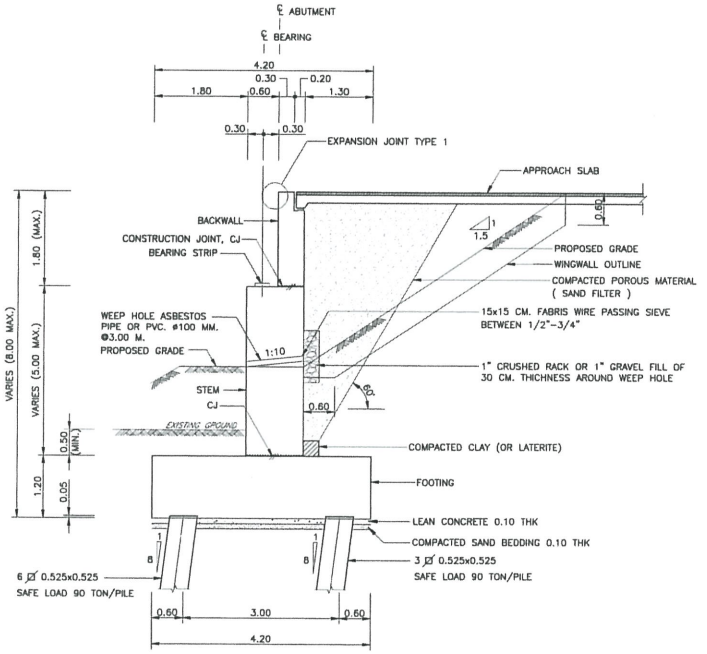
PLAN AP1
SCALE A1 = 1:50
A3 = 1:100



ELEVATION
SCALE A1 = 1:50
A3 = 1:100



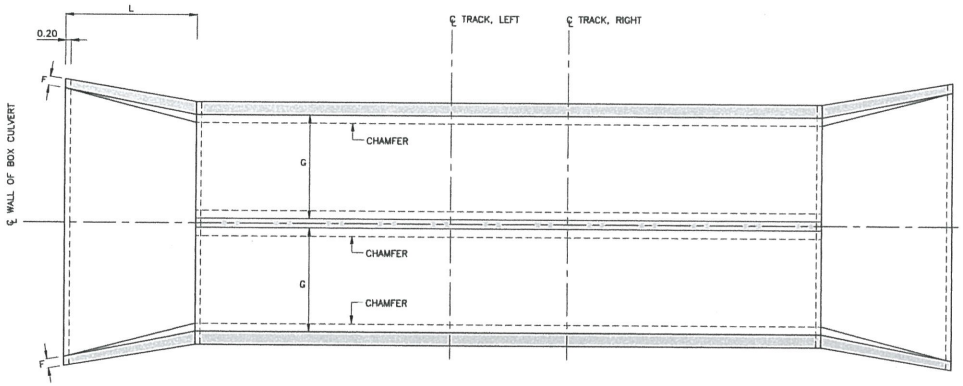
SECTION A–A
SCALE A1 = 1:50
A3 = 1:100



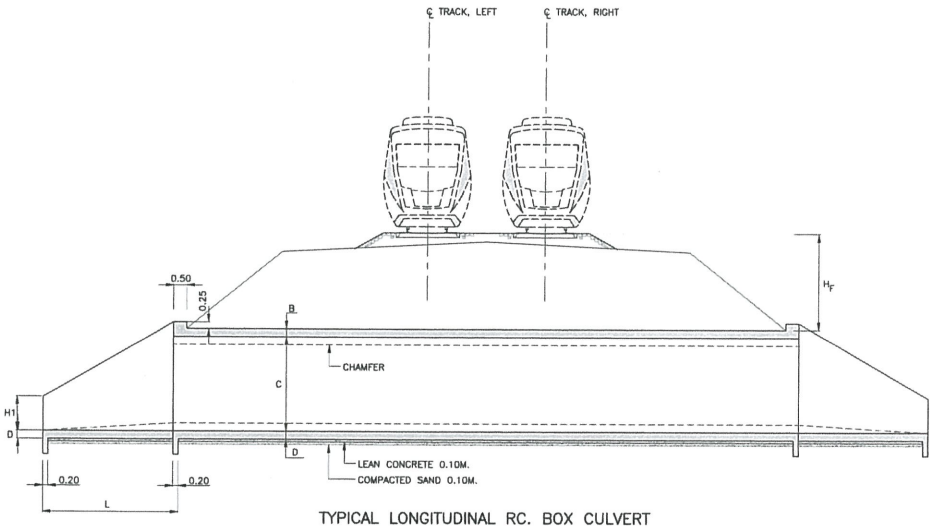
SECTION B–B
SCALE A1 = 1:50
A3 = 1:100

S:\WORKING_CAD\1465-SCR.2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-202.DWG

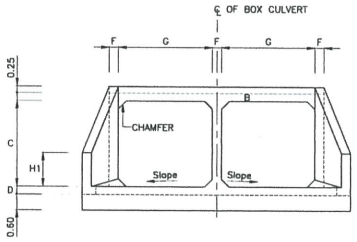
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING ABUTMENT TYPE "B" DIMENSION DETAILS	DATE: Feb-18 DWG. NO.: SCR-RC-ST-202	SCALE: AS SHOWN SHEET NO.: 132



PLAN RC. MULTI BOX CULVERT
SCALE 1 : 100



TYPICAL LONGITUDINAL RC. BOX CULVERT
SCALE 1 : 100



SECTION RC. DOUBLE BOX CULVERT
SCALE 1 : 100

DIMENSION OF BOX CULVERT (M.)							
NO.	STATION KM+M.	TYPE OF UNDERPASS	TOTAL LENGTH M.	NO. OF CELL CELL	NO. OF CARRIAGEWAY	SKEW ANGLE (DEG) AT START	SKEW ANGLE (DEG) AT END
1	7+635	CIP-RC	50	2	2	0	0
2	8+305	CIP-RC	50	2	2	0	0
3	16+190	CIP-RC	50	2	2	0	0
4	29+970	CIP-RC	50	2	2	0	0
5	38+835	CIP-RC	50	2	2	0	0
6	51+660	CIP-RC	50	2	2	0	0
7	76+685	CIP-RC	50	2	2	0	0
8	85+463	CIP-RC	50	2	2	0	0
9	96+629	CIP-RC	50	2	2	0	0
10	4+452 AT SPUR LINE	CIP-RC	50	2	2	0	0

NOTE : CIP-RC IS CAST-IN-PLACE REINFORCED CONCRETE.

DIMENSION OF BOX CULVERT (M.)				
C	G	L	H1	H_F
3.00	3.00	4.50	1.20	< 3.00

NOTE :

1. CLEAR CONCRETE COVER SHALL BE 0.05 M. EXCEPT THE BOTTOM OF SLABS OR WALLS AT WHITCH CLEAR COVER OF 0.075 M. SHALL BE PROVIDED.

S:\WORKING_CAD\1485-SCR\2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-301.DWG

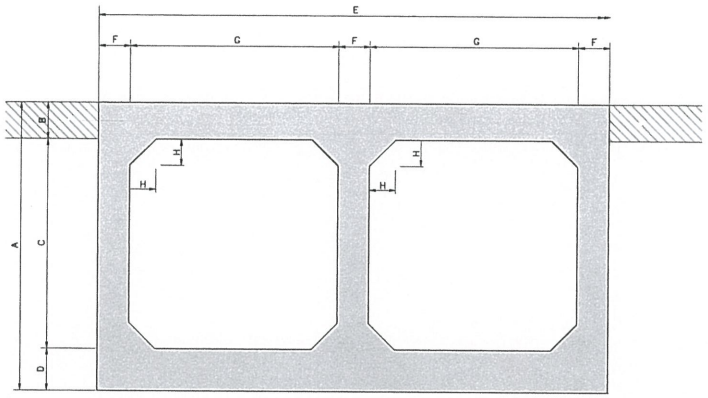
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: RAILWAY CROSSING
UNDERPASS BOX CULVERT PLAN AND ELEVATION

DATE: Feb-18
SCALE: AS SHOWN
DWG. NO.: SCR-RC-ST-301
SHEET NO.: 133

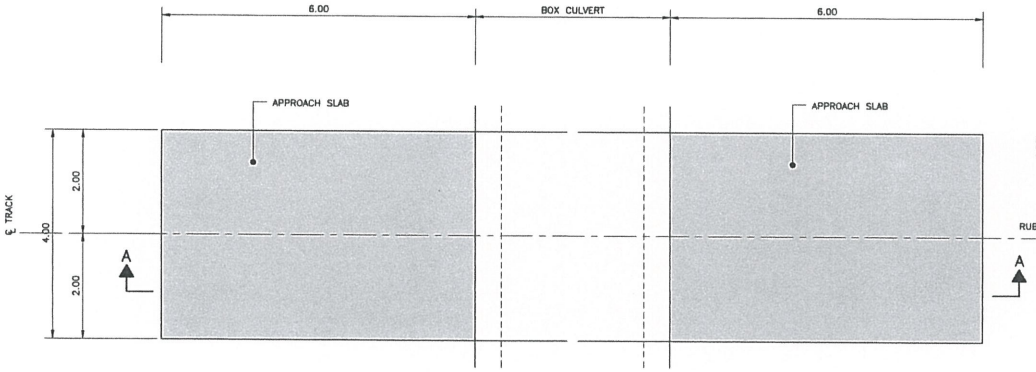


2 CELL BOX CULVERT

NOT TO SCALE

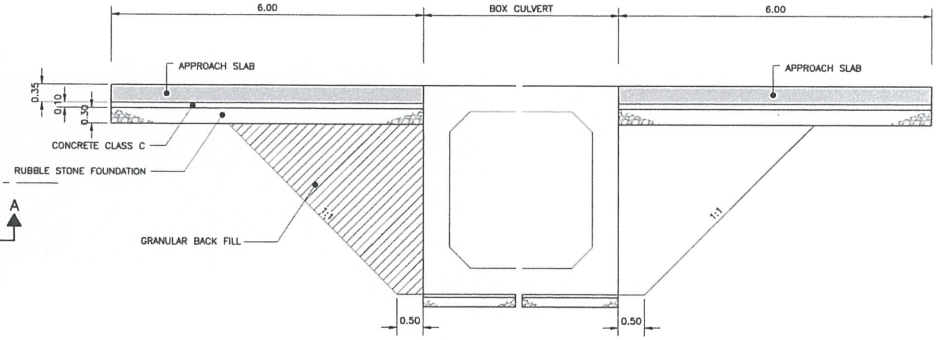
CONCRETE DIMENSION DETAILS FOR BOX CULVERT

SIZE OF CULVERT OPENING HxW		CONCRETE DIMENSION (CM.)							
		A	B	C	D	E	F	G	H
2 CELL	3.00x3.00	385	40	300	45	720	40	300	40



PLAN

SCALE 1:100



SECTION A–A

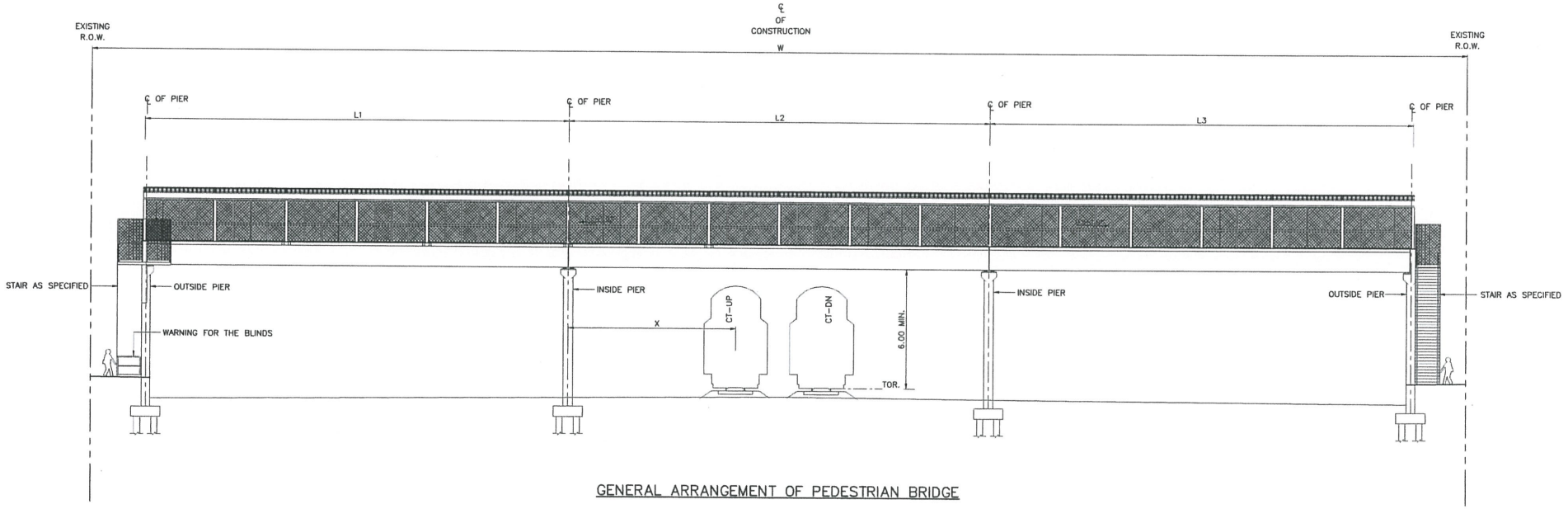
SCALE 1:100

NOTE :

1. CONCRETE COVER = 50 mm.

S:\WORKING_CAD\1455-SCR\2_WORKING\2_RAILWAY CROSSING\3_STRUCTURAL\SCR-RC-ST-302.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL DETAILS OF UNDERPASS BOX CULVERT AND BASE SLAB	DATE: Feb-18 DWG. NO.: SCR-RC-ST-302	SCALE: AS SHOWN SHEET NO.: 134



GENERAL ARRANGEMENT OF PEDESTRIAN BRIDGE

NO.	KM. (R)	TYPE	R.O.W	SPAN	L1	L2	L3	L4	X
1	6+030	1	80	3	23.50	30.00	23.50	–	12.50
2	40+869	1	80	3	23.50	30.00	23.50	–	12.50

NOTE :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED
2. TOR. = TOP OF RAIL

S:\WORKING_CAD\1465-SCR\2_WORKING\3_PEDESTRIAN BRIDGE_LIST รูปแบบ CROSSING\SCR-PB-LA-001.DWG

otp

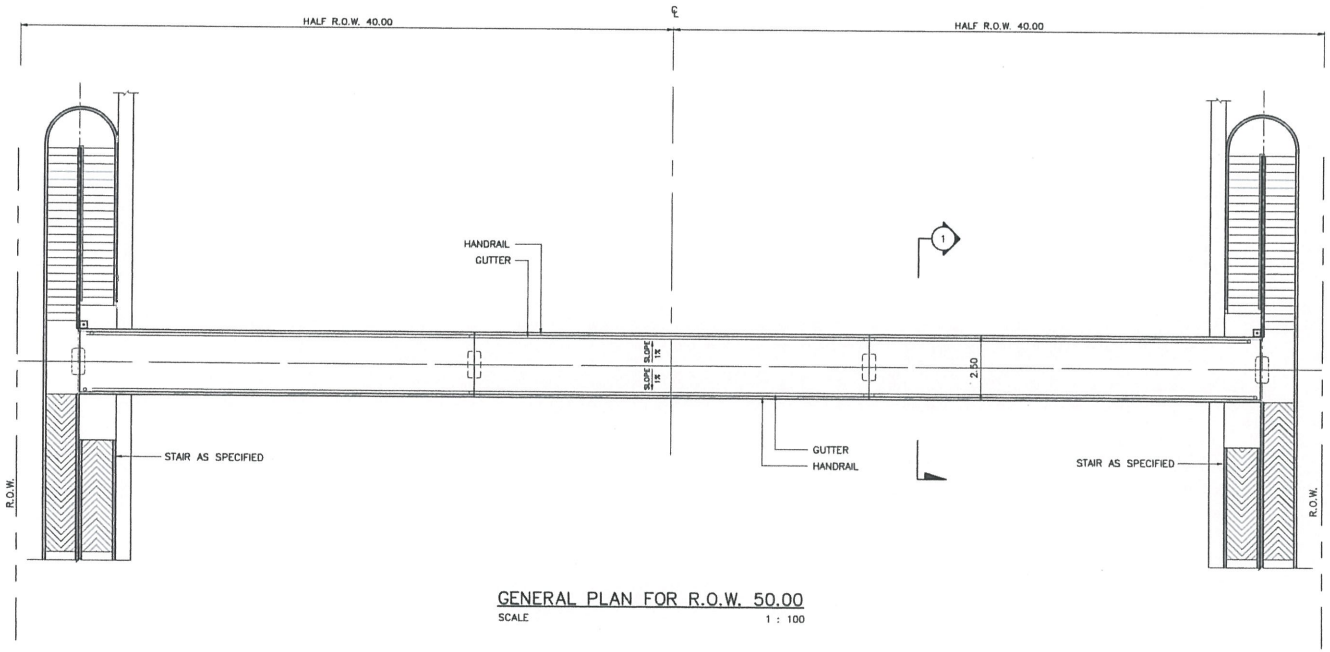
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

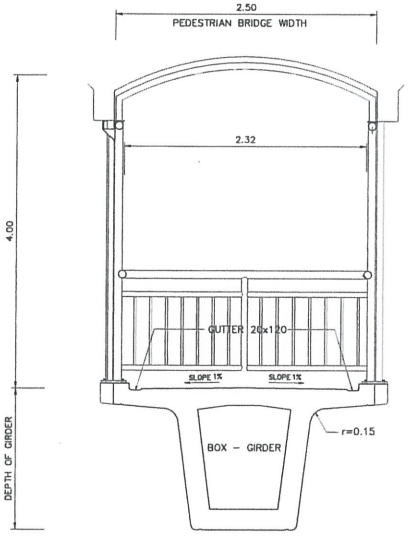
TITLE: RAILWAY CROSSING
GENERAL NOTES OF PEDESTRAIN BRIDGE

DATE: Feb 18
SCALE: AS SHOWN
DWG. NO.: SCR-PB-LA-001
SHEET NO.: 135



GENERAL PLAN FOR R.O.W. 50.00

SCALE 1 : 100



SECTION (1) – (1)

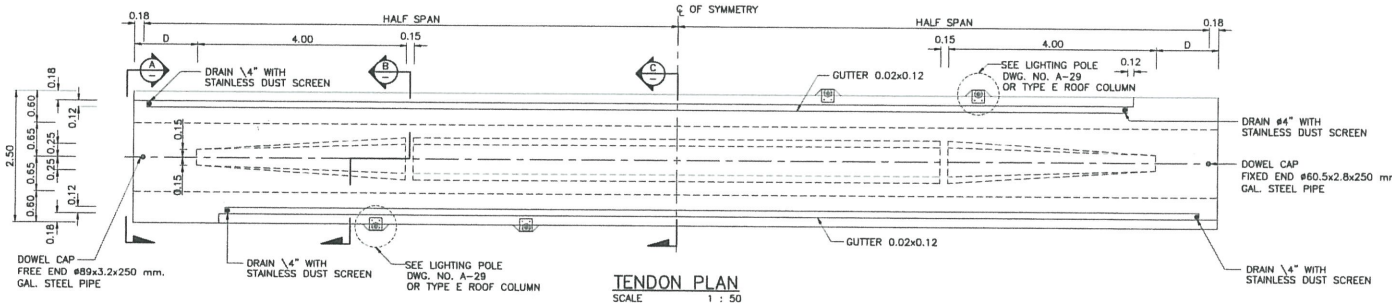
SCALE 1 : 25

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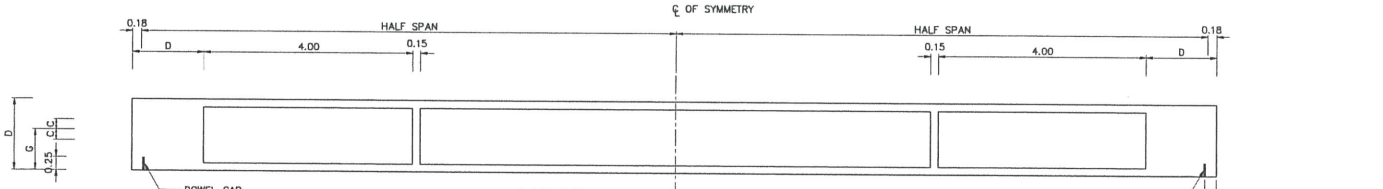
1. REFER TO STANDARD DRAWINGS FOR PEDESTRIAN BRIDGE OF DEPARTMENT OF HIGHWAY OF THAILAND(DOH) DATE: MAY 2004 DWG. NO. A-4.
2. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED
3. DOH = DEPARTMENT OF HIGHWAYS OF THAILAND

S:\WORKING_CAD\1465-SCR\2_WORKING\3_PEDESTRIAN BRIDGE_1ST รางวิ่ง CROSSING\SCR-PB-ST-011.DWG

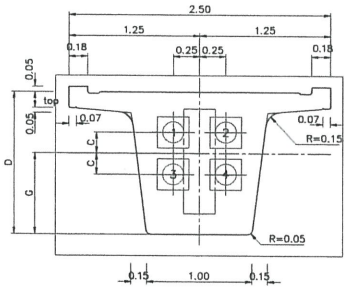
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL PLAN OF PEDESTRIAN BRIDGE	DATE: Feb 18 DWG. NO.: SCR-PB-ST-011	SCALE: AS SHOWN SHEET NO.: 136



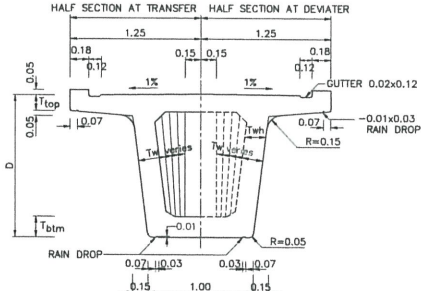
TENDON PLAN
SCALE 1 : 50



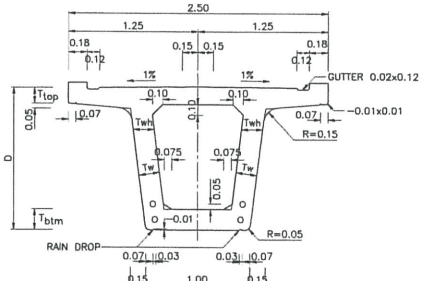
LONGITUDINAL SECTION OF GIRDER
SCALE 1 : 50



END SECTION (A)
SCALE 1 : 25



TRANSFER SECTION (B)
SCALE 1 : 25



TYPICAL SECTION (C)
SCALE 1 : 25

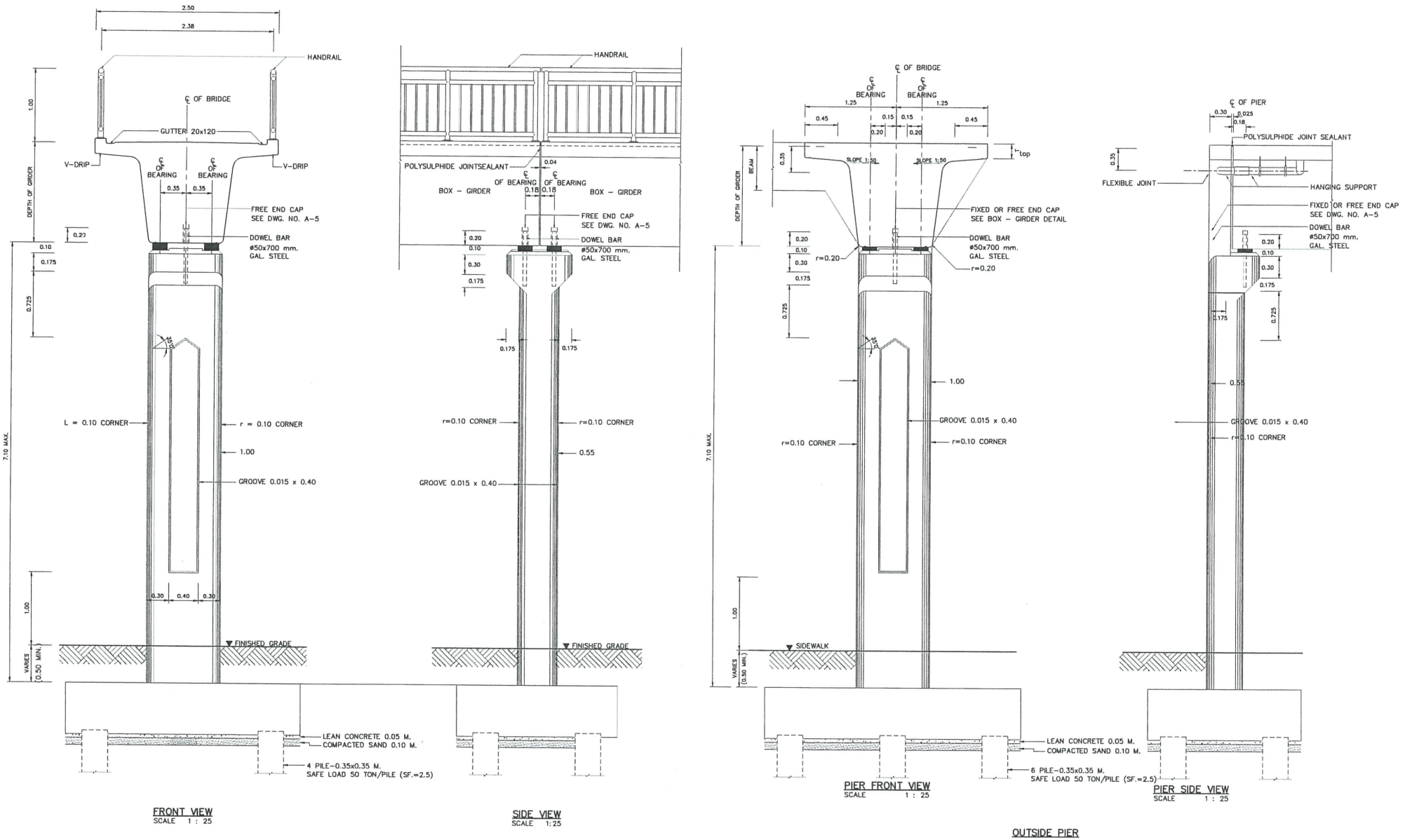
GIRDER TYPE	DESIGN SPAN (M.)	DIMENSIONS (MM.)							APP. GIRDER WEIGHT (T.)
		D	G	C	T btm	T top	T w	T wh	
B20	15-20	825	480	120	150	150	200	206	44
B25	20-25	1,000	575	150	150	150	200	204	60
B30	25-30	1,175	680	150	150	150	200	202	77
B35	30-35	1,350	780	200	200	150	220	222	102
B38	35-38.5	1,350	780	200	250	180	220	222	120

NOTE

1. REFER TO STANDARD DRAWINGS FOR PEDESTRIAN BRIDGE OF DOH DATE: MAY 2004 DWG. NO. A-5
2. THIS DRAWING IS ONLY DETAILED THE DATA OF MISCELLANIES SUCH AS GUTTERS, STAIRS, HANDRAILS, DRAIN HOLES, HANDRAILS, DRAIN HOLES, DOWEL SLEEVES AND LIGHTING POLES THE CONTRACTOR MUST BE VERIFY/CONFIRM THE CORRECT OF LOCATIONS, DIMENSIONS, AND DETAILS OF ABOVE MENTIONED ELEMENTS TO MEET THE OWNERS REQUIREMENTS OR AS PER SPECIFICATION OF MATERIAL IN THE GENERAL LAYOUT DRAWING.

S:\WORKING_CAD\1485-SCR\2_WORKING\3_PEDESTRIAN BRIDGE_LIST 92\DWG CROSSING\SCR-PB-ST-012.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS BOX GIRDER FOR PEDESTRAIN BRIDGE	DATE: Feb 18 DWG. NO.: SCR-PB-ST-012	SCALE: AS SHOWN SHEET NO.: 137

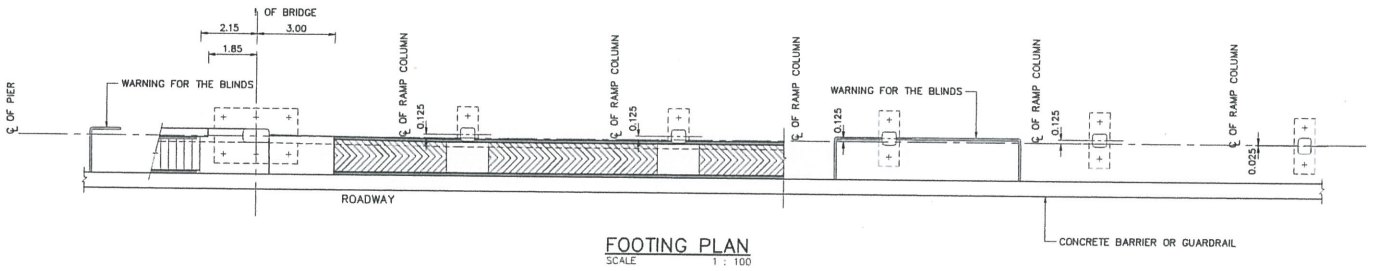


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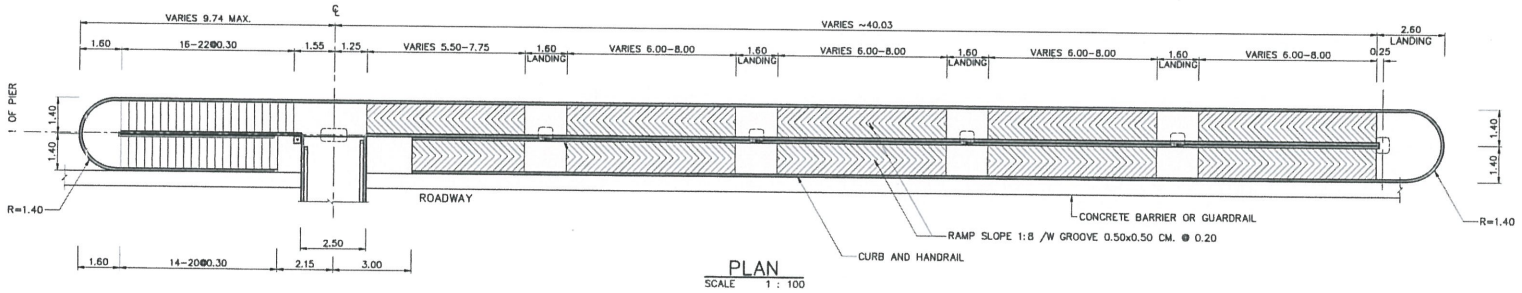
1. REFER TO STANDARD DRAWINGS FOR PEDESTRIAN BRIDGE OF DOH DATE: MAY 2004 DWG. NO. A-7 TO A-9
2. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE RAILWAY CROSSING TYPICAL DETAILS OF PIER FOR PEDESTRAIN BRIDGE	DATE: Feb 18 DWG. NO.: SCR-PB-ST-013	SCALE: AS SHOWN SHEET NO.: 138

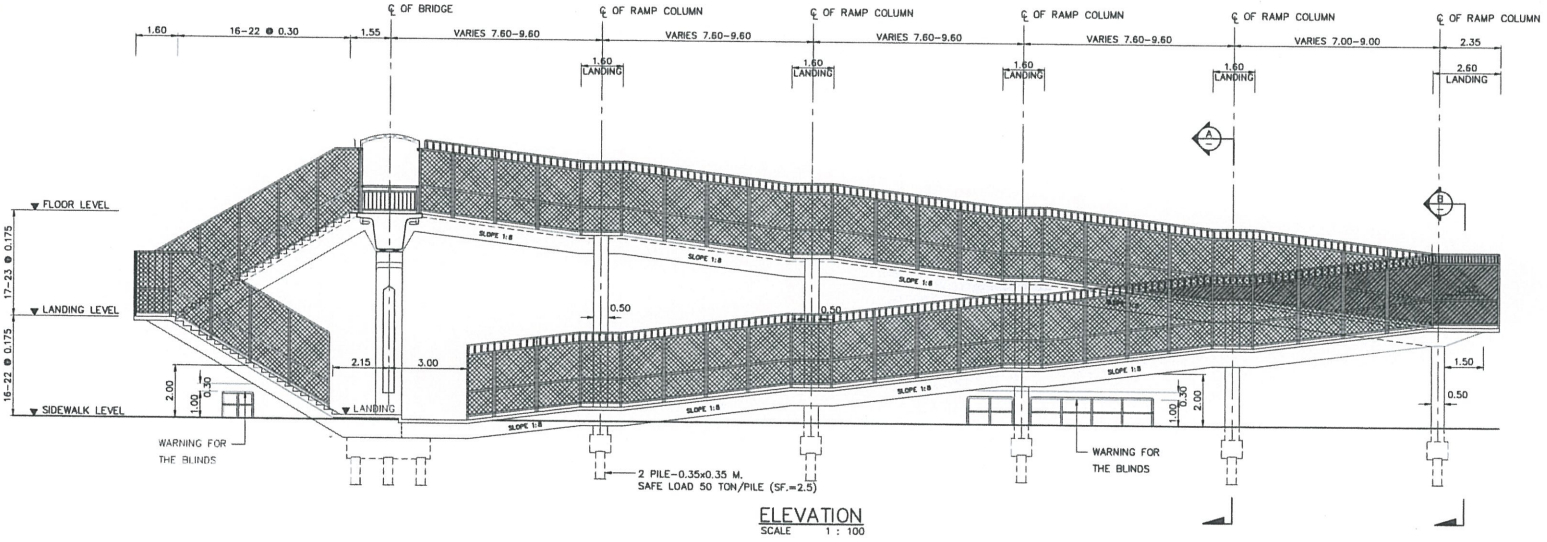
S:\WORKING_CAD\1465-SCR12_WORKING\3_PEDESTRIAN BRIDGE_1ST STAGE\CROSSING\SCR-PB-ST-013.DWG



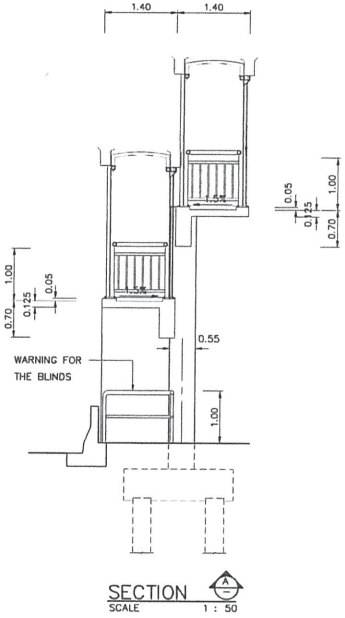
FOOTING PLAN
SCALE 1 : 100



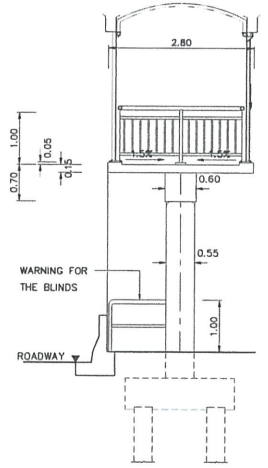
PLAN
SCALE 1 : 100



ELEVATION
SCALE 1 : 100



SECTION A-A
SCALE 1 : 50



SECTION B-B
SCALE 1 : 50

NOTE :

1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: RAILWAY CROSSING TYPICAL DETAILS OF STAIR FOR PEDESTRAIN BRIDGE	DATE: Feb 18 SCALE: AS SHOWN DWG. NO.: SCR-PB-ST-014 SHEET NO.: 139	

S:\WORKING_CAD\1465-SCR\2_WORKING\3_PEDESTRIAN BRIDGE_1ST ชั้นใน CROSSING\SCR-PB-ST-014.DWG

ARCHITECT WORK

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S-03 (BAN NA 2)	SITE PLAN	SCR-S3-AR-0001	8
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S-04 (PAK CHAN)	SITE PLAN	SCR-S4-AR-0001	10
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S-05 (KRA BURI)	SITE PLAN	SCR-S5-AR-0001	12
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	ELEVATON 3, 4	SCR-SB-AR-0006	31

TITLE	DRAWING NO.	SHEET NO.

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

ABC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

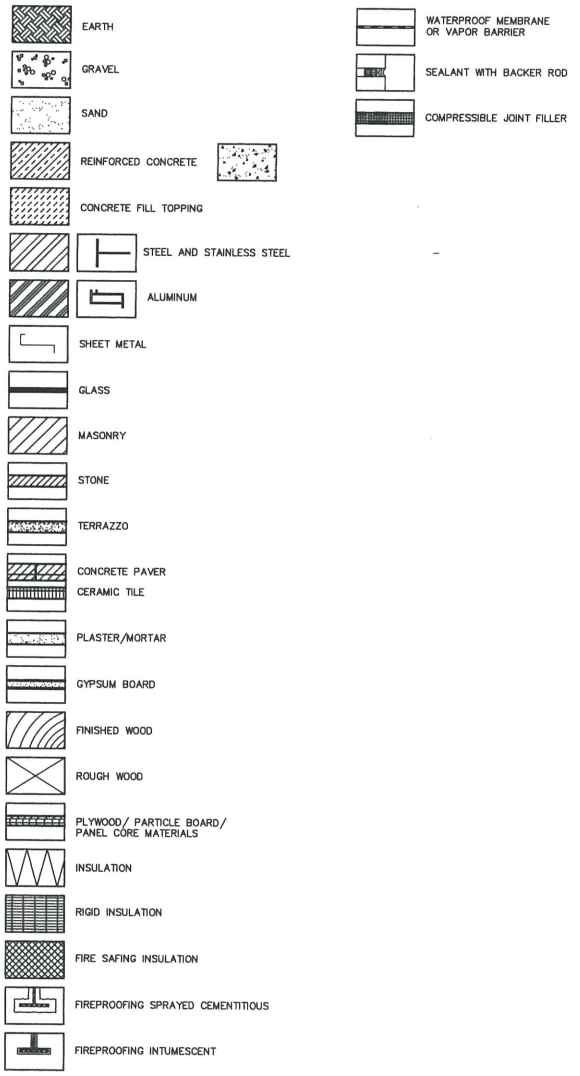
TITLE: GENERAL
DRAWING LIST

DATE: FEBRUARY 2018
SCALE:
DWG. NO.: SCR-GN-AR-0001
SHEET NO.: 1

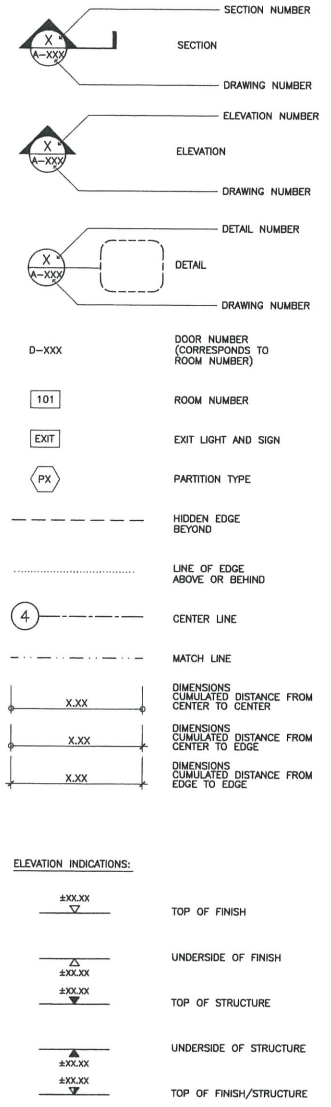
ABBREVIATIONS

ACOUS	ACOUSTIC(AL)
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AGG	AGGREGATE
ALT	ALTERNATE
ALU	ALUMINUM
ANOD	ANODIZED
APPD	APPROVED
APPROX	APPROXIMATE(LY)
ARCH	ARCHITECT(URAL)
AUTO	AUTOMATIC
B/	BOTTOM OF
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BM	BENCH MARK
BRG	BEARING
BO	BY OTHERS
BOT	BOTTOM
CC	CENTER TO CENTER
CB	CATCH BASIN
CER	CERAMIC
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR(ANCE)
CMU	CONCRETE MASONRY UNIT
CO	CLEAR OPENING
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS (CONTINUE)
CONTR	CONTRACTOR
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CU	CUBIC
D	DIAMETER
DEPT	DEPARTMENT
DET	DETAIL
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DN	DOWN
DO	DITTO
DTL	DETAIL
DWG	DRAWING
E	EAST
EA	EACH
EL	ELEVATOR
ELEC	ELECTRIC(AL)
ELEV	ELEVATION
ENCL	ENCLOSE (ENCLOSURE)
ENGR	ENGINEER
ENT	ENTRANCE
EJ	EXPANSION JOINT
EQ	EQUAL
EQUIP	EQUIPMENT
ES	ESCALATOR
EXCAV	EXCAVATE
EXIST	EXISTING
EXP	EXPOSED (EXPANSION)
EXT	EXTERIOR
FAB	FABRICATE(ED)
FD	FLOOR DRAIN
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FL	FLOOR
FIG	FIGURE
FIN	FINISH(ED)
FRM	FRAME
FS	FULL SIZE
FT	FOOT (FEET)
FTG	FOOTING
FURN	FURNITURE (FURNISHINGS)
FUT	FUTURE
GA	GUAGE (GAGE)
GALV	GALVANIZE(ED)
GL	GLASS (GLAZING)
GRAT	GRATING
GRD	GRADE
GRND	GROUND
GYP	GYPSUM
HD	HEAD
HDW	HARDWARE
HDWD	HARDWOOD
HGT	HEIGHT
HM	HOLLOW METAL
HML	HORIZONTAL MODULE LINE
HNGR	HANGER
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR(S) [FIRE RESISTANCE RATING]
HT	HEIGHT
ID	INSIDE DIMENSION (DIAMETER)
IN	INCH
INCL	INCLUDE(ING)
INSUL	INSULATE(TION)
INT	INTERIOR
JT	JOINT
LB	POUND
LH	LEFT HAND
LL	LIVE LOAD
LP	LOW POINT
MANF	MANUFACTURER
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTL	METAL
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIMENSION (DIAMETER)
OPNG	OPENING
OPP	OPPOSITE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT
PTD	PAINT(ED)
QTY	QUANTITY
R	RISER (RADIUS)
REF	REFERENCE
REINF	REINFORCE(MENT)(ED)
REQ	REQUIRED (REQUIREMENT)
RH	RIGHT HAND
RM	ROOM
RO	ROUGH OPENING
S	SOUTH
SEC	SECTION
SH	SPRINKLER HEAD
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFIED (SPECIFICATION(S))
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUC	STRUCTURE(-TURAL)
SUSP	SUSPENDED
T	TREAD
T/	TOP OF
TEL	TELEPHONE
TH	THICK(NESS)
TR	TRAVELATOR
TRAFO	TRANSFORMER
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VAR	VARIES (VARY)
VDGS	VISUAL DISPLAY GUIDANCE SYSTEM
VERT	VERTICAL
VIF	VERIFY IN FIELD
VML	VERTICAL MODULE LINE
VWC	VINYL WALL COVERING
W	WEST
W/	WITH
W/O	WITHOUT
WD	WOOD
WP	WORK POINT
WR	WATER-RESISTANT

MATERIAL SYMBOLS

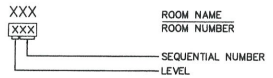


SYMBOLS

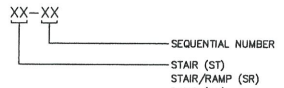


ELEVATION INDICATIONS:

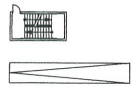
ROOM NAMES AND NUMBERS



STAIRS AND RAMPS



VERTICAL CIRCULATION

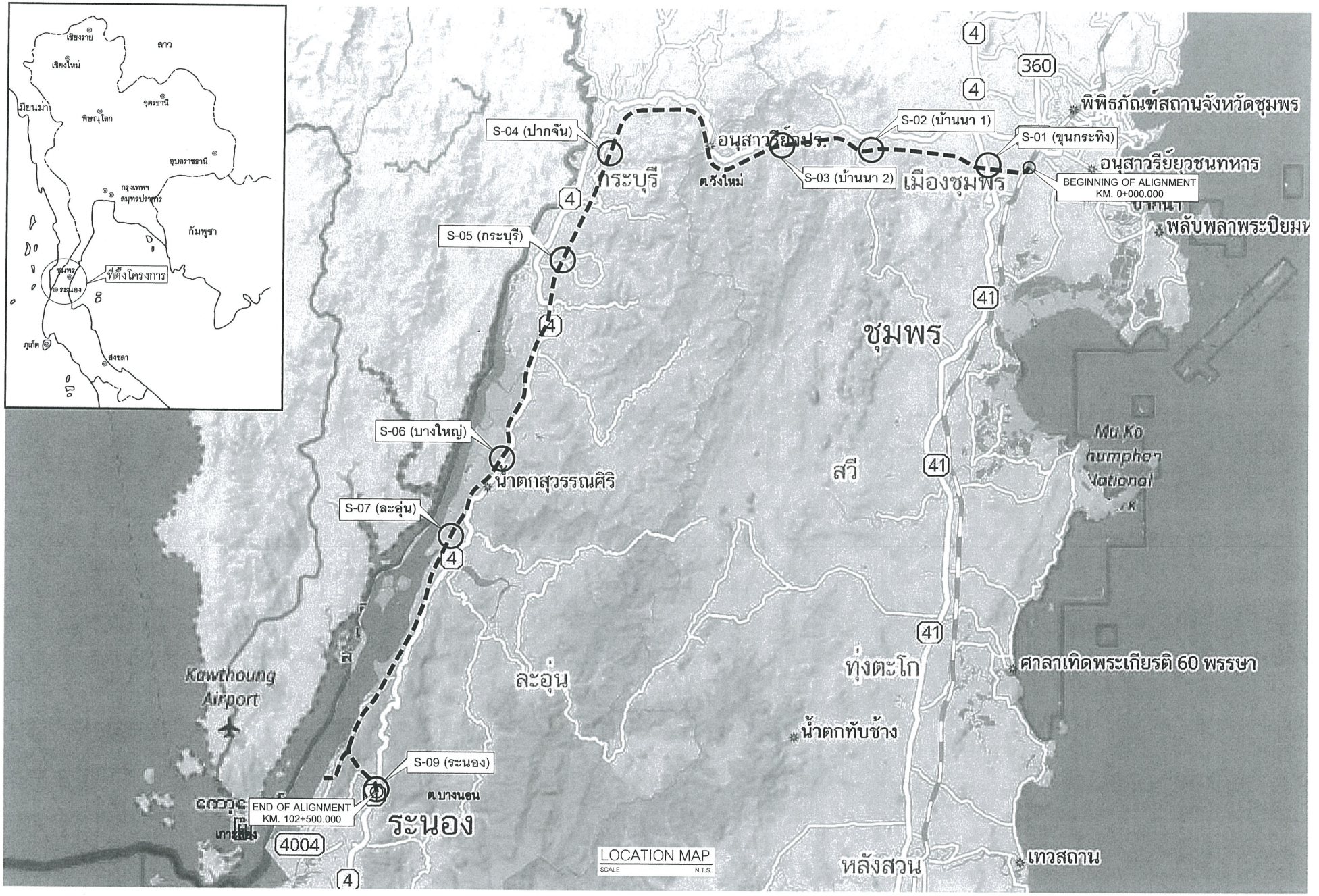


MISCELLANEOUS

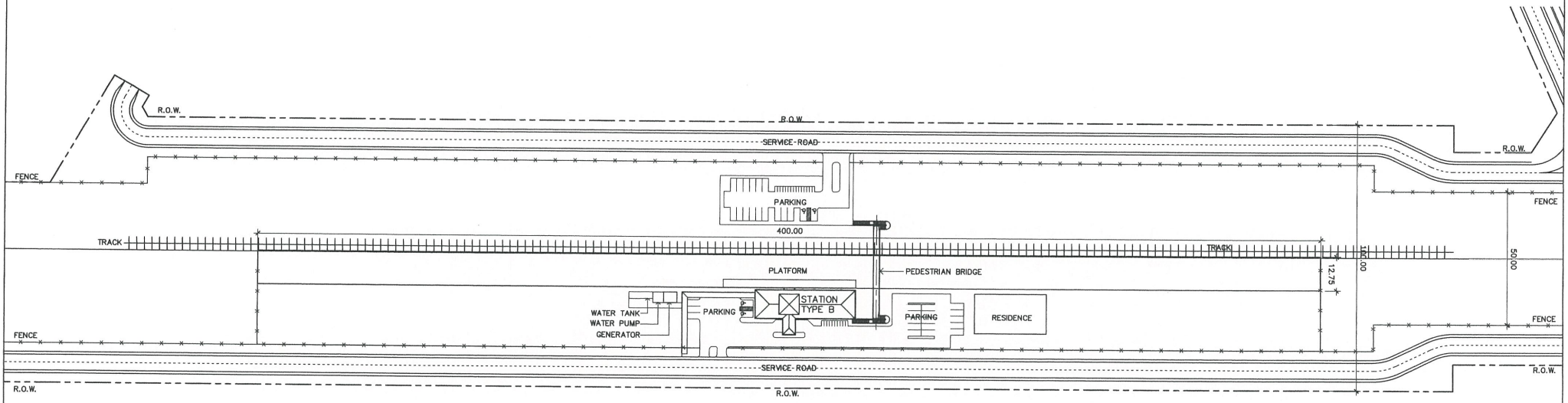


GENERAL NOTES

1. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE DIMENSIONS.
2. ALL DIMENSIONS IN THESE DRAWINGS ARE IN METERS UNLESS OTHERWISE INDICATED.



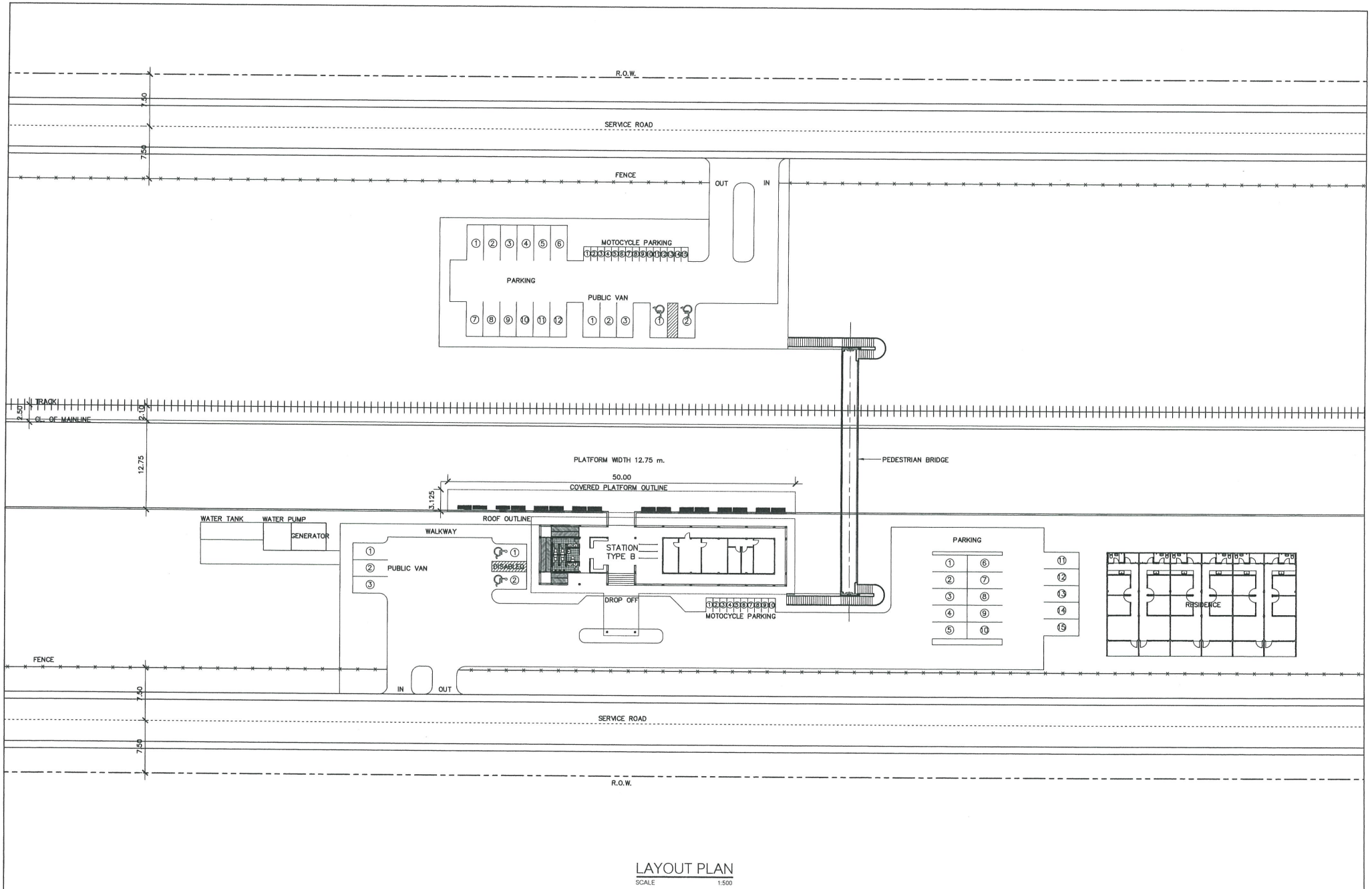
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE GENERAL LOCATION MAP	DATE : FEBRUARY 2018 DWG. NO. : SCR-GN-AR-0003	SCALE : SHEET NO. : 3



SITE PLAN

SCALE 1 : 1500

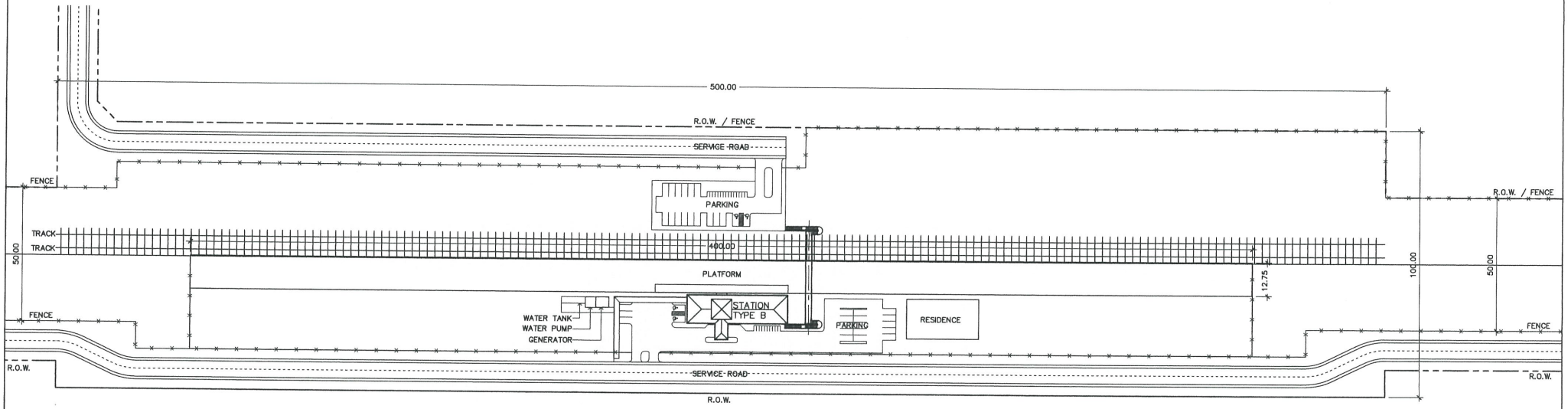
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-01 (KHUN KRATHING) SITE PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S1-AR-0001	SCALE: SHEET NO.: 4



LAYOUT PLAN

SCALE 1:500

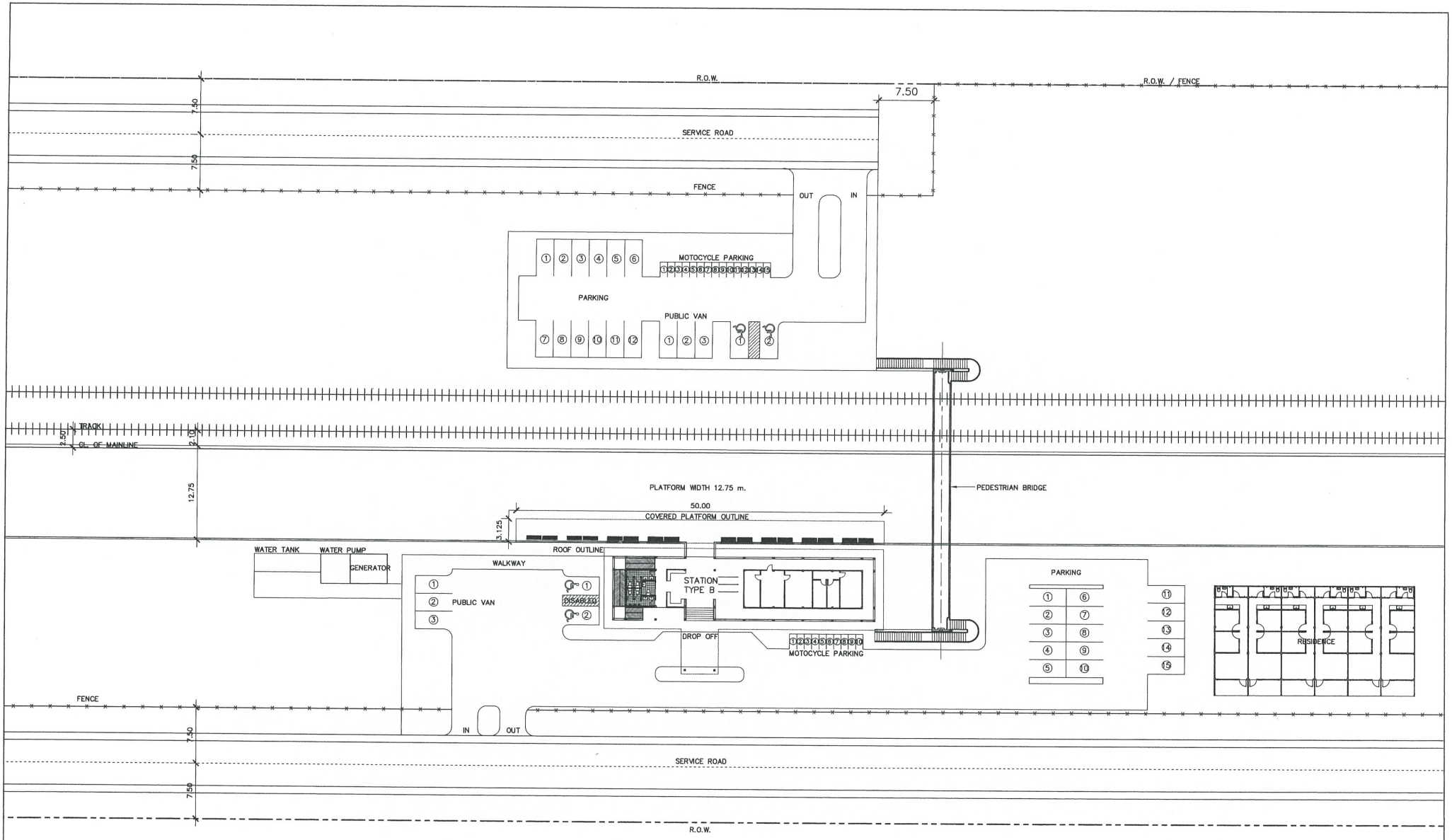
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-01 (KHUN KRATHING) LAYOUT PLAN	DATE: FEBRUARY 2018	SCALE:
				DWG. NO.: SCR-S1-AR-0002	SHEET NO.: 5



SITE PLAN

SCALE 1 : 1500

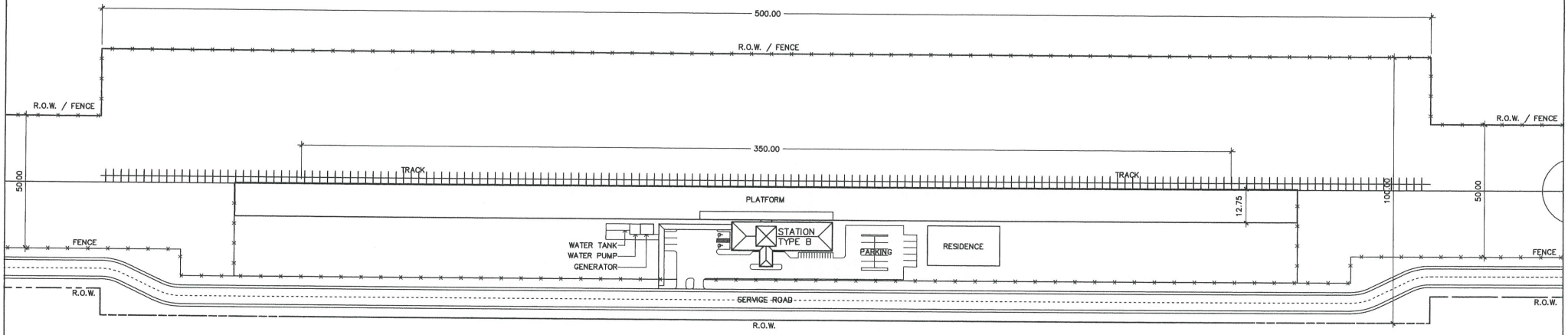
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-02 (BAN NA 1) SITE PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S2-AR-0001	SCALE: SHEET NO.: 6



LAYOUT PLAN

SCALE 1 : 500

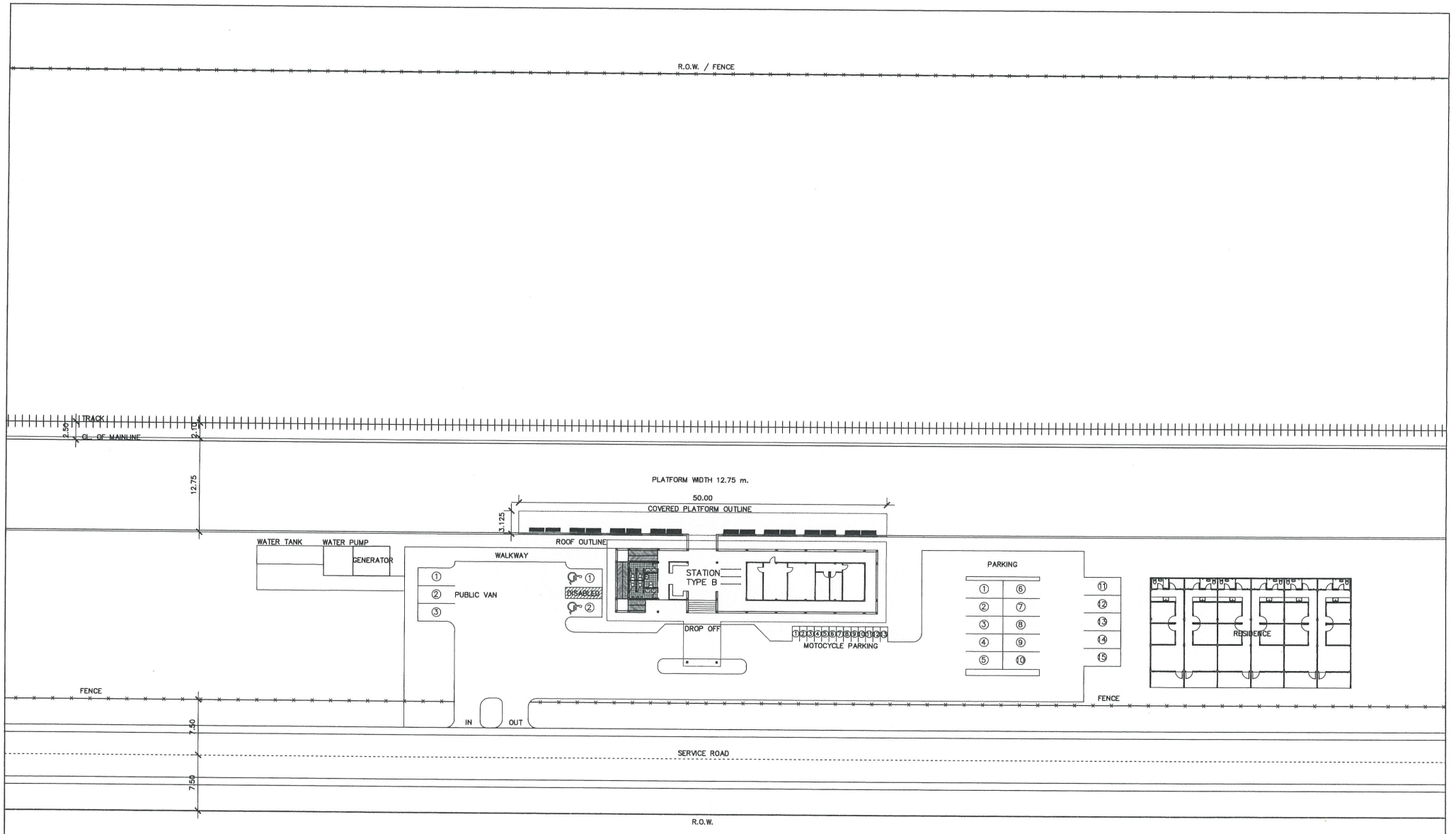
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-02 (BAN NA 1) LAYOUT PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S2-AR-0002	SCALE: SHEET NO.: 7



SITE PLAN

SCALE 1 : 1500

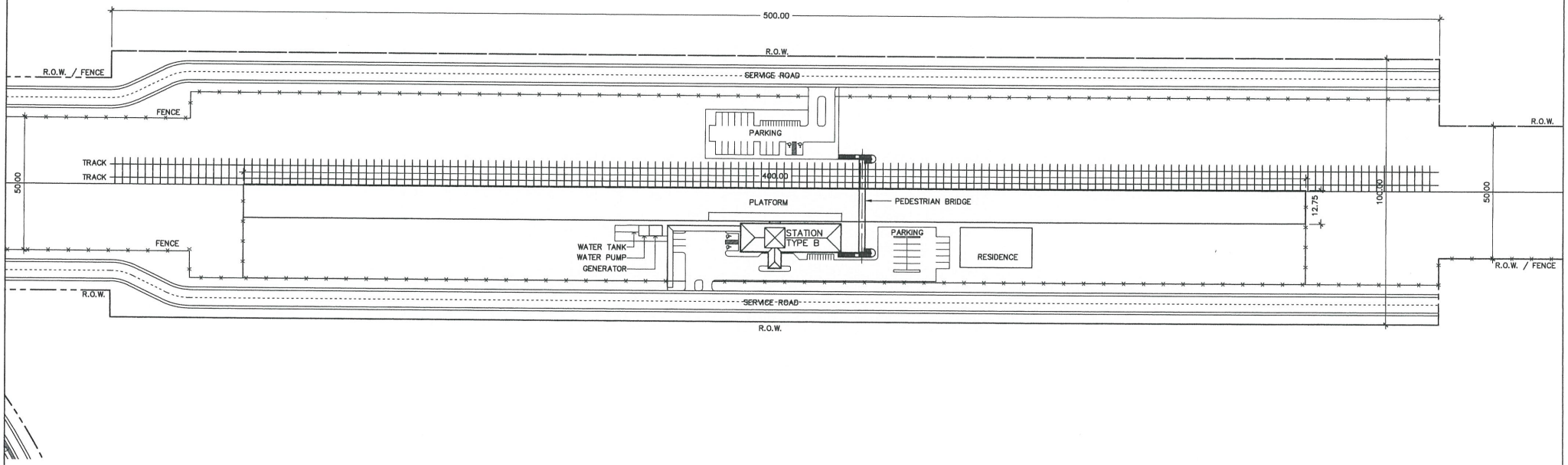
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-03 (BAN NA 2) SITE PLAN	DATE: FEBRUARY 2018	SCALE:	
				DWG. NO.: SCR-S3-AR-0001	SHEET NO.: 8	



LAYOUT PLAN

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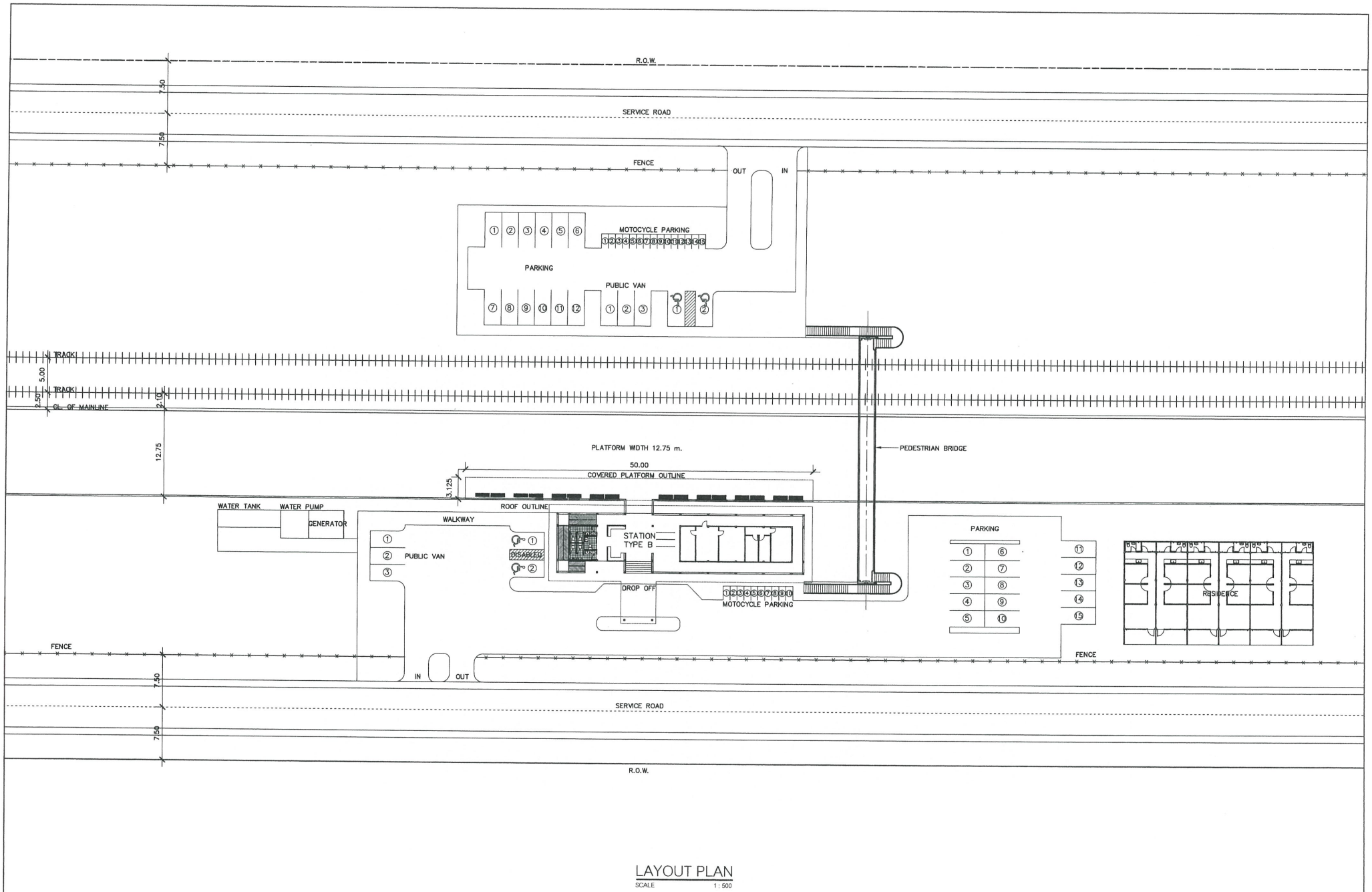
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-03 (BAN NA 2) LAYOUT PLAN	DATE: FEBRUARY 2018	SCALE:
				DWG. NO.: SCR-S3-AR-0002	SHEET NO.: 9



SITE PLAN

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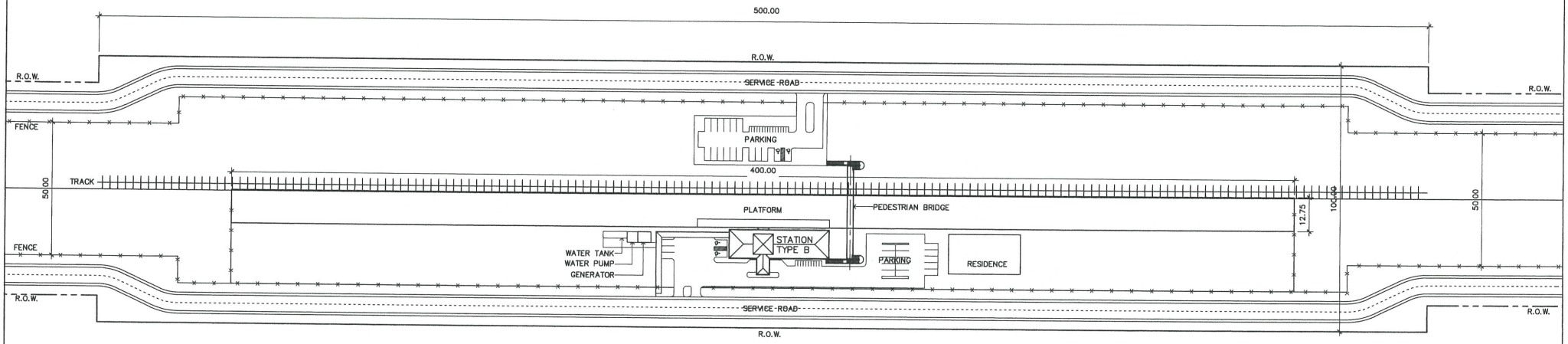
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-04 (PAK CHAN) SITE PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR-S4-AR-0001	SCALE : SHEET NO. : 10



LAYOUT PLAN

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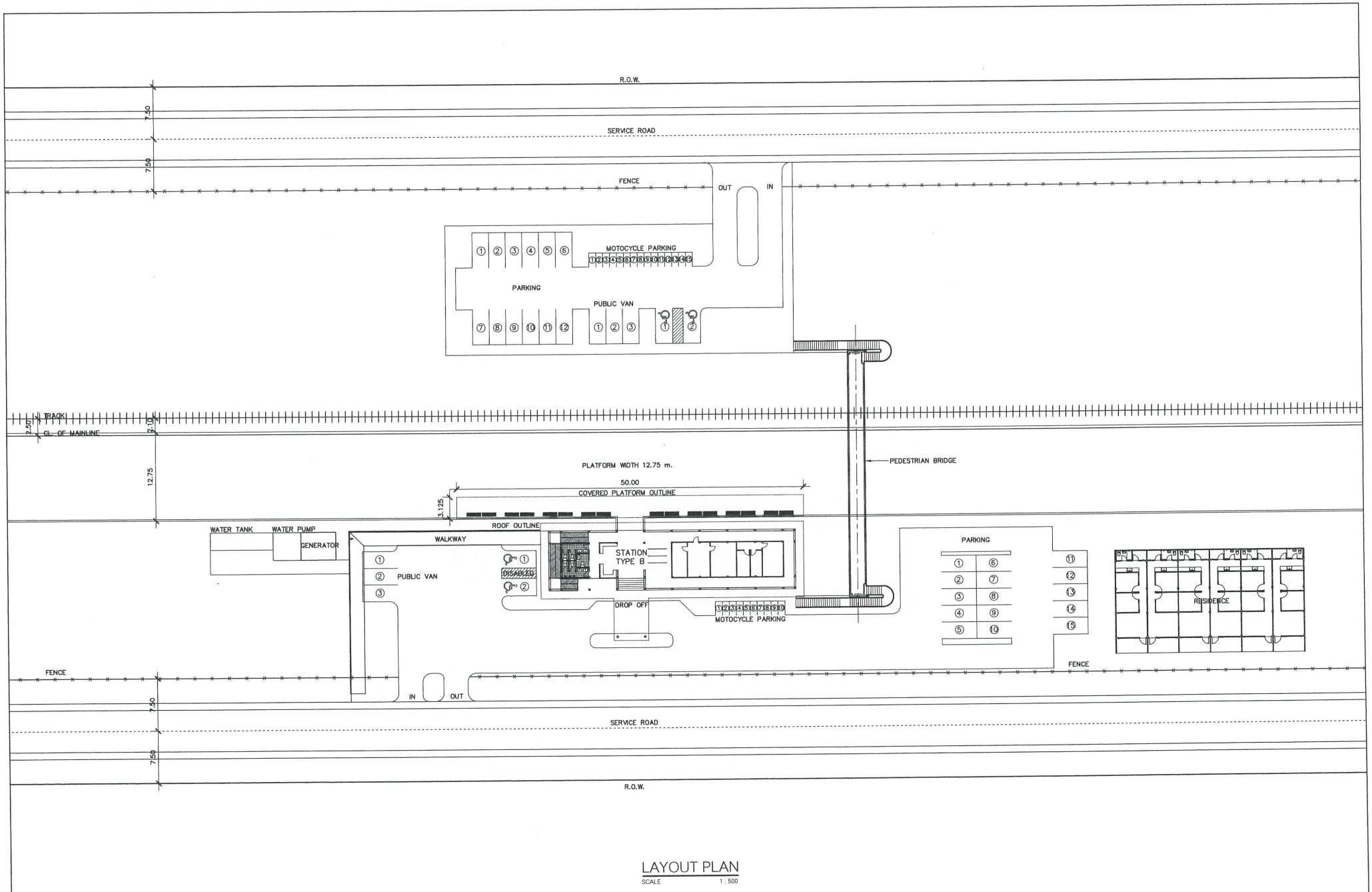
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-04 (PAK CHAN) LAYOUT PLAN	DATE: FEBRUARY 2018	SCALE:
				DWG. NO.: SCR-S4-AR-0002	SHEET NO.: 11



SITE PLAN

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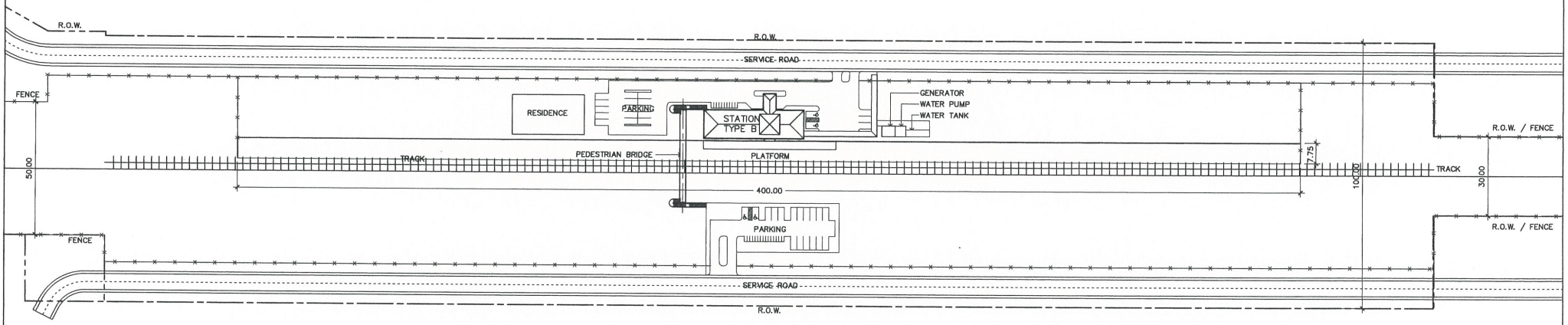
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-05 (KRA BURI) SITE PLAN	DATE : FEBRUARY 2018	SCALE :	
				DWG. NO. : SCR-S5-AR-0001	SHEET NO. : 12	



LAYOUT PLAN

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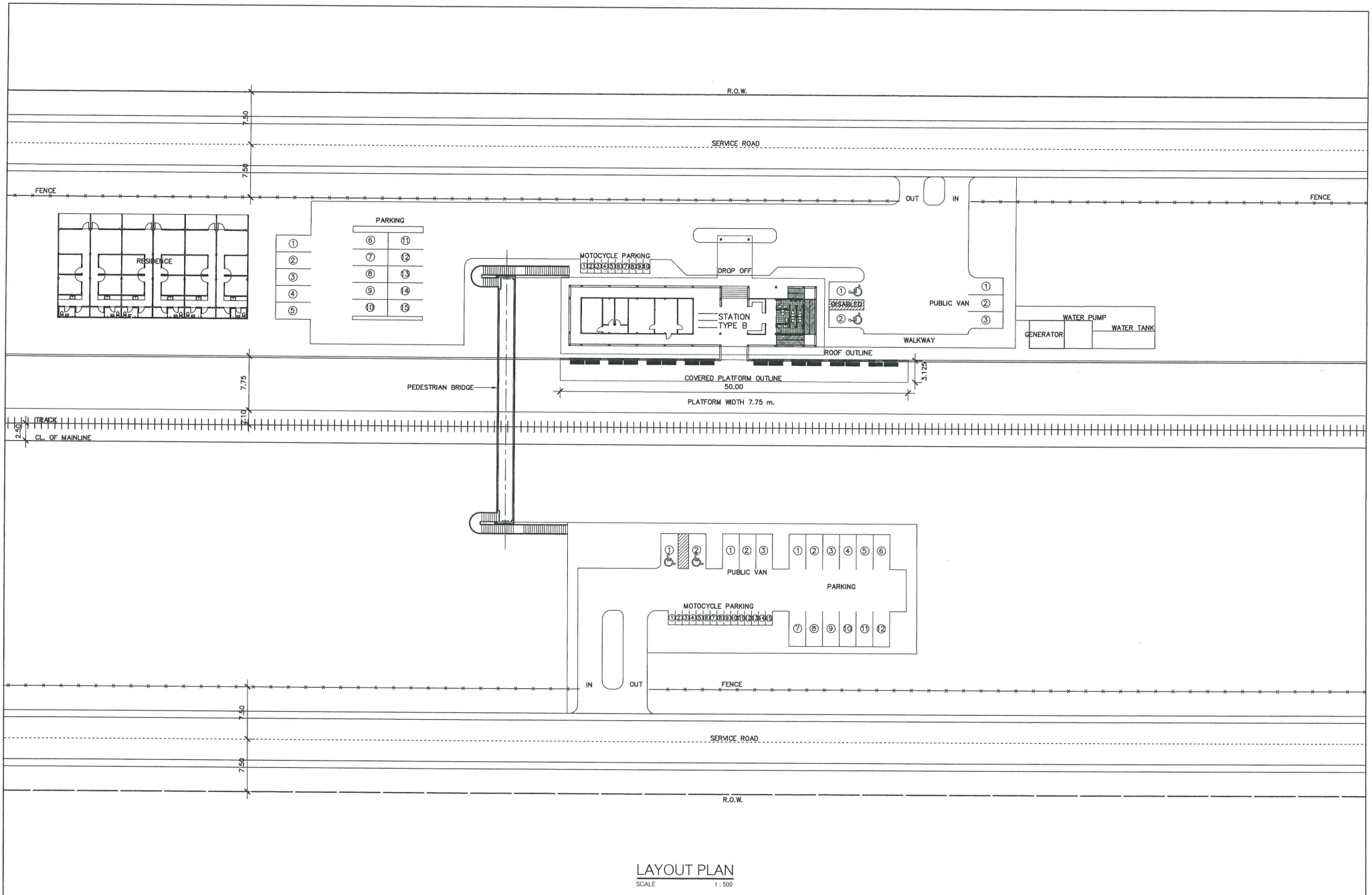
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-05 (KRA BURI) LAYOUT PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S5-AR-0002	SCALE: SHEET NO.: 13



SITE PLAN

SCALE 1 : 1500

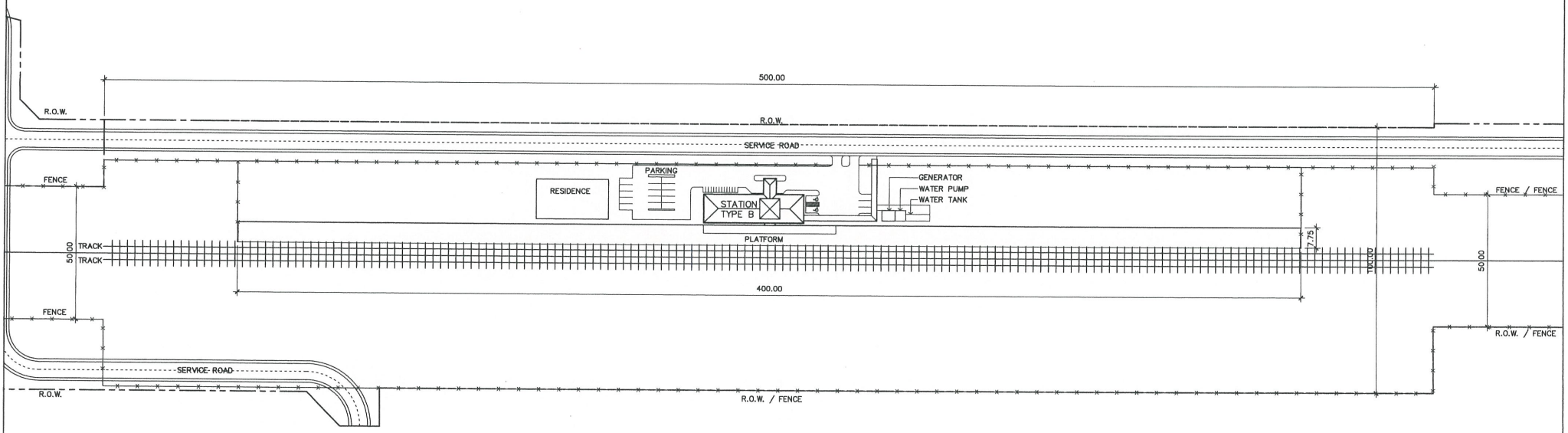
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-06 (BANG YAI) SITE PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR-S6-AR-0001	SCALE : SHEET NO. : 14



LAYOUT PLAN

SCALE 1 : 500

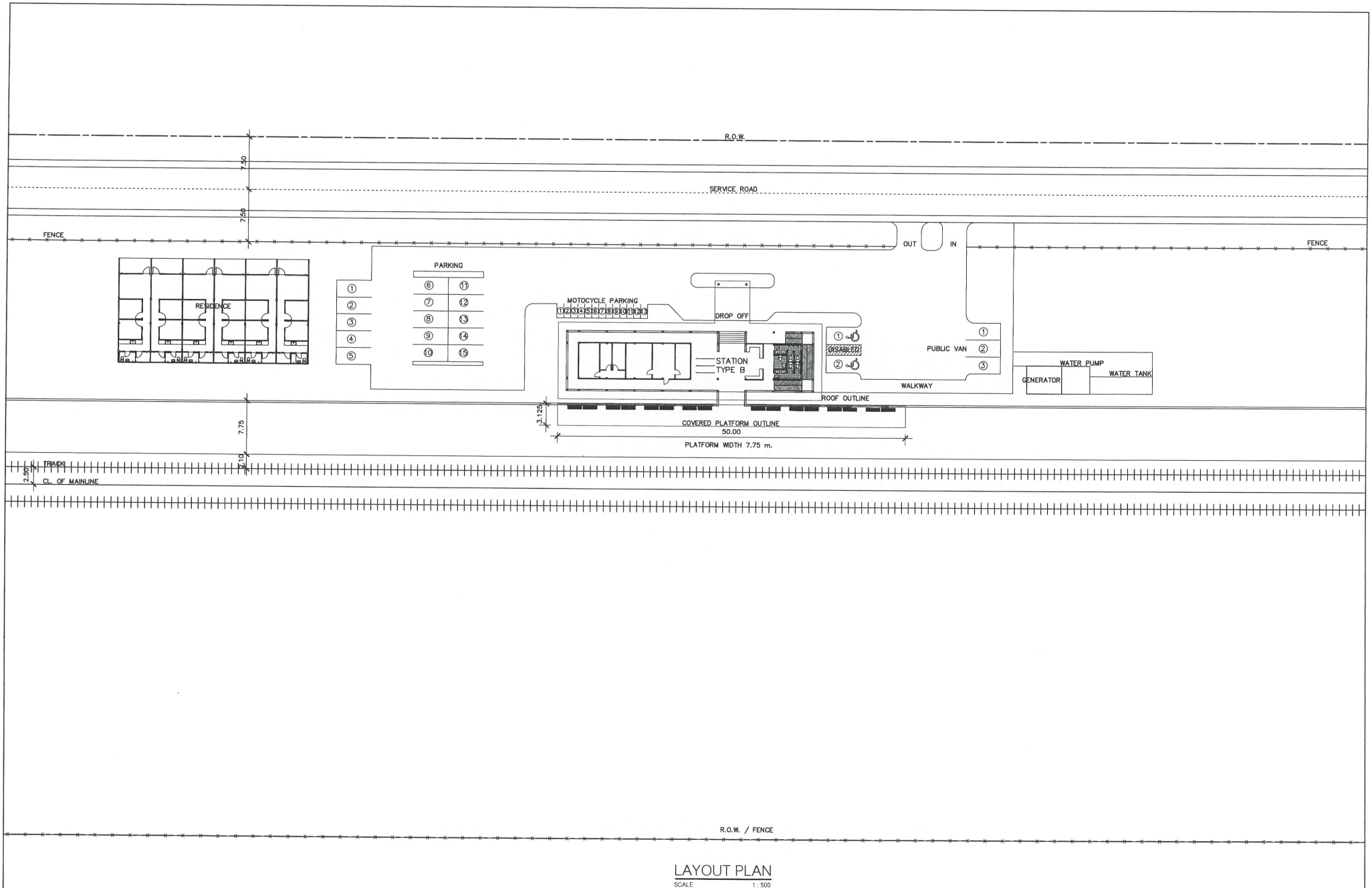
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-06 (BANG YAI) LAYOUT PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR-S6-AR-0002	SCALE : SHEET NO. : 15



SITE PLAN

SCALE 1 : 1500

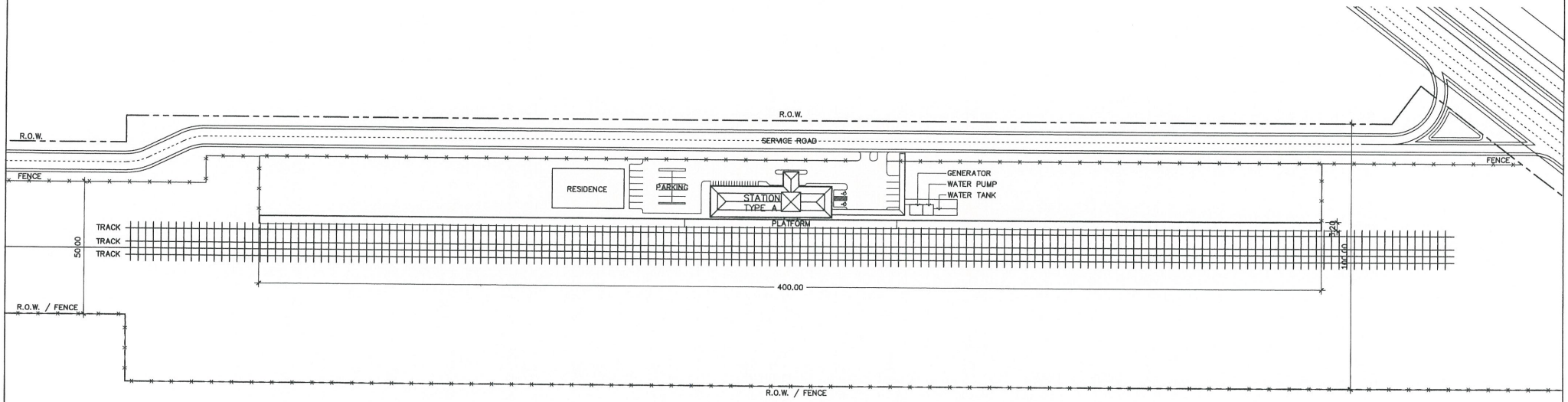
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-07 (LA-UN) SITE PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S7-AR-0001	SCALE: SHEET NO.: 16



LAYOUT PLAN

SCALE 1 : 500

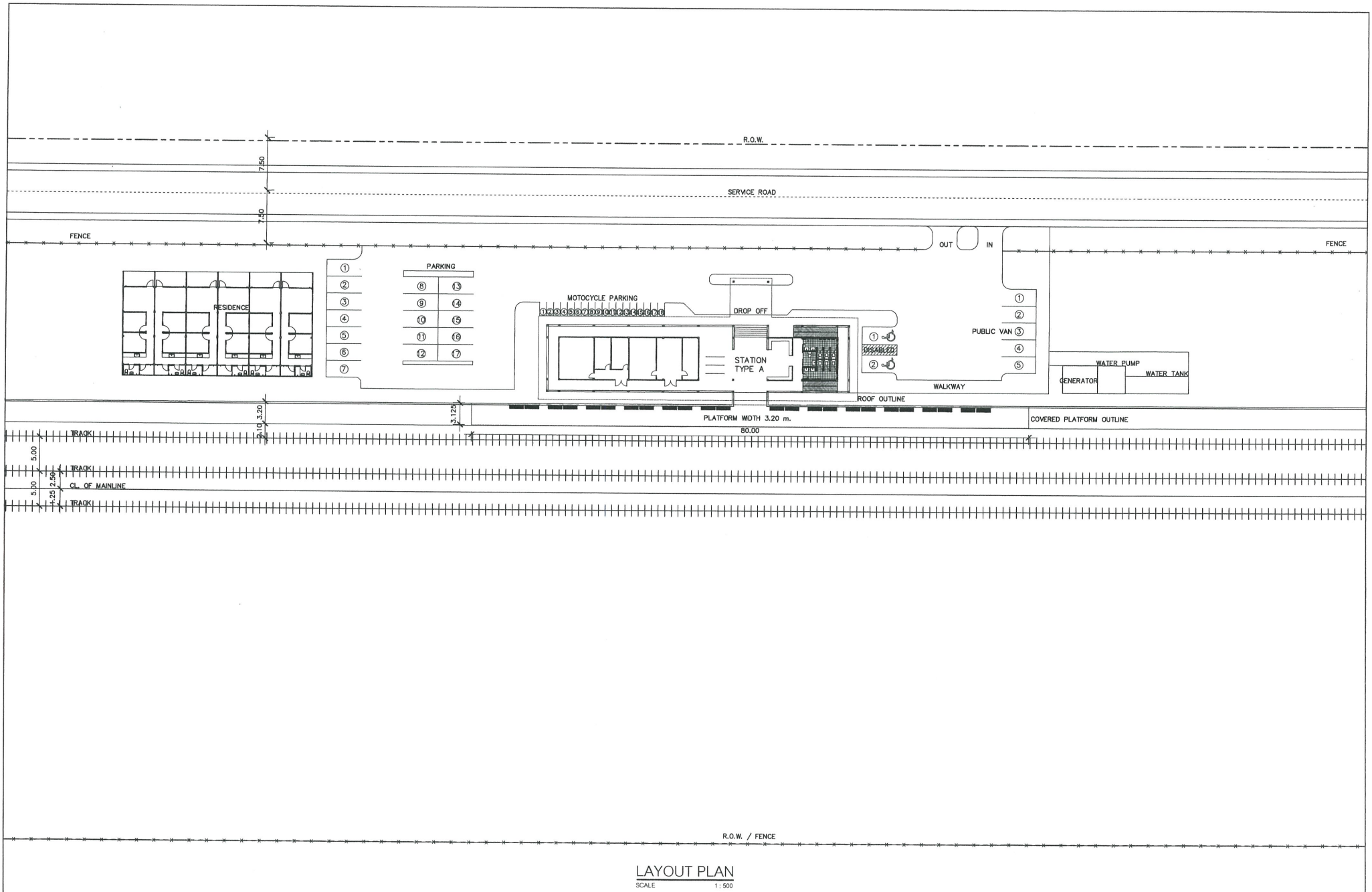
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-07 (LA-UN) LAYOUT PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR-S7-AR-0002	SCALE : SHEET NO. : 17



SITE PLAN

SCALE 1 : 1500

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-09 (RANONG) SITE PLAN	DATE : FEBRUARY 2018	SCALE :	
				DWG. NO. : SCR-S9-AR-0001	SHEET NO. : 18	



LAYOUT PLAN

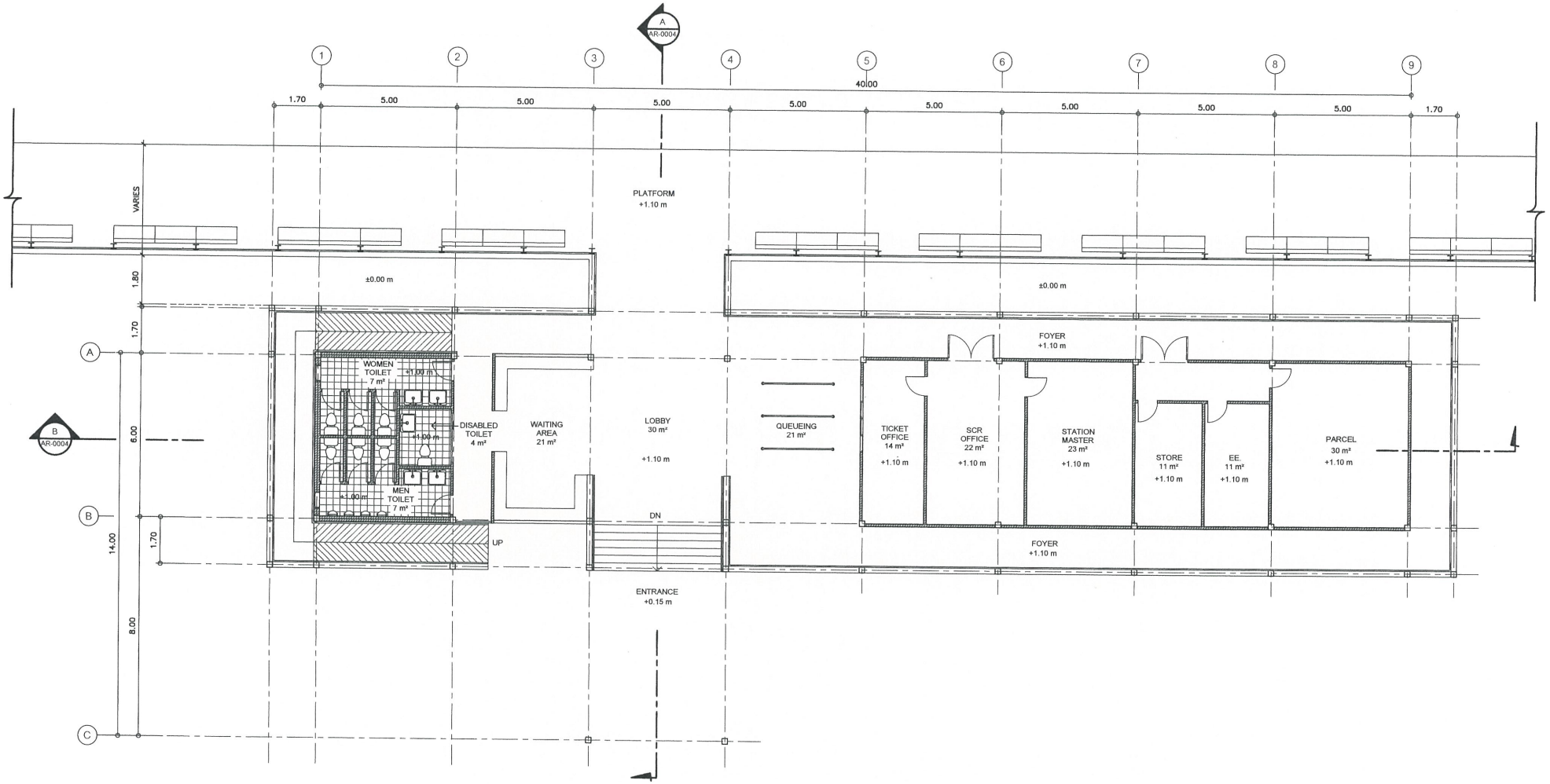
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-09 (RANONG) LAYOUT PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S9-AR-0002	SCALE: SHEET NO.: 19

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR		WALL				CEILING			FIRE RATING	REMARK
		MATERIAL	FINISH	MATERIAL	FINISH	PAINT	BASE	MATERIAL	FINISH	PAINT	(HOUR)	
101	TICKET OFFICE											
102	SCR OFFICE											
103	STATION MASTER											
104	STORE											
105	EE.											
106	PARCEL											
107	DISABLED TOILET											
108	WOMEN TOILET											
109	MEN TOILET											
110	WAITING AREA											
111	LOBBY											
112	QUEUEING											

MATERIAL LEGEND		

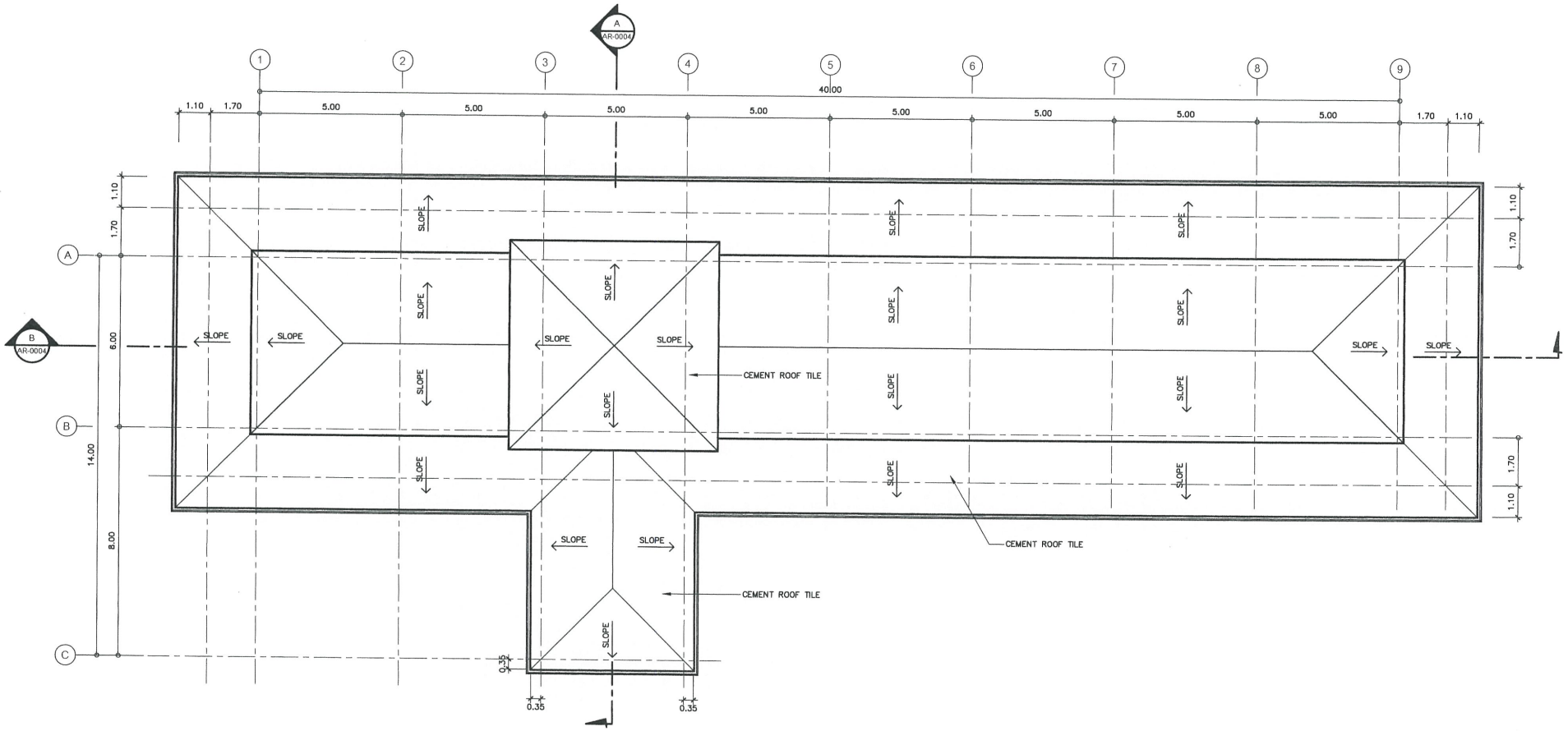


GROUND FLOOR PLAN

SCALE 1 : 150



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE A GROUND FLOOR PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR–SA–AR–0002	SCALE : SHEET NO. : 21

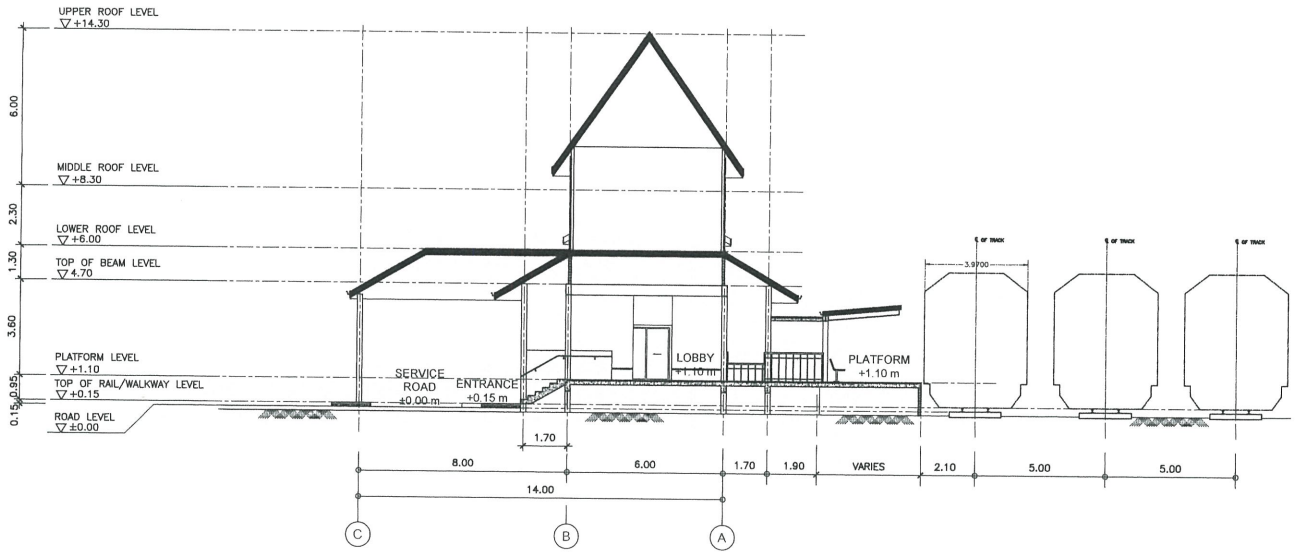


ROOF PLAN

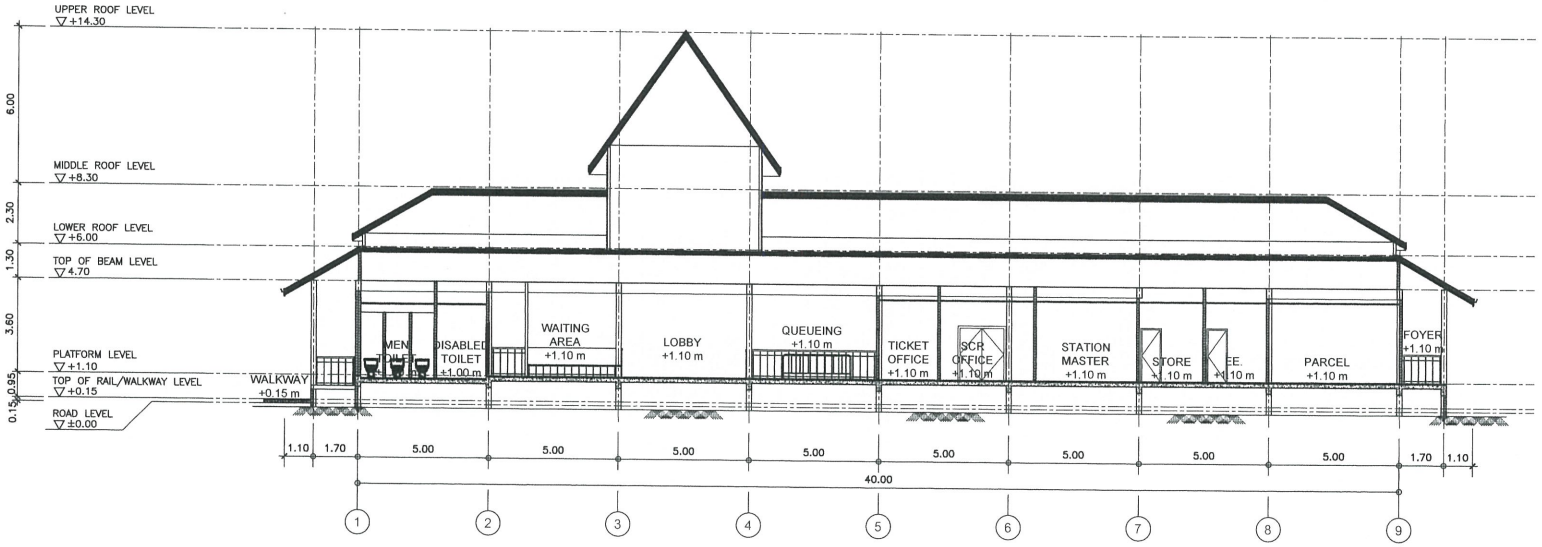
SCALE 1 : 150



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE A ROOF PLAN	DATE : FEBRUARY 2018 DWG. NO. : SCR–SA–AR–0003	SCALE : SHEET NO. : 22

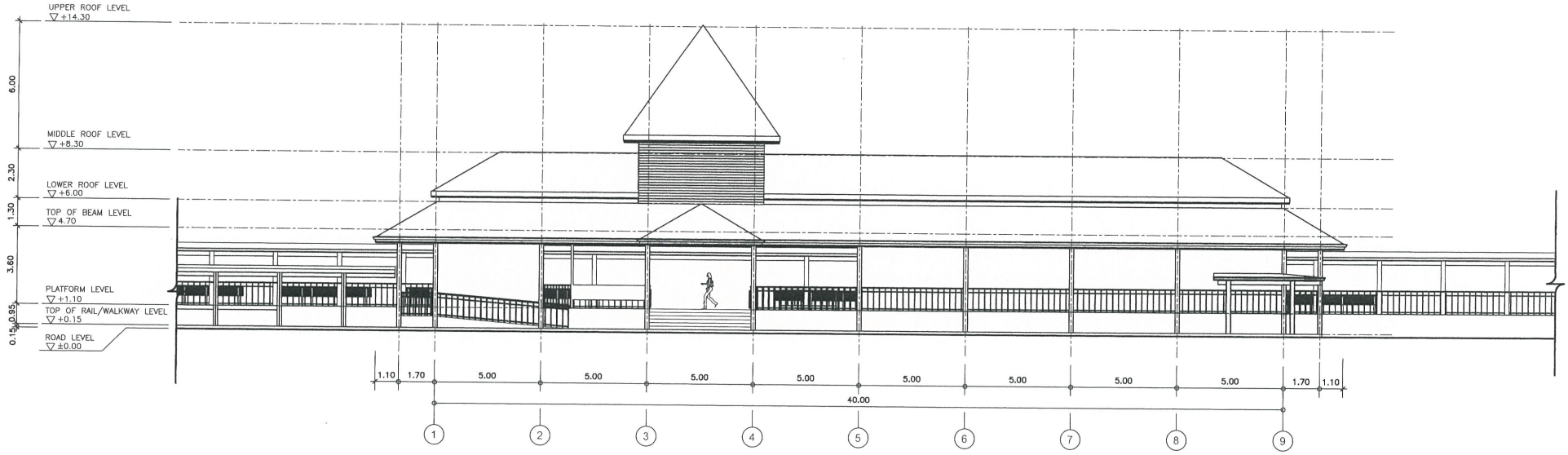


A SECTION
SCALE 1 : 200

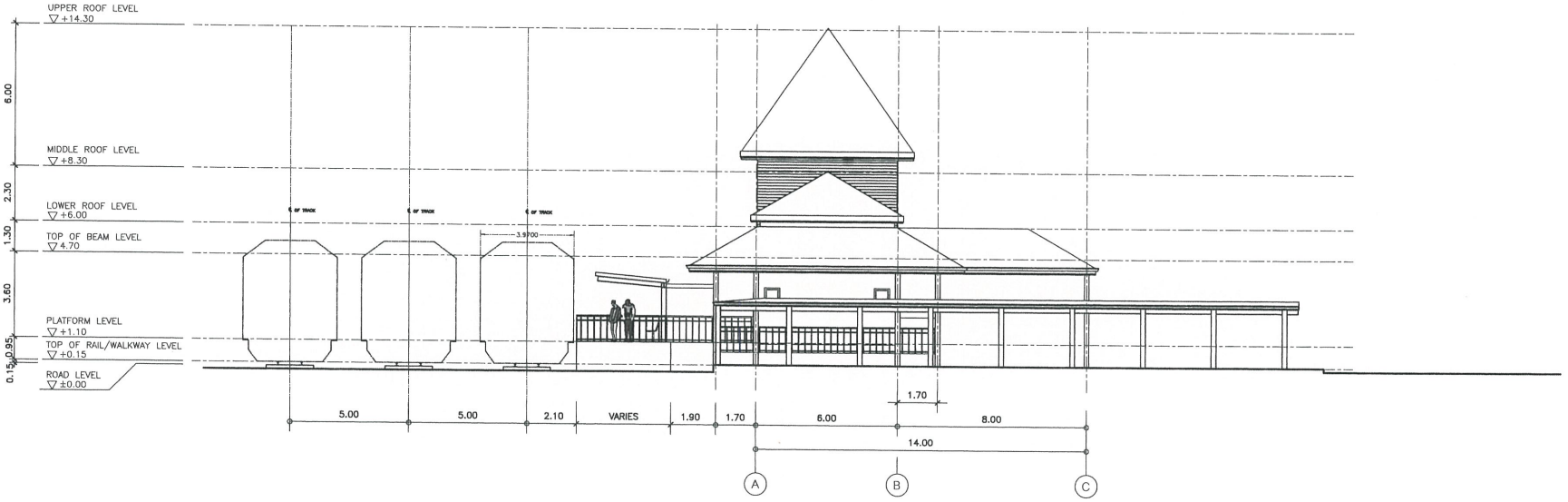


B SECTION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: STATION–TYPE A SECTION A, B	DATE: FEBRUARY 2018 DWG. NO.: SCR–SA–AR–0004	SCALE: SHEET NO.: 23

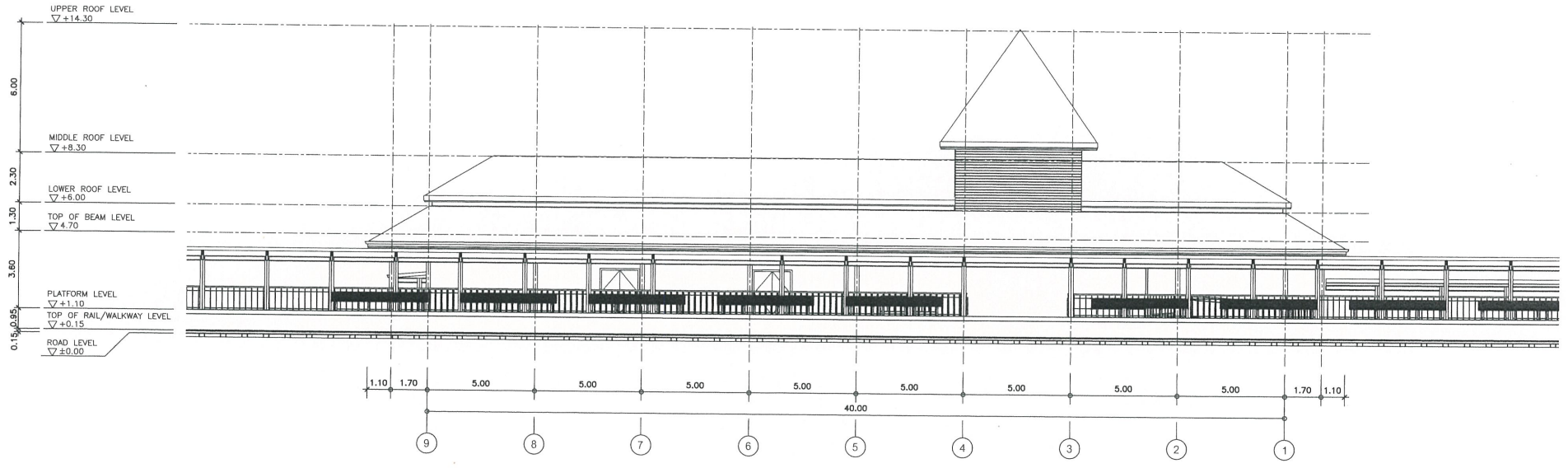


1 ELEVATION
SCALE 1 : 200

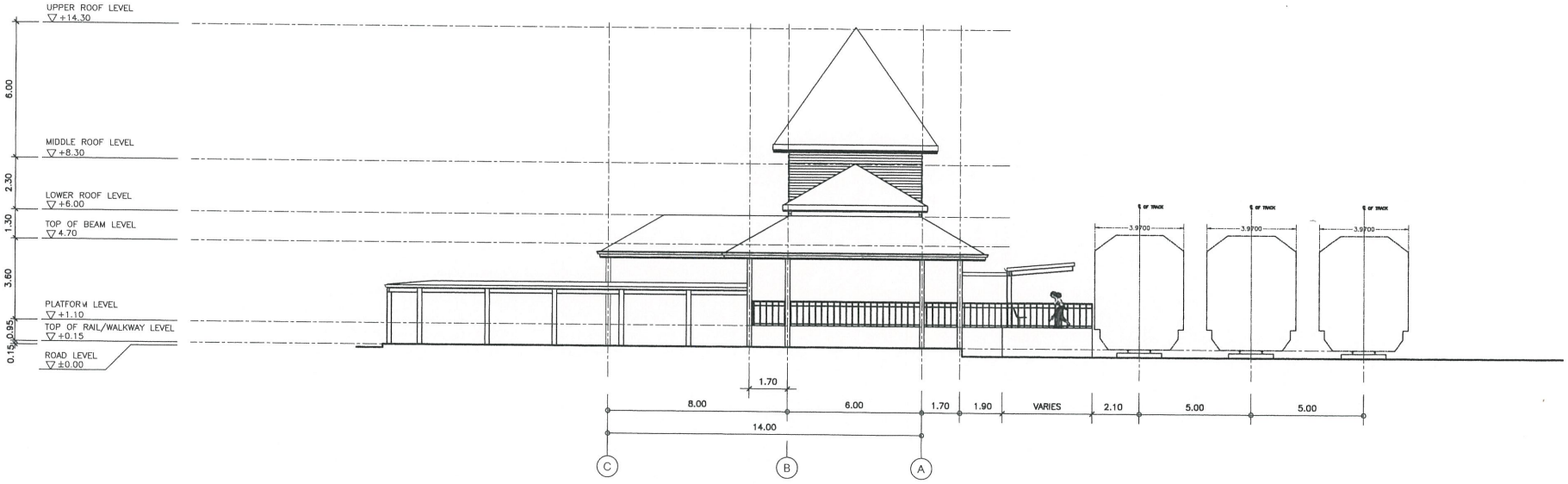


2 ELEVATION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE A ELEVATION 1, 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–SA–AR–0005	SCALE: SHEET NO.: 24



3 ELEVATION
SCALE 1 : 200



4 ELEVATION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE A ELEVATION 3, 4	DATE: FEBRUARY 2018 DWG. NO.: SCR–SA–AR–0006	SCALE: SHEET NO.: 25

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR		WALL				CEILING			FIRE RATING	REMARK
		MATERIAL	FINISH	MATERIAL	FINISH	PAINT	BASE	MATERIAL	FINISH	PAINT	(HOUR)	
101	TICKET OFFICE											
102	SCR OFFICE											
103	STATION MASTER											
104	STORE											
105	EE.											
106	PARCEL											
107	DISABLED TOILET											
108	WOMEN TOILET											
109	MEN TOILET											
110	WAITING AREA											
111	LOBBY											
112	QUEUEING											

MATERIAL LEGEND		

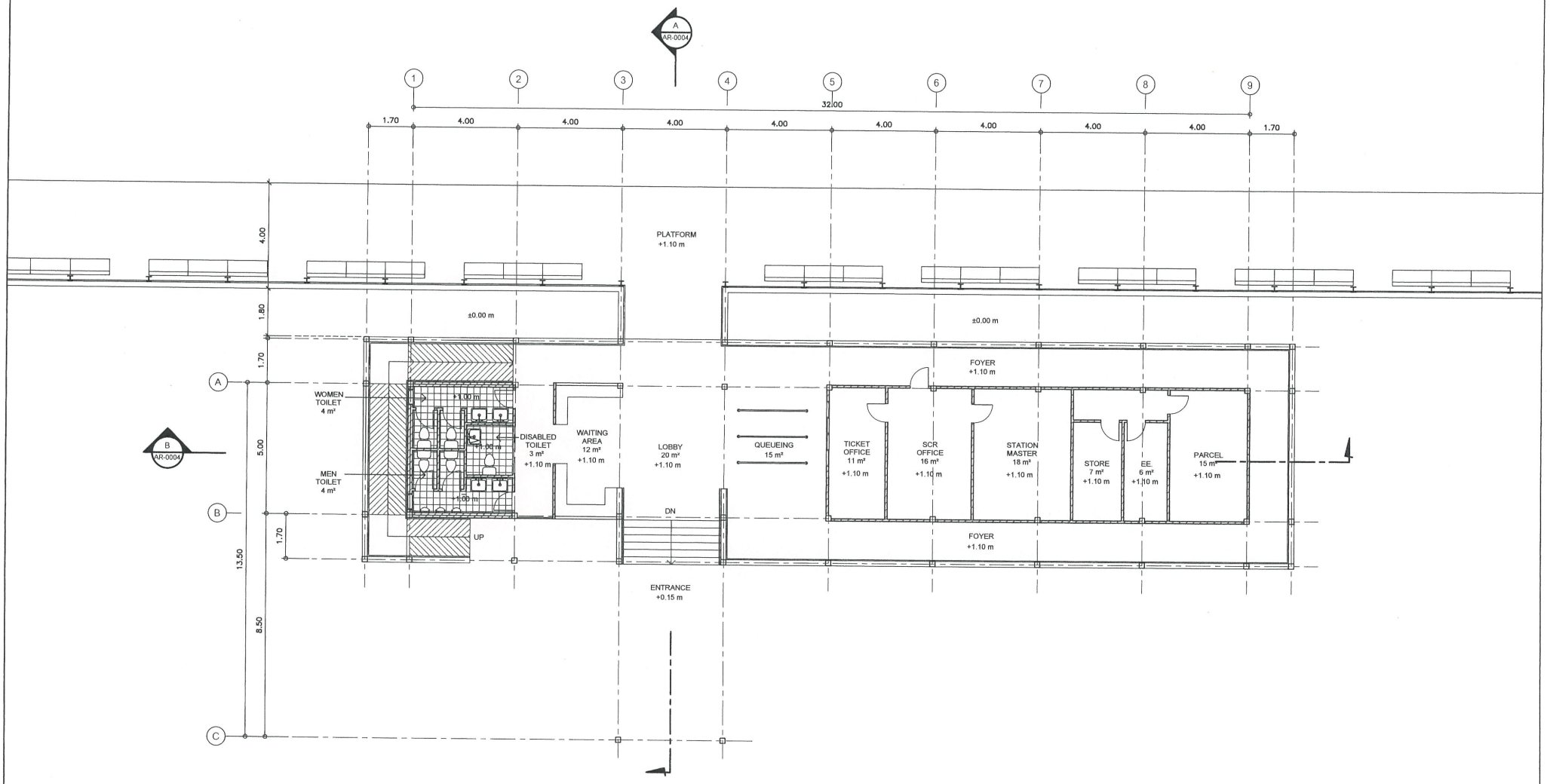
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: STATION-TYPE B
ROOM FINISH SCHEDULE

DATE: FEBRUARY 2018
SCALE:
DWG. NO.: SCR-SB-AR-0001
SHEET NO.: 26

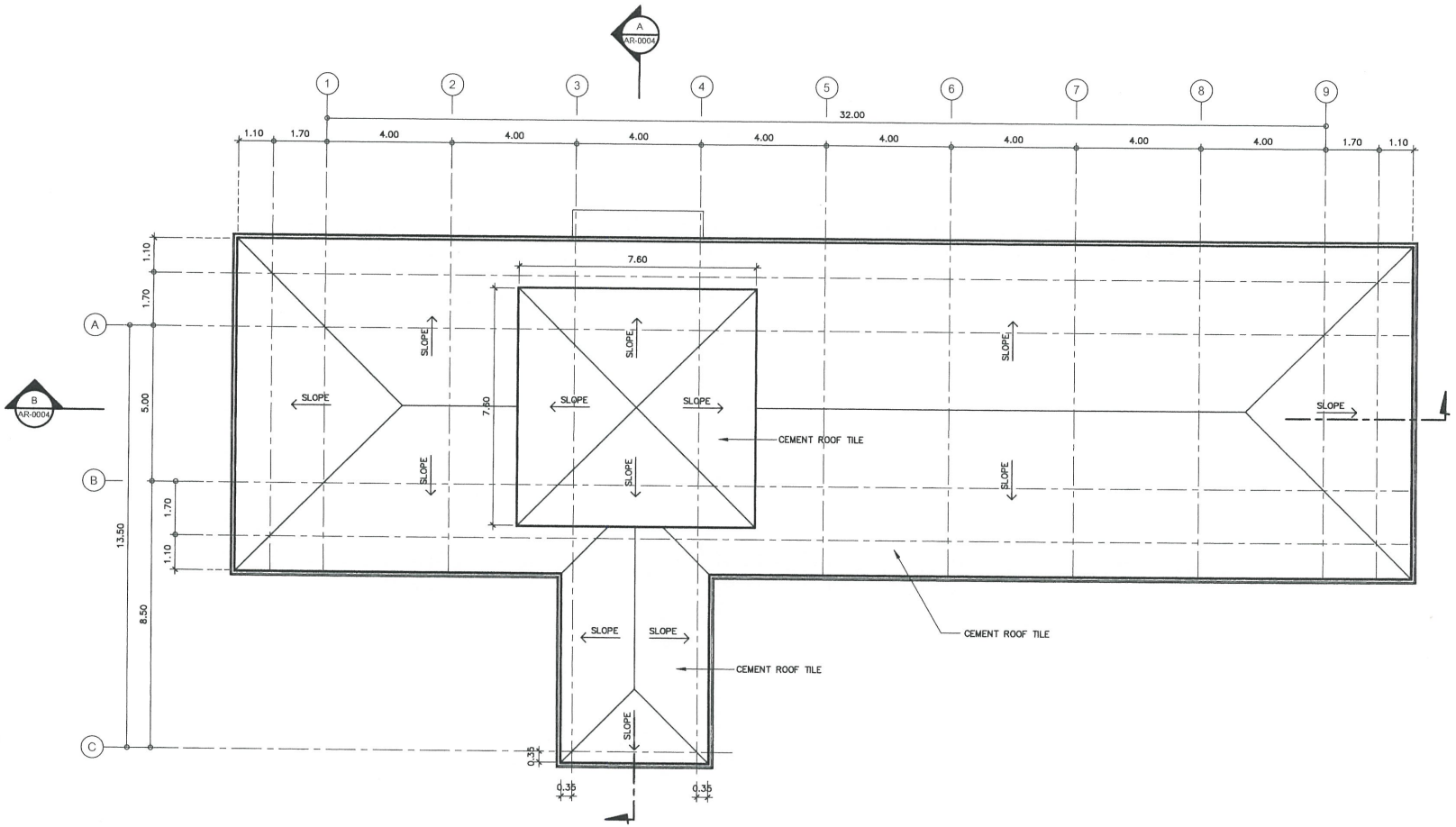


GROUND FLOOR PLAN

SCALE 1 : 150



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE B GROUND FLOOR PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–AR–0002	SCALE: SHEET NO.: 27

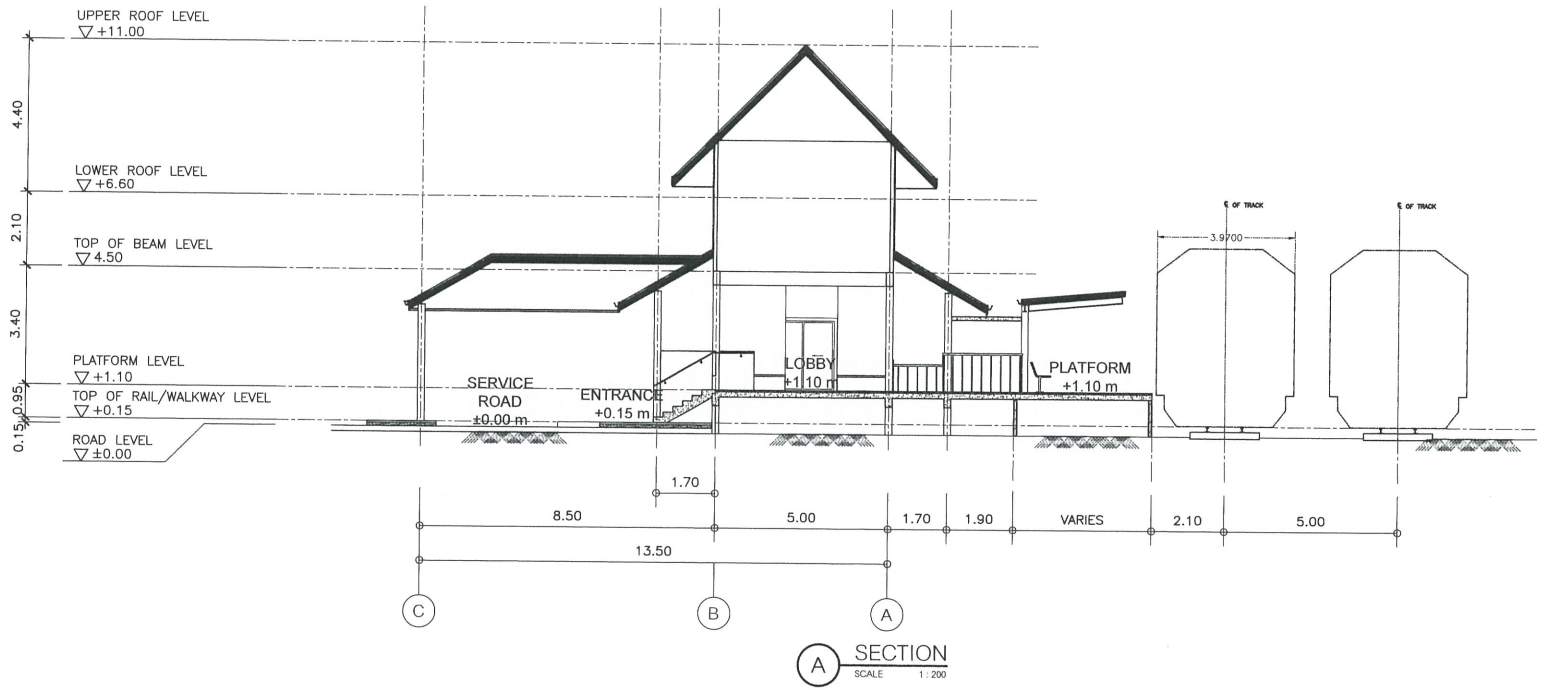


ROOF PLAN

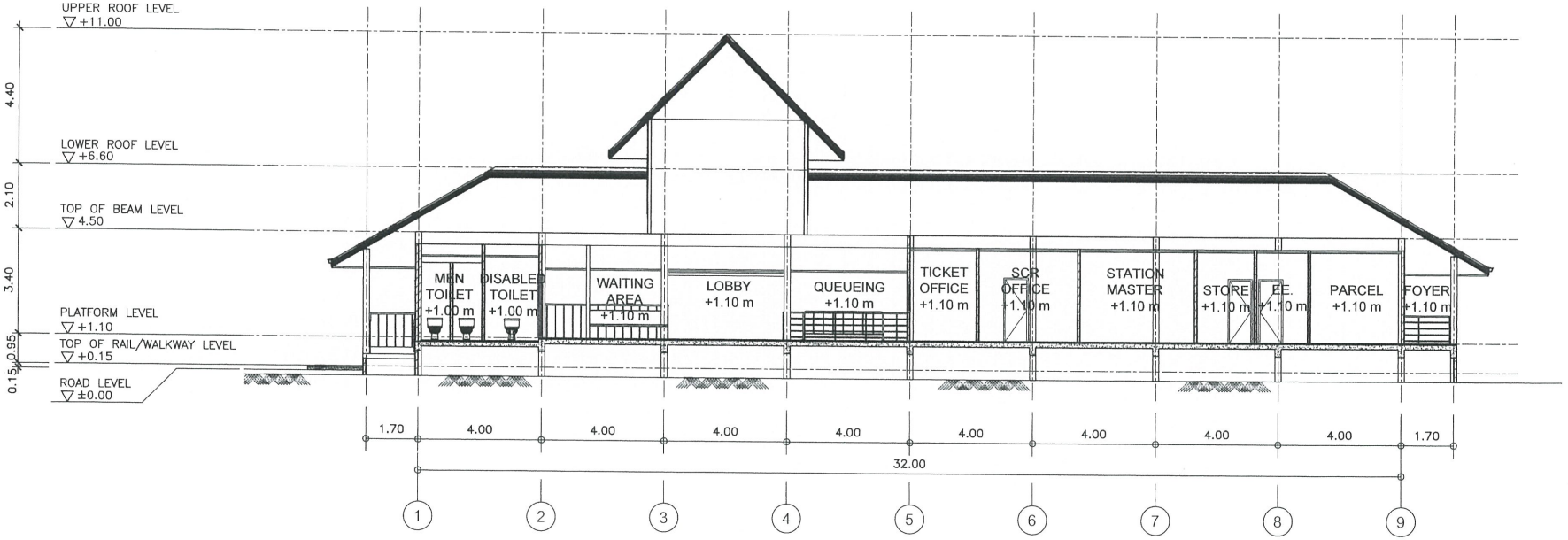
SCALE 1 : 150



KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE B ROOF PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–AR–0003	SCALE: SHEET NO.: 28

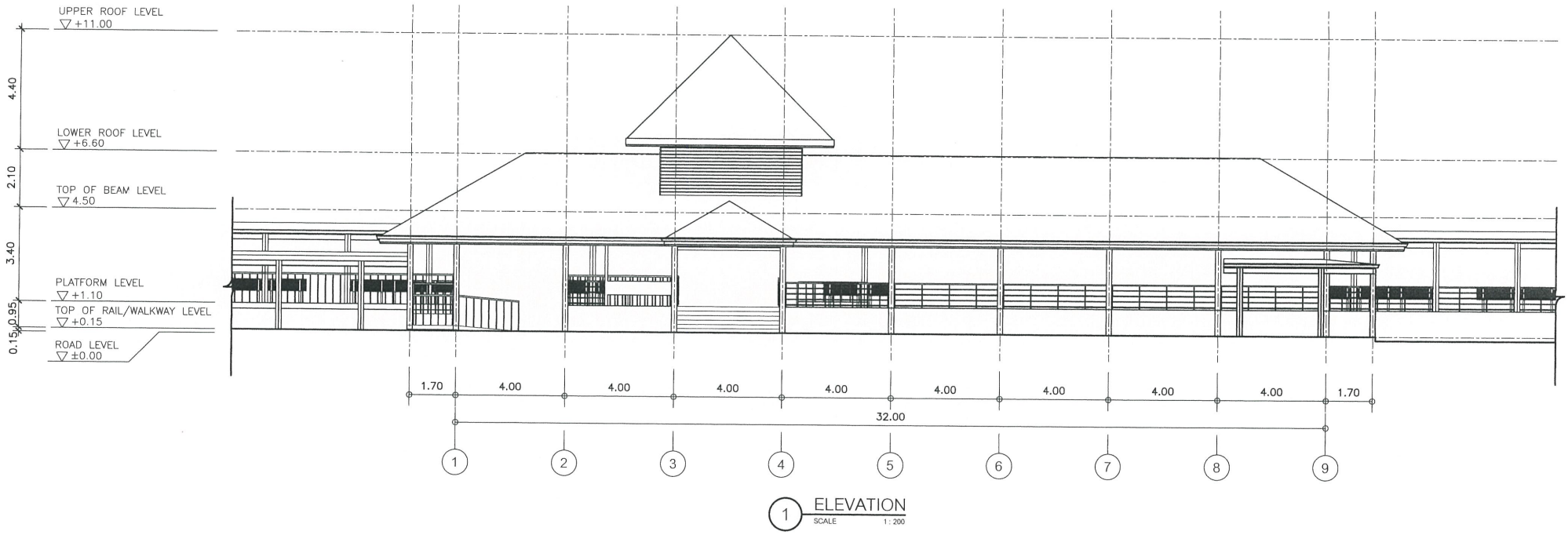


A SECTION
SCALE 1 : 200

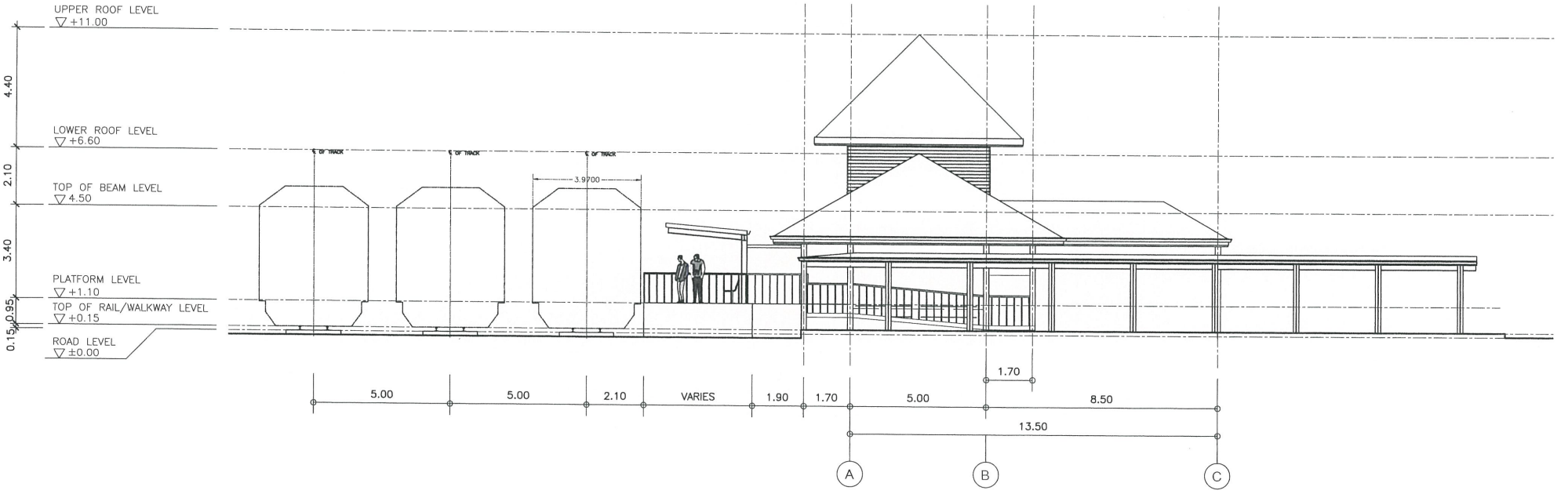


B SECTION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE B SECTION A, B	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–AR–0004	SCALE: SHEET NO.: 29

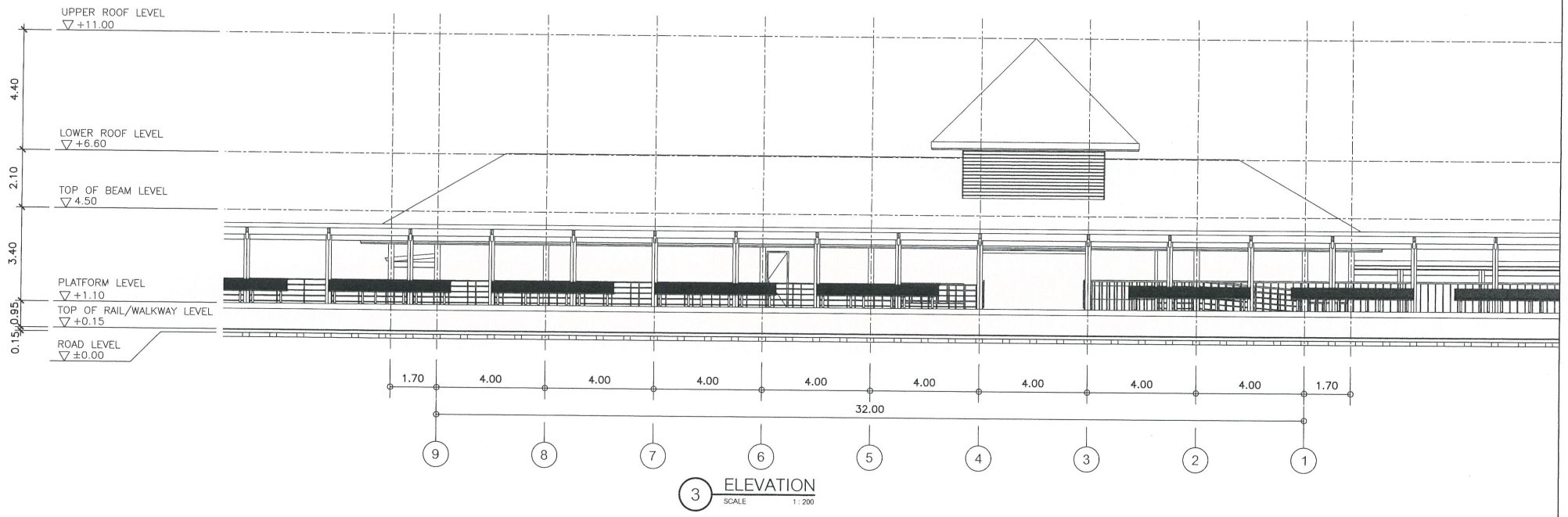


1 ELEVATION
SCALE 1 : 200

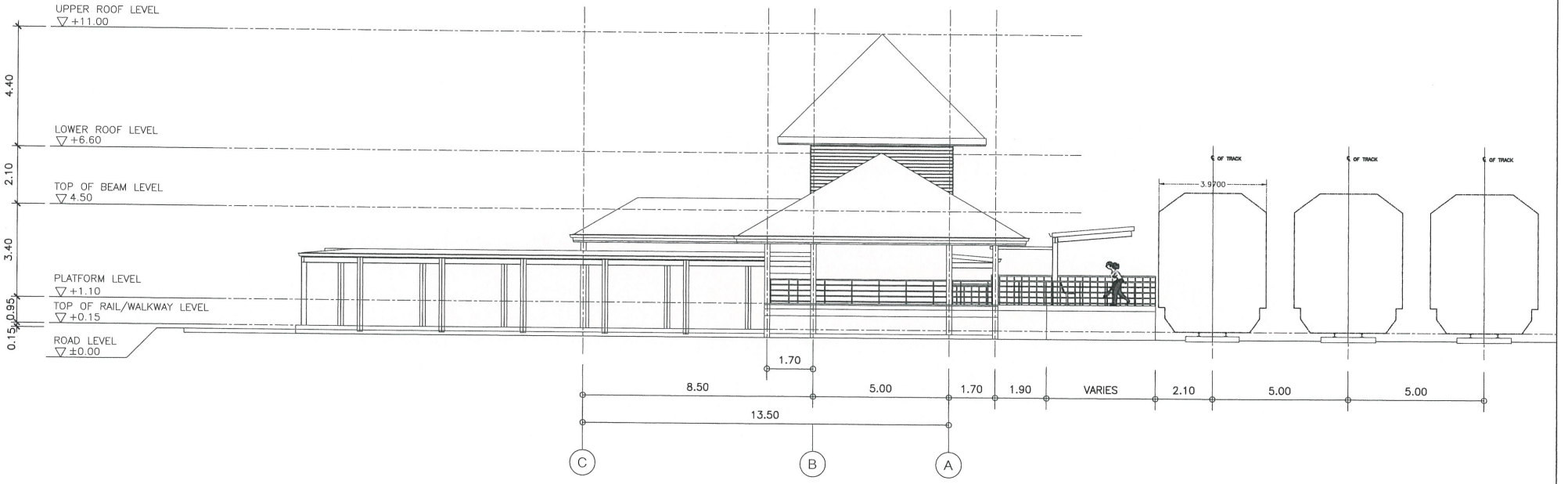


2 ELEVATION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE B ELEVATION 1, 2	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–AR–0005	SCALE: SHEET NO.: 30



3 ELEVATION
SCALE 1 : 200



4 ELEVATION
SCALE 1 : 200

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION–TYPE B ELEVATION 3, 4	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–AR–0006	SCALE: SHEET NO.: 31

ELECTRICAL AND MECHANICAL WORK

LIST DRAWING		
SHEET NO.	ITEM	DRAWING NO.
	GENERAL	
1	LIST OF DRAWINGS	SCR-G-001
2	ELECTRICAL SYSTEM ABBREVIATION SYMBOL AND GENERAL NOTES	SCR-G-002
3	AIR CONDITIONING AND VENTILATION SYSTEM ABBREVIATION SYMBOL AND GENERAL NOTES	SCR-G-003
4	PLUMBING AND SANITARY SYSTEM ABBREVIATION SYMBOL AND GENERAL NOTES	SCR-G-004
	ELECTRICAL & MECHANICAL WORK	
	S-01 KHUN KRATHING	
	ELECTRICAL SYSTEM (EE)	
5	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S1-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
6	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S1-PS-001
	S-02 BAN NA (1)	
	ELECTRICAL SYSTEM (EE)	
7	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S2-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
8	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S2-PS-001
	S-03 BAN NA (2)	
	ELECTRICAL SYSTEM (EE)	
9	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S3-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
10	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S3-PS-001
	S-04 PAK CHAN	
	ELECTRICAL SYSTEM (EE)	
11	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S4-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
12	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S4-PS-001
	S-05 KRA BUR	
	ELECTRICAL SYSTEM (EE)	
13	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S5-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
14	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S5-PS-001
	S-06 BANG YAI	
	ELECTRICAL SYSTEM (EE)	
15	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S6-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
16	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S6-PS-001
	S-07 LA-UN	
	ELECTRICAL SYSTEM (EE)	
17	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S7-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
18	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S7-PS-001
	S-09 RANONG	
	ELECTRICAL SYSTEM (EE)	
19	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-S9-EE-001
	PLUMBING AND SANITARY SYSTEM (PS)	
20	COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	SCR-S9-PS-001
	STATION TYPE A	
	ELECTRICAL SYSTEM (EE)	
21	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-SA-EE-001
22	LV POWER DISTRIBUTION SYSTEM RISER DIAGRAM	SCR-SA-EE-002
23	LIGHTING CONTROL SYSTEM RISER DIAGRAM	SCR-SA-EE-003
24	FIRE ALARM SYSTEM RISER DIAGRAM	SCR-SA-EE-004
25	PUBLIC TELEPHONE SYSTEM RISER DIAGRAM RISER DIAGRAM	SCR-SA-EE-005
26	LIGHTNING PROTECTION SYSTEM RISER DIAGRAM	SCR-SA-EE-006
27	EMERGENCY CALL SYSTEM DIAGRAM	SCR-SA-EE-007
	AIR CONDITIONING AND VENTILATION SYSTEM (AC)	
28	AIR CONDITIONING SYSTEM SCHEMATIC DIAGRAM	SCR-SA-ME-001
	PLUMBING AND SANITARY SYSTEM (PS)	
29	COLD WATER SYSTEM RISER DIAGRAM	SCR-SA-PS-001
30	SOIL, WASTE AND VENT SYSTEM RISER DIAGRAM	SCR-SA-PS-002
31	RAIN LEADER SYSTEM RISER DIAGRAM	SCR-SA-PS-003
	STATION TYPE B	
	ELECTRICAL SYSTEM (EE)	
32	LV POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	SCR-SB-EE-001
33	LV POWER DISTRIBUTION SYSTEM RISER DIAGRAM	SCR-SB-EE-002
34	LIGHTING CONTROL SYSTEM RISER DIAGRAM	SCR-SB-EE-003
35	FIRE ALARM SYSTEM RISER DIAGRAM	SCR-SB-EE-004
36	PUBLIC TELEPHONE SYSTEM RISER DIAGRAM	SCR-SB-EE-005
37	LIGHTNING PROTECTION SYSTEM RISER DIAGRAM	SCR-SB-EE-006
38	EMERGENCY CALL SYSTEM DIAGRAM	SCR-SB-EE-007
	AIR CONDITIONING AND VENTILATION SYSTEM (AC)	
39	AIR CONDITIONING SYSTEM SCHEMATIC DIAGRAM	SCR-SB-ME-001
	PLUMBING AND SANITARY SYSTEM (PS)	
40	COLD WATER SYSTEM RISER DIAGRAM	SCR-SB-PS-001
41	SOIL, WASTE AND VENT SYSTEM RISER DIAGRAM	SCR-SB-PS-002
42	RAIN LEADER SYSTEM RISER DIAGRAM	SCR-SB-PS-003

ABBREVIATIONS FOR ELECTRICAL SYSTEM

ABBREVIATIONS	DESCRIPTIONS
A	AMPERE
AC (or ac)	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AN/AF	AIR NATURAL/AIR FORCED
ANN	ANNUNCIATOR
AS	AMPERE SELECTOR SWITCH
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXITIARY
B	BLUE
BC	BARE COPPER CONDUCTOR
BMS	BUILDING MANAGEMENT SYSTEM
C	CORE
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CT	CURRENT TRANSFORMER
COM	COMMUNICATION SYSTEM
CKT	CIRCUIT
Cu.	COPPER
DC (or dc)	DIRECT CURRENT
DIA.	DIAMETER
DPM.	(MULTI-FUNCTIONAL) DIGITAL POWER METER
DWG.	DRAWING
E	EARTH
EMT	ELECTRICAL METALLIC TUBING
EMDB	ESSENTIAL MAIN DISTRIBUTION BOARD
ESPS	ESCALATOR SPRINKLER PROTECTION SYSTEM
ESS	ESSENTIAL
F	FUSE
FCP	FIRE ALARM CONTROL PANEL
FP	FIRE PUMP
FRC	FIRE RESISTANT CABLE
GND	GROUND
HDPE	HIGH DENSITY POLYETHYLENE
HH	HANDHOLE
HP (or hp)	HORSE POWER
HRC	HIGH RUPTURING CAPACITY
HV	HIGH VOLTAGE
Hz.	HERTZ
Ic	INTERRUPTING CAPACITY
IMC	INTERMEDIATE METAL CONDUIT
JP	JOCKEY PUMP
KA	KILO AMPERE
kV	KILO VOLT
kVA	KILO VOLT-AMPERE
kVAr	KILO VOLT-AMPERE REACTIVE
KW	KILO WATT
kWH	KILO WATT-HOUR
LA	LIGHTNING ARRESTER
LBS	LOAD BREAK SWITCH
LC	LOAD CENTER (or Panelboard)
LCP	LIGHTING CONTROL PANEL
LRP	LIGHTING RELAY PANEL
LTG.	LIGHTING
LSOH	LOW SMOKE,ZERO HALOGEN
LV	LOW VOLTAGE
M	METER
mm.	MILLIMETER
MCC	MOTOR CONTROL CENTER
MCCB	MOULDED CASE CIRCUIT BREAKER
MDB	MAIN DISTRIBUTION BOARD
MH	MANHOLE
MS	MARSHALLING BOX
MV	MEDIUM VOLTAGE
N	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
P	POLE
PA	PUBLIC ADDRESS SYSTEM
PC	PERSONAL COMPUTER
PF	POWER FACTOR
PFC	POWER FACTOR CONTROLLER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE

ABBREVIATION	DESCRIPTION
R	RED
RC	REINFORCED CONCRETE
RCCB	RESIDUAL CURRENT CIRCUIT BREAKER
RMU	RING MAIN UNIT
rpm.	REVOLUTION PER MINUTE
RPU	REMOTE PROCESSING UNIT
RSC	RIGID STEEL CONDUIT
RTRC	REINFORCED THERMOSETTING RESIN CONDUIT
RTU	REMOTE TERMINAL UNIT
S	SWITCH
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SN	SANITARY
SQ.	SQUARE
SQ.MM.	SQUARE MILLIMETER
SRG	SIGNAL REFERENCE GRID
SP	SWITCH PANEL
SPD	SURGE PROTECTION DEVICES
STD.	STANDARD
SW	SWITCH
SWA	STEEL WIRE ARMOURED
SWGR	SWITCHGEAR
TR	TRANSFORMER
TYP	TYPICAL
UPS	UNINTERRUPTIBLE POWER SUPPLY
UG	UNDERGROUND
U/G	UNDERGROUND
V	VOLT
VA	VOLT-AMPERE
VS	VOLT SELECTOR SWITCH
W	WATT
wp	WEATHERPROOF
WWTP	WASTE WATER TREATMENT PLANT
W/	WITH
W/O	WITHOUT
XLPE	CROSS-LINKED POLYETHYLENE
Y	YELLOW

SYMBOL FOR POWER DISTRIBUTION SYSTEM

SYMBOL	DESCRIPTION
	DISTRIBUTION TRANSFORMER
	LIGHTNING ARRESTER OR SURGE ARRESTER
M	MOTOR DRIVED MECHANISM
	LOW TENSION CURRENT TRANSFORMER
	LOW TENSION HRC. FUSE
	CONTROL FUSE
	LOAD BREAK SWITCHES OR SWITCH DISCONNECTORS
	CIRCUIT BREAKER
	AIR CIRCUIT BREAKER
PFC	POWER FACTOR CONTROLLER
	POWER CAPACITOR
	MULTIFUNCTION DIGITAL METER (V,A,KW,KWH,PF,Hz)
A	AMPETER
AS	AMPMETER SELECTOR SWITCH 4 POSITION
V	VOLTMETER
VS	VOLT SELECTOR SWITCH 7 POSITION
KW	KILOWATT METER
kWH	DIGITAL kWH METER WITH CURRENT TRANSFORMER
⊗	PILOT LAMP
MDB	MAIN DISTRIBUTION BOARD
EMDB	ESSENTIAL MAIN DISTRIBUTION BOARD

SYMBOL	DESCRIPTION
NMDB	NON-ESSENTIAL MAIN DISTRIBUTION BOARD
	DISTRIBUTION PANEL
	DISTRIBUTION PANEL BY OTHER
	kWH METER PANEL
	LOAD CENTER OR PANEL BOARD
	LIGHTING RELAY PANEL BOARD
	FUSE SAFETY SWITCH WITH ENCLOSURE
	SAFETY SWITCH WITH ENCLOSURE -NEMA Type 1 OR IP >=10 -NEMA Type 3R OR IP >=14 FOR OUTDOOR TYPE
CB	CIRCUIT BREAKER BOX WITH ENCLOSURE RATING AS SPECIFIED
C OR P	CONNECTING BOX OR PULL BOX
MH OR H	ELECTRICAL MANHOLE OR HANDHOLE
B	CONNECTED POINT FOR BUILDING MANAGEMENT SYSTEM
X,Y,Z	HOME RUN TO PANELBOARD,CIRCUIT NUMBER "X" , "Y" AND "Z"
	WIRING IN CONDUIT,RUN CONCEALED ABOVE CEILING OR IN CONCRETE WALL
	WIRING IN CONDUIT,RUN EXPOSED
	WIRING IN CONDUIT RUN CONCEALED IN FLOOR SLAB
	WIRING IN CONDUIT RUN UNDERGROUND
	WIRING DOWN
	WIRING UP

SYMBOLS FOR EMERGENCY LIGHT AND EXTI SIGN SYSTEM

SYMBOL	DESCRIPTION
	2x>=3.6W.LED SPOT LIGHT SQUARE BULB.WITH SIMPLEX RECEPTACLE. SURFACE MOUNTED AT 2.50 M.AFF.
	1x>=12W.LED.WHITE. SINGLE FACE FIRE EXIT SIGN WITH SIMPLEX RECEPTACLE. SURFACE MOUNTED AT 2.50 M.AFF.
	1x>=12W.LED.WHITE. DOUBLE FACE FIRE EXIT SIGN WITH SIMPLEX RECEPTACLE. SURFACE MOUNTED AT 2.50 M.AFF.

SYMBOLS FOR LIGHTING SYSTEM

SYMBOL	DESCRIPTION
	RECESSED CEILING ALUMINIUM LOUVER LUMINAIRE 600x600mm. LED 2 SET.220VAC.4000K.900LUMEN.DIAMETER 28mm.(Or Equivalent)
	RECESSED CEILING ALUMINIUM LOUVER LUMINAIRE 600x1200mm. LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	RECESSED CEILING PRISMATIC ACRYLIC LOUVER LUMINAIRE 600X600mm. LED 2 SET.220VAC.4000K.900LUMEN.DIAMETER 28mm.(Or Equivalent)
	RECESSED CEILING PRISMATIC ACRYLIC LOUVER LUMINAIRE 600X1200mm. LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	RECESSED CEILING PRISMATIC ACRYLIC DIFFUSER LUMINAIRE LED 1 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	RECESSED CEILING PRISMATIC ACRYLIC DIFFUSER LUMINAIRE LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED PRISMATIC ACRYLIC DIFFUSER L-SHAPE LUMINAIRE LED 1 SET.220VAC.4000K.900LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED PRISMATIC ACRYLIC DIFFUSER L-SHAPE LUMINAIRE LED 1 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN TYPE LUMINAIRE LED 1 SET.220VAC.4000K.900LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN TYPE LUMINAIRE LED 2 SET.220VAC.4000K.900LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN TYPE LUMINAIRE LED 1 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN TYPE LUMINAIRE LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD INDUSTRIAL TYPE LUMINAIRE LED 1 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD INDUSTRIAL TYPE LUMINAIRE LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN LUMINAIRE WITH WIRE GUARD LED.220VAC.4000K.900LUMEN.(Or Equivalent)
	SURFACE MOUNTED STANDARD BATTEN LUMINAIRE WITH WIRE GUARD LED.220VAC.4000K.2300LUMEN.(Or Equivalent)

	DESCRIPTION
	SURFACE MOUNTED WEATHERPROOF LUMINAIRE.IP65 LED 1 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
	SURFACE MOUNTED WEATHERPROOF LUMINAIRE.IP65 LED 2 SET.220VAC.4000K.2300LUMEN.DIAMETER 28mm.(Or Equivalent)
AD	DOWNLIGHT RECESS CEILING MOUNTED LUMINAIRE. ADJUSTABLE LED.220VAC.3000K.650LUMEN.(Or Equivalent)
	DOWNLIGHT RECESS CEILING MOUNTED LUMINAIRE LED.220VAC.4000K.1950LUMEN.(Or Equivalent)
	DOWNLIGHT RECESS CEILING MOUNTED LUMINAIRE LED.220VAC.4000K.1820LUMEN.(Or Equivalent)
50°	DOWNLIGHT RECESS CEILING MOUNTED LUMINAIRE. BEAM ANGLE >=50° LED.220VAC.4000K.2200LUMEN.(Or Equivalent)
	DOWNLIGHT RECESS CEILING MOUNTED LUMINAIRE LED.220VAC.4000K.2157LUMEN.(Or Equivalent)
	STEPLIGHT LUMINAIRE IP>=65 LED.220VAC.3000K.RA>=80 BEAM ANGLE >=120°
	SURFACE MOUNTED CANOPY LUMINAIRE LED.220VAC.4000K.>=8000LUMEN.(Or Equivalent)
	HIGH BAY LUMINAIRE LED 4 SET.220VAC.5700K.21000LUMEN.(Or Equivalent)
	LINEAR INGROUND LUMINAIRE IP>=65 LED 24VDC. 1150LUMEN/m. WARM WHITE.BEAM ANGLE >=15°
	STREET LIGHTING LUMINAIRE.HOT-DIPPED GALVANIZED POST STEEL 6.00M. LED.220VAC.4000K(±200K).>=4860LUMEN.IP65.SINGLE ARM
	HIGH MAST LUMINAIRE HIGH PRESSURE SODIUM 6x400W.220V. 50Hz.

SYMBOLS FOR SWITCH AND SOCKET OUTLET

SYMBOL	DESCRIPTION
S	SINGLE POLE SWITCH.16A.250V.WALL FLUSH MOUNTED AT 1.30M.AFF.UNLESS OTHER INDICATED
S_{WP}	SINGLE POLE SWITCH.16A.250V.WITH WEATHER PROOF BOX. AT 1.30M.AFF.UNLESS OTHER INDICATED
S2	2-WAY SWITCH.16A.250V.WALL FLUSH MOUNTED AT 1.30M.AFF.UNLESS OTHER INDICATED
SF	ILLUMINATED SINGLE POLE SWITCH.16A.250V. FOR VENTILATION FAN.
	SIMPLEX RECEPTACLE WITH GROUND SLOT AND SAFETY SHUTTER. 16A.250V.RECESS MOUNTED AT 0.30M.AFF.UNLESS OTHER INDICATED.
	DUPLEX RECEPTACLE WITH GROUND SLOT AND SAFETY SHUTTER. 16A.250V.RECESS MOUNTED AT 0.30M.AFF.UNLESS OTHER INDICATED.
wp	DUPLEX WEATHERPROOF RECEPTACLE WITH GROUND SLOT AND SAFETY SHUTTER. 16A.250V.RECESS MOUNTED AT 0.30M.AFF.UNLESS OTHER INDICATED.
S	DUPLEX WEATHERPROOF RECEPTACLE WITH GROUND SLOT AND SAFETY SHUTTER. 16A.250V. IN STAINLESS ENCLOSURE BOX. RECESS MOUNTED AT 0.30M.AFF. UNLESS OTHER INDICATED.
wp	DUPLEX WEATHERPROOF RECEPTACLE WITH GROUND SLOT AND SAFETY SHUTTER.16A.250V. POP-UP FLOOR OUTLET
16A	POWER RECEPTACLE. INDUSTRIAL TYPE. 16A.3P+N+E. SURFACE MOUNTED AT 1.00M.AFF.
32A	POWER RECEPTACLE. INDUSTRIAL TYPE. 32A.3P+N+E. SURFACE MOUNTED AT 1.00M.AFF.
	POWER RECEPTACLE. INDUSTRIAL TYPE. 16A.1P+N+E. SURFACE MOUNTED AT 1.00M.AFF.
J	JUNCTION BOX

SYMBOLS FOR FIRE ALARM SYSTEM

SYMBOL	DESCRIPTION
FCP	FIRE ALARM CONTROL PANEL WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
ANN	GRAPHIC ANNUNCIATOR WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
FTB	FIRE AMARM TERMINAL BOX WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
H	HEAT DETECTOR,COMBINATION TYPE (FIXED TEMPERATURE AT 58°C AND RATE-OF-RISE TEMPERATURE) WITH LED ALARM INDICATION SURFACE MOUNTED
S	SMOKE DETECTOR , PHOTOELECTRIC TYPE WITH LED ALARM INDICATION SURFACE MOUNTED
M	MANUAL STATION , DOUBLE ACTION TYPE WALL MOUNTED AT 1.50 M. AFF.
H_S	ELECTRONIC HORN WITH STROBE WALL MOUNTED AT 1.50 M. AFF.
T	FIRE TELEPHONE JACK WITH FIRE EMERGENCY PHONE WALL MOUNTED AT 1.50 M. AFF.
	END-OF-LINE RESISTOR CONNECTED TO END OF LINE AT THE LAST EQUIPMENT OF LOOP
CM	ALARM CONTROL MODULE MOUNTED IN FIRE ALARM TERMINAL BOX
MM	INITIATING DEVICES MONITOR MODULE MOUNTED IN FIRE ALARM TERMINAL BOX
FI	FAULT ISOLATOR MODULE MOUNTED IN FIRE ALARM CONTROL PANEL

SYMBOL	DESCRIPTION
AD-GD	ADDRESSABLE FOR INITIATING DEVICES AND ALARM DEVICES

SYMBOLS FOR LIGHTNING PROTECTION AND GROUNDING SYSTEM

SYMBOLS	DESCRIPTIONS
	AIR TERMINALS >=ø16mm.x1000mm. WITH SADDLE
	BARE COPPER TAPE 25x3mm. WITH BAKELITE SUPPORT CLAMP FOR METAL SHEET@ 1.00m.
	SQUARE TAPE 25X4mm. BAKELITE SUPPORT WITH CLAMP FOR METAL SHEET.
	EXOTHERMIC WELDING.
	TESTING JOINT.DISCONNECTING LINK.LUG TYPE.
	FOUNDATION EARTH ELECTRODE.
	EARTHING REFERENCE.1-95 SQ.MM.BC DIRECT BURIAL.
	GROUND ROD.COPPER CLAD STEEL. >=16mm.x3000mm.LONG
	GROUND INSPECTION PIT W/GROUND ROD.COPPER CLAD STEEL. >=16mm.x3000mm.LONG
GB	GROUND COPPER BUSBAR WITH INSULATOR SUPPORT

SOUND & PUBLIC ADDRESS SYSTEM SYMBOLS

SYMBOLS	DESCRIPTIONS
	CEILING LOUDSPEAKER
	POWER AMPLIFIER
OR	HORN LOUDSPEAKER
	MICROPHONE (DESKTOP)
VC	VOLUME CONTROL
SB	SOUND CABLE TERMINAL BOX
C	CALLING SPEAKER

TELEPHONE SYSTEM SYMBOLS

SYMBOLS	DESCRIPTIONS
PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
MDF	MAIN DISTRIBUTION FRAME
OTC	OUTDOOR TELEPHONE CABINET
TC	TELEPHONE TERMINAL.
	TELEPHONE OUTLET (RJ11)
	FLOOR TELEPHONE OUTLET (RJ11)
P	PUBLIC TELEPHONE OUTLET (RJ11)

R:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\05LIST OF DRAWING\SCR-G-002.DWG

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: ELECTRICAL SYSTEM
ABBREVIATION SYMBOL AND GENERAL NOTES

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-G-002
SHEET NO.: 2

SYMBOLS ABBREVIATIONS AND GENERAL NOTES

ABBREVIATIONS	DESCRIPTIONS	ABBREVIATIONS	DESCRIPTIONS
A	AMPERE	MIN	MINIMUM
A/C	AIR CONDITIONING	m.	METER
AF	AMPERE FRAME	mm.	MILIMETER
AFF	ABOVE FINISHED FLOOR	m, m^2,m^3	
AHU	AIR HANDLING UNIT	m/s	METER PER SECOND
AMCC	AIR CONDITIONING MOTOR CONTROL CENTER	NC	NOISE CRITERIA
AT	AMPERE TRIP	NTS	NOT TO SCALE
AUX	AUXILIARY	N/C	NORMALLY CLOSE
AWG	AMERICAN WIRE GAGE	N/O	NORMALLY OPEN
BMS	BUILDING MANAGEMENT SYSTEM	NO.	NUMBER OF UNITS
B/S	BUILDING SERVICE	OA	OUTDOOR AIR
BOQ	BILL OF QUANTITY	OD	OUTSIDE DIAMETER
CB	CIRCUIT BREAKER	O/F	OVER FLOW
CD	CEILING DIFFUSER WITH VOLUME DAMPER	pa	PASCALS
CDR	CONDENSER WATER RETURN	PD	PRESURE DROP
CDS	CONDENSER WATER SUPPLY	PVC	POLYVINYL CHLORIDE
COP	CONDENSER WATER PUMP	RA	RETURN AIR
WCH	WATER COOL CHILLER	RAC	RETURN AIR CHAMBER
CHR	CHILLED WATER RETURN	RAD	RETURN AIR DUCT
CHRR	CHILLED WATER REVERSE RETURN	RAG	RETURN AIR GRILLE
CHS	CHILLED WATER SUPPLY	RAR	RETURN AIR REGISTER
CHP	CHILLED WATER PUMP	RCD	RESIDUAL CURRENT DEVICE
cm.	CENTIMETER	RH	RALETIVE HUMIDITY
CT	COOLING TOWER	RPM	REVOLUTIONS PER MINUTE
CDU	AIR COOLED CONDENSENSING UNIT	SA	SUPPLY AIR
°C	DEGREE CELCIUS	SAD	SUPPLY AIR DUCT
C/W	COMPLETE WITH	SAG	SUPPLY AIR GRILLE
DB	DECIBEL	SAR	SUPPLY AIR REGISTER
DBT	DRY BULD TEMPERATURE	SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
DC	DIRECT CURRENT	SF	SAFETY FACTOR
DIA(ø)	DIAMETER	SOR	STATION OPERATION ROOM
DPT	DEW POINT TEMPERATURE	SP	STATIC PRESSURE
DWG	DRAWING	SPF	STAIR PRESSURIZED FAN
EA	EXHAUST AIR	Std.	STANDARD
EAD	EXHAUST AIR DUCT	SW	SWITH
EAG	EXHAUST AIR GRILLE	TA	TRANSFER AIR
EAR	EXHAUST AIR REGISTER	TAD	TRANSFER AIR DUCT
ESF	EXHAUST SMOKE FAN	TAG	TRANSFER AIR GRILLE
EAT	ENTERING AIR TEMPERATURE	TD	TEMPERATURE DIFFERENCE
EFF	EFFICIENCY	TEMP	TEMPERATURE
EMT	ELECTRICAL METALLIC TUBING	TH	TATAL HEAT
EWT	ENTERING WATER TEMPERATURE	TVM	TICKET VENDING MACHINE
EF	EXHAUST FAN	TYP	TYPICAL
FA	FRESH AIR	T/A	TO ABOVE
FAD	FRESH AIR DUCT	T/B	TO BELOW
FAG	FRESH AIR GRILLE (WITH INSECT SCREEN)	U/G	UNDERGROUND
FAR	FRESH AIR REGISTER (WITH INSECT SCREEN)	U/V	UNDER VOLTAGE
FCP (OR FACP)	FAN COIL UNIT (CHILLED WATER)	V	VOLT
FCU	FAN COIL UNIT	VA	VOLT-AMPERE
FD	FIRE DAMPER	VAV	VARIABLE AIR VOLUME
FR	FIRE RESISTANT	VD	VOLUME DAMPER
FSD	COMBINATION FIRE/SMOKE DAMPER	VRF	VARIABLE REFRIGARANT FLOW
F/A	FROM ABOVE	VSD	VARIABLE SPEED DRIVE
F/B	FROM BELOW	WBT	WET BULD TEMPERATURE
GPF	GAS PURGE FAN		
H/L	HIGH LEVEL		
HDPE	HIGH DENSITY POLYETHYLENE		
HG	MERCURY		
HP (OR hp)	HORSE POWER		
Hz	HERTZ		
ID	INSIDE DIAMETER		
IMC	INTERMEDIATE METAL CONDUIT		
ISO	INTERNATIONAL STANDARD ORGANIZATION		
IT	INFORMATION TECHNOLOGY		
KWH	KILO-WATT-HOUR		
kW.	KILOWATT		
LAT	LEAVING AIR TEMPERATURE		
LHG	LATENT HEAT GAIN		
LPS	LITRE PER SECOND		
LSD	LINEAR SLOT DIFFUSER		
LWT	LEAVING WATER TEMPERATURE		
L/L	LOW LEVEL		
L/s	LITRES PER SECOND		
MAX	MAXIMUM		
MCB	MINIATURE CIRCUIT BREAKER		
MDB	MAIN DISTRIBUTION BOARD (OR MAIN SWITCHBOARD)		
MD	MOTERIZED DAMPER		
MCC	MOTOR CONTROL CENTER		

SYMBOL	DESCRIPTION
CHS	CHILLED WATER SUPPLY PIPE
CHR	CHILLED WATER RETURN PIPE
CHRR	CHILLED WATER REVERSE RETURN PIPE
CWS	CONDENSER WATER SUPPLY PIPE
CWR	CONDENSER WATER RETURN PIPE
CD	CONDENSATE DRAIN PIPE
RS & RL	REFRIGERANT SUCTION & LIQUID PIPE
C	COMMON PIPE
M	MAKE-UP WATER
EQ	EQUALIZER
OF	OVERFLOW
B	BLEED OFF
	GATE VALVE
	GLOBE VALVE
	MOTORIZED (REGULATING) THREE WAY CONTROL VALVE
	MOTORIZED (ON-OFF) THREE WAY CONTROL VALVE
	Y-STRAINER
	MOTORIZED (ON-OFF) TWO WAY CONTROL VALVE
	MOTORIZED (REGULATING) TWO WAY CONTROL VALVE
	BALANCING VALVE
	BALL FLOAT VALVE
	AUTOMATIC AIR VENT WITH GATE VALVE
	MANUAL AIR VENT
	WATER PUMP
	THERMOMETER
	FLEXIBLE PIPE CONNECTOR (RUBBER TYPE)
	CHECK VALVE
T	SPACE THERMOSTAT
H	ROOM HUMIDISTAT
S_F	FAN SPEED SWITCH
T_S	THERMOSTAT WITH 3-SPEED SWITCH
T_C	CEILING MOUNTED SPACE THERMOSTAT
SD	DUCT TYPE SMOKE DETECTOR
M_{VSD}	VARIABLE SPEED DRIVE MOTOR
M	MOTOR
	AIR FLOW DIRECTION
	FAN AIR GRILL
AHU	AIR HANDING UNIT
	AIR LOUVER
	PLENUM CHAMBER

SYMBOL	DESCRIPTION
	CONNECTION TOP
	CONNECTION BOTTOM
	DIRECTION OF FLOW IN PIPE
FM	FLOW METER
FS	FLOW SWITCH
M	WATER METER
	TEST POINT
FT	FLOW TRANSMITTER (FOR REMOTE READING)
TT	TEMPERATURE TRANSMITTER (FOR REMOTE READING)
TIC	TEMPERATURE INDICATOR AND CONTROLLER
FIC	FLOW INDICATOR AND CONTROLLER
TI	TEMPERATURE INDICATOR (FOR LOCAL READING)
FI	FLOW INDICATOR (FOR LOCAL READING)
TT	TEMPERATOR SENSOR
	TEE
	REDUCER CONCENTRIC
	REDUCER ECCENTRIC STRAIGHT INVERT
	REDUCER ECCENTRIC STRAIGHT CROWN
	LATERAL
	FLANGE
	UNION CONNECTION
	REMOVABLE CAP END
	BLIND FLANGE END
	CLEANOUT OR PLUG
	PRESSURE GAUGE W/ NEEDLE VALVE
	AC MOTOR CONTROL CENTER
	VOLUME CONTROL DAMPER (MANUAL)
	MOTORIZED (ON-OFF), VOLUME CONTROL DAMPER
	MOTORIZED (REGULATING), VOLUME CONTROL DAMPER
PRV	PRESSURE VALVE
PRV	PRESSURE BYPASS VALVE
	ELBOW 90°
	ELBOW 45°
	ELBOW UP
	ELBOW DOWN
	TEE UP
	TEE DOWN
	AIR FILTER
BD	BACKDRAFT DAMPER (GRAVITY DAMPER)
	HIGH PRESSURE INDUSTRIAL TYPE

SYMBOL	DESCRIPTION
	DIRECTION OF FLOW IN DUCT
	RECTANGULAR TRANSITION IN HEIGHT (PLAN)
	RECTANGULAR TRANSITION IN WIDTH
	RECTANGULAR TO CIRCULAR
	CIRCULAR TO CIRCULAR
	FLEXIBLE CONNECTION
	TURNING VANES IN SQUARE BEND DUCTWORK
	TURNING VANES IN BEND DUCKWORK
	SPLITTER DAMPER
	DUCTWORK
	DUCT ELBOW UP
	DUCT ELBOW DOWN
	AIR DUCT W/ INTERNAL DUCT LINING
	ACCESS PANEL W/ HANDLES
	FLEXIBLE DUCT
	SPIRAL ROUND DUCT (SRD)
	FLAT OVAL DUCT (FOD)
	HORIZONTAL END SUCTION PUMP
	WATER COOLED CHILLER
	FAN COIN UNIT
	FAN COIN UNIT (CASSETTE TYPE)
	COOLING TOWER
	OZONE GENERATOR SET
	AUTOMATIC FAN
	WALL MOUNT TYPE (VENTILATING FAN)
	OSCILATING TYPE
	WINDOW MOUTH TYPE
	CEILING MOUNT TYPE
	CEILING TYPE
	CENTRIFUGAL FAN (TOP VIEW/SIDE VIEW)
	CONDENSING UNIT
	AXIAL FAN
	PROPELLER FAN
	MINI SIROCCO
FD	FIRE DAMPER
	AIR GRILLE OR REGISTER
VD	VOLUME DAMPER
	LINEAR SLOT DIFFFUSER W/ PLENUM BOX
MD	MOTORIZED DAMPER
	RETURN/EXHAUST AIR GRILLE
FSD	COMBINATION FIRE/SMOKE DAMPER
	PERFORATED AIR GRILLE
BD	BACK DRAFT DAMPER
	SQUARE CEILING
A x B	DUCT SIZE, FIRST FIGURE SHOWN ON PLAN (DIMENSIONS ARE IN MM. AS SHOWN ON PLANS)
	PRECISION AIR CONDITIONING

R:\AEC-DS-MEP\1465-SCR\03-DRAWING\CAD\05.LIST OF DRAWING\SCR-G-003.DWG

otp

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: AIR CONDITIONING AND VENTILATION SYSTEM ABBREVIATION SYMBOL AND GENERAL NOTES

DATE: FEBRUARY 2018	SCALE: NTS.
DWG. NO.: SCR-G-003	SHEET NO.: 3

ABBREVIATIONS FOR PLUMBING AND SANITARY SYSTEM

ABBREVIATION	DESCRIPTION
A	AMPERE
A/C	ABOVE CEILING
AAV	AUTOMETIC AIR VENT
AF	AMPERE FRAME
AFFL	ABOVE FINISHED FLOOR LEVEL
AP	ACCESS PANEL
AT	AMPERE TRIP
ATM	ATMOSPHERIE
AUX	AUXILIARY
AWG	AMERICAN WIRE GAGE
B.O.P.	BOTTOM OF PIPE
B/F	BELOW FLOOR
B/S	BUILDING SERVICES
BMS	BUILDING MANAGEMENT SYSTEM
BOQ	BILL OF QUANTITY
BT	BATH TUB
BV	BALL VALVE
C.O.P.	CENTER OF PIPE
C/W	COMPLETE WITH
CB	CIRCUIT BREAKER
CD	CONDENSATE DRAIN
CO	CLEAN OUT
CONC	CONCRETE
CP	CAST IRON PIPE
CW	COLD WATER
CWR	COLD WATER RETURN
CWS	COLD WATER SUPPLY
DB	DECIBEL
DC	DIRECT CURRENT
DIA	DIAMETER
DP	DRAIN PUMP
DPM	DIGITAL POWER METER
DPT	DEW POINT TEMPERATURE
DWG	DRAWING
EF	EXHAUST FAN
EFF	EFFICIENCY
EHW	ELECTRIC HOT WATER HEAT
EMT	ELECTRICAL METALLIC TUBING
EWT	ENTERING WATER TEMPERATURE
FC	FAUCET
FCO	FLOOR CLEAN OUT
FCP	FIRE ALARM CONTROL PANEL
FD	FLOOR DRAIN
FFL	FINISHED FLOOR LEVEL
FI	FLOOR INLET
FR	FIRE RESISTANT
FV	FLUSH VALVE
GV	GATE VALVE
H/L	HIGH LEVEL
HB	HOSE BIBB
HDPE	HIGH DENSITY POLYETHYLENE
HG	MERCURY
HP	HORSE POWER
HS	HAND SPRAY
HW	HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
Hz	HERTZ
ID	INSIDE DIAMETER
IE	INVERTED ELEVATION
IMC	INTERMEDIATE METAL CONDUIT
INV	INVERT
ISO	INTERNATIONAL STANDARDS ORGANIZATION
IT	INFORMATION TECHNOLOGY
KS	KICHEN SINK
kWH	KILO-WATT-HOUR
L TO R	LEFT TO RIGHT
L/L	LOW LEVEL
LAV	LAVATORY
LPS	LITRE PER SECOND
M/L	MIDDLE LEVEL
MAX	MAXIMUM
MCB	MINIATURE CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MAIN DRAIN
MDB	MAIN DISTRIBUTION BOARD
MEA	METROPOLITAN ELECTRICITY AUTHORITY
MIN	MINIMUM
MS	MARSHALING BOX
NC	NORMALLY CLOESD

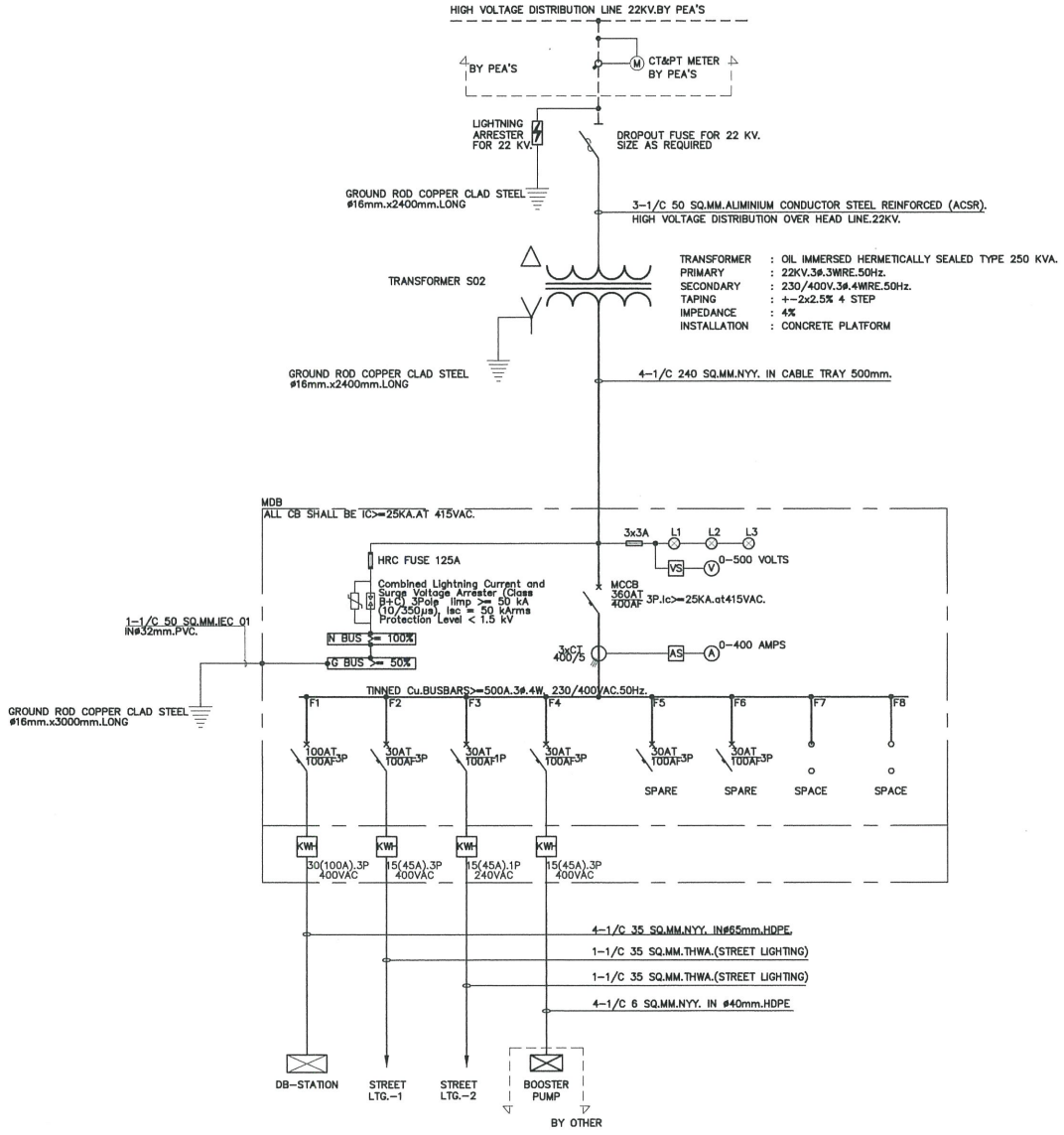
ABBREVIATION	DESCRIPTION
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OCC	OPERATION CONTROL CENTER
OD	OUTSIDE DIAMETER
PD	PUMP DISCHARGE
PD	PRESSURE DROP
PLC	PROGRAMMABLE LOGIC CONTROLLER
PPM	PARTS PER MILLION
PSD	PLATFORM SCREEN DOOR
PVC	POLYVINYL CHLORIDE
R/T	RAINTIGHT
RCCB	RESIDUAL CURRENT CIRCUIT BREAKER
RCD	RESIDUAL CURRENT DEVICE
RCP	RAINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RH	RELATIVE HUMIDITY
RL	RAIN LEADER
RMU	RING MAIN UNIT
RPM	REVOLUTIONS PER MINUTE
RPU	REMOTE PROCESSING UNIT
RSC	RIGID STEEL CONDUIT
RTU	REMOTE TERMINAL UNIT
S/N	SOLID NEUTRAL
SA	SHOCK ABSORBER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SD	SCRUPER DRAIN
SF	SAFETY FACTOR
SH	SHOWER HEAD
SK	SINK
SN	SANITARY
SOR	STATION OPERATION ROOM
SP	STATIC PRESSURE
SQ.	SQUARE
SS	SERVICE SINK
Std.	STANDARD
SW	SWITCH
SWA	STEEL WIRE ARMORED
SWGR	SWITCHGEAR
SWP	SEWAGE PUMP
T TO B	TOP TO BELOW
T.O.P.	TOP OF PIPE
T/A	TO ABOVE
T/B	TO BELOW
TD	TEMPERATURE DIFFERENCE
TEMP	TEMPERATURE
TIS	THAI INDUSTRIAL STANDARDS
TR	TRANSFORMER
TVM	TICKET VENDING MACHINE
U/G	UNDERGROUND
U/V	UNDER VOLTAGE
UPS	UNINTERRUPTIBLE POWER SUPPLY
UPVC	ULTRAVIOLET RESISTANT POLYVINYL CHLORIDE
UR	URINAL
UV	ULTRAVIOLET
V	VENT
V	VOLT OR VENT
VA	VOLT- AMPERE
VB	VACUUM BREAKER
VC	VACUUM FITTING
VP	VELOCITY PRESSURE
VTR	AIR VENT CAP, ROOF TYPE
VTW	AIR VENT CAP, WALL MOUNT TYPE
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WWTP	WASTE WATER TREATMENT PLANT

SYMBOL FOR PLUMBING AND SANITARY SYSTEM

SYMBOL	DESCRIPTION
W	WASTE PIPE
K	KITCHEN WASTE PIPE
RL	RAIN LEADER
S	SOIL PIPE
CW	COLD WATER PIPE
HW	HOT WATER PIPE
V	VENT PIPE
F	FIRE PIPE
G	GAS PIPE
SD	SUBDRAIN
SP	SEWAGE PRESSURE PIPE
UR	URINAL, ISOMETRIC
WC	WATER CLOSET, ISOMETRIC
FD	FLOOR DRAIN, ISOMETRIC
SD	SHOWER DRAIN, ISOMETRIC
FCO	FLOOR CLEANOUT, ISOMETRIC
CO	CLEANOUT PLUG, ISOMETRIC
FD	FLOOR DRAIN, PLAN
SD	SHOWER DRAIN, PLAN
FCO	FLOOR CLEANOUT, PLAN
FCO	FLOOR CLEANOUT WITH P-TRAP BELOW
H	HOT WATER HEATER
HP	HEAT PUMP
F	FILTER
HS	HOT WATER STORAGE TANK
	BUTTERFLY VALVE
	ROOF DRAIN
BLOCK OUT	BLOCK OUT
BLOCK OUT	BLOCK OUT WITH P-TRAP BELOW
RD	ROOF DRAIN
WC	WATER CLOSET, FLUSH VALVE
BD	BIDET
UR	URINAL
LAV	LAVATORY
BT	BATH TUB
SH	SHOWER HEAD
HB	HOSE BIBB
DF	DRINKING FOUNTAIN
M	WATER METER
	SCUPPER DRAIN

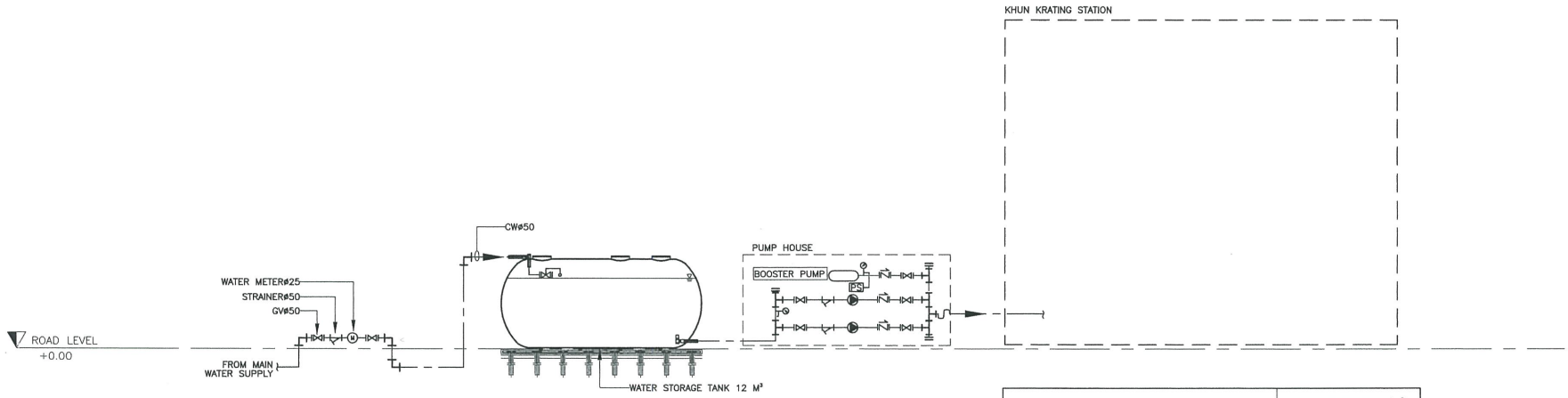
SYMBOL	DESCRIPTION
	MANHOLE W/RC COVER
	MANHOLE W/GRATING COVER
	CONNECTION, TOP
	CONNECTION, SIDE CONNECTION
	CONNECTION, BOTTOM CONNECTION
	ELBOW, TURNED DOWN
	ELBOW, TURNED UP
	WATER PUMP
	UNION
	BUTTERFLY VALVE, LUG TYPE
	VALVE BOX
	BALL VALVE, SCREWED END
	CHECK VALVE, FLANGE END
MCP	MOTOR CONTROL PANEL
PLD	PLANTER DRAIN
	FLOAT VALVE
	MANHOLE
	GATE VALVE, FLANGE END
	BALANCING VALVE
	BACK FLOW PREVENTER VALVE
	PRESSURE REDUCING VALVE, PILOT OPERATED TYPE, FLANGE END
	PRESSURE REDUCING VALVE, PILOT OPERATED TYPE, SCREWED END
	RELIEF VALVE
	MODULATING FLOAT VALVE, PILOT OPERATED TYPE
	FLEXIBLE CONNECTION (CLAMP END) LENGTH 4 TIMES OF PIPE DIAMETER
	FLEXIBLE CONNECTION (FLANGE END) LENGTH 4 TIMES OF PIPE DIAMETER
	TWIN SPHERE FLEXIBLE CONNECTION, FLANGE END
	TWIN SPHERE FLEXIBLE CONNECTION, SCREWED END
	STRAINER
	FOOT VALVE
	STAINLESS STEEL FLEXIBLE HOSE,LENGTH 4 TIMES OF PIPE DIAMETER, FLANGE END
	AUTOMATIC AIR VENT W/T SHUT OFF VALVE AND LOCAL DRAIN
F	FLOW SWITCH
PS	PRESSURE SWITCH
	PRESSURE GAUGE W/ NEEDLE VALVE
W	WATER HAMMER ARRESTOR WITH SHUT-OFF VALVE
	CW OUTLET
	DRAIN
P	PRESSURE PENUMATIC DIAPHRAGM TANK

SYMBOL	DESCRIPTION
	CAP ON THE END OF PIPE
	PRESSURE REDUCING VALVE
	BLIND FLANGE
	FLEXIBLE RUBBER
	AIR VENT CAP, ROOF TYPE
	AIR VENT CAP, WALL MOUNT TYPE

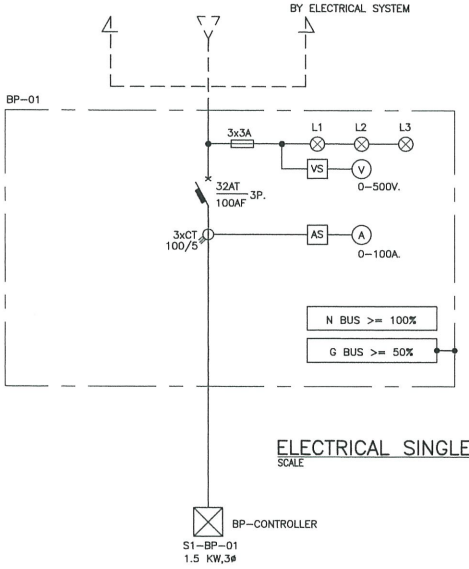


LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S1-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

\\EC-DS-MEP\1485-SCR\03-DRAWING\CAD\S-01 ????????\02.PS\SCR-S1-PS-001.DWG

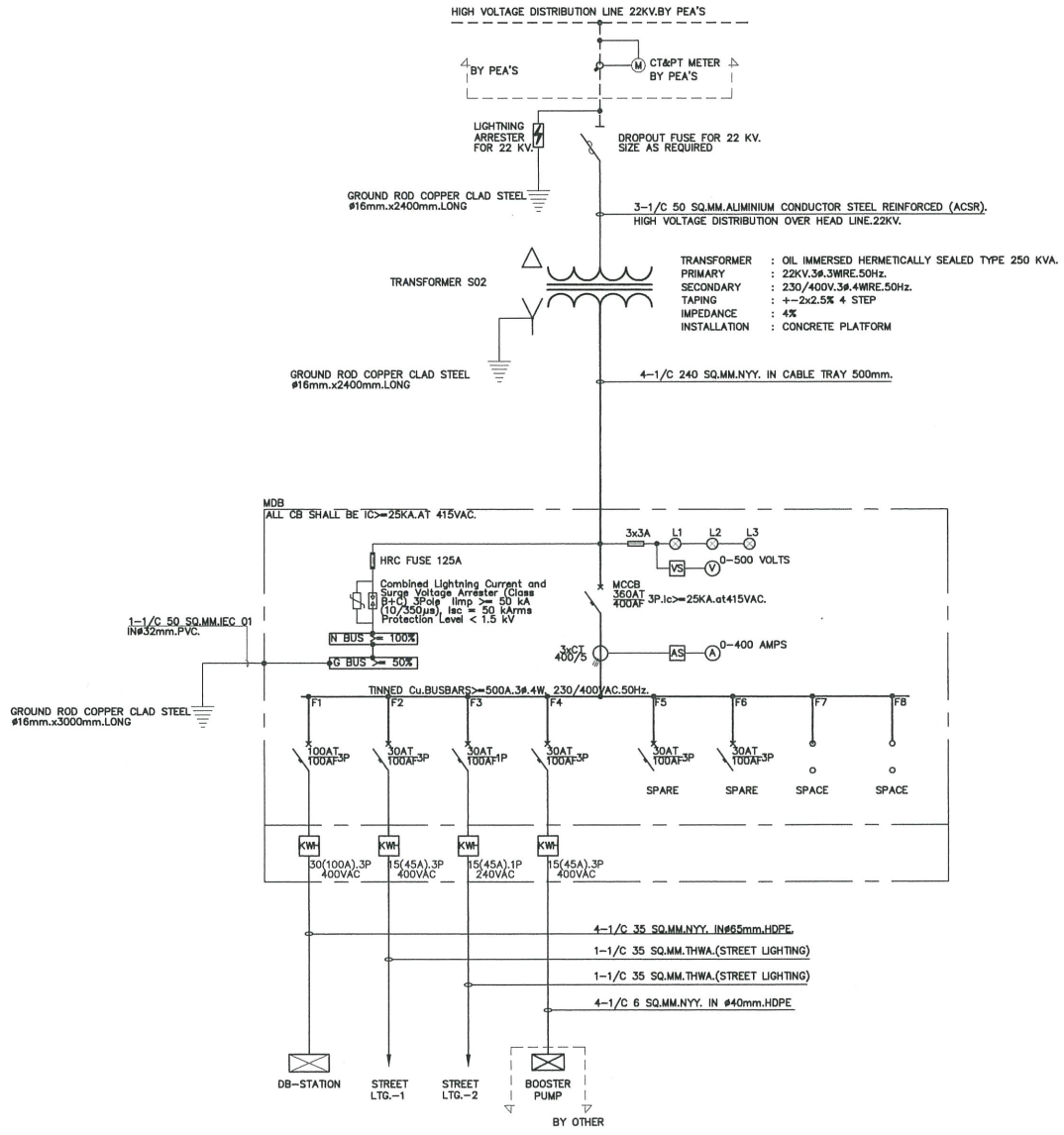
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
S-01 KHUN KRATHING
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM SITE PLAN

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-S1-PS-001
SHEET NO.: 6

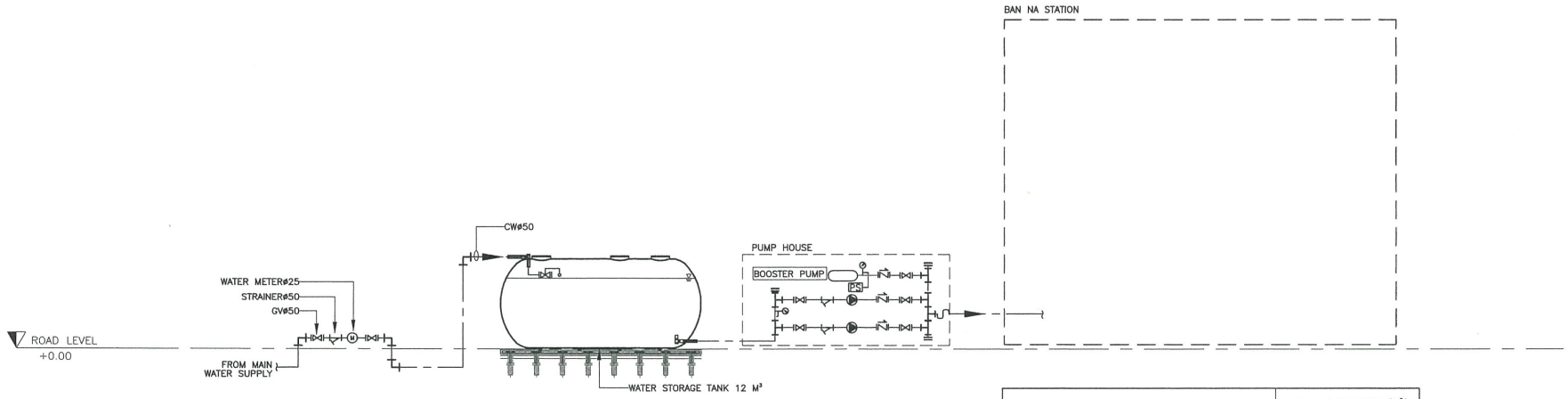


LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

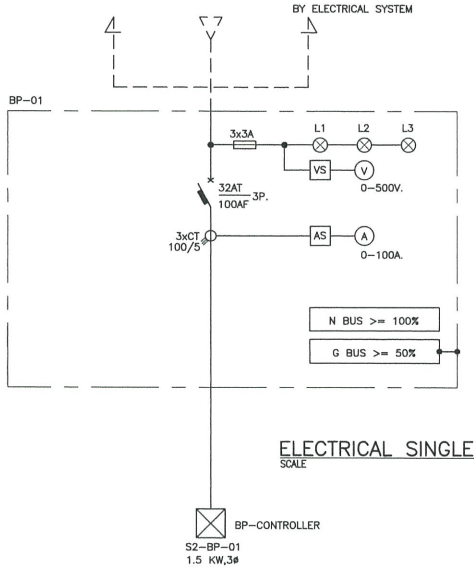
SCALE NTS.

\EEC-DS-MEP\1465-SCR\03-DRAWING\CAD\S-02 ***** (1)\01.EE\SCR-S2-EE-001.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-02 BAN NA (1) ELECTRICAL SYSTEM LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-S2-EE-001	SCALE: NTS. SHEET NO.: 7



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

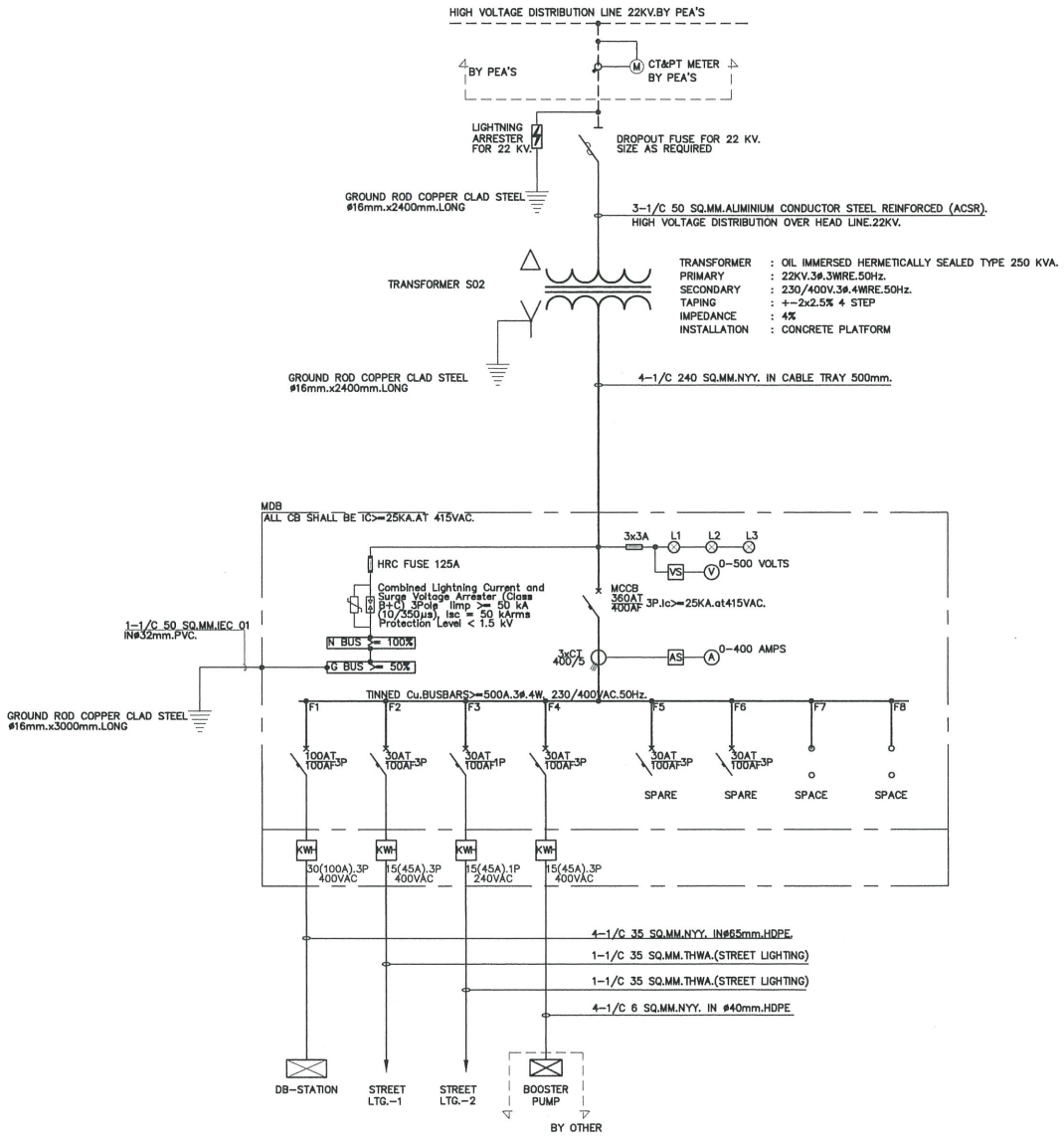
EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S2-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

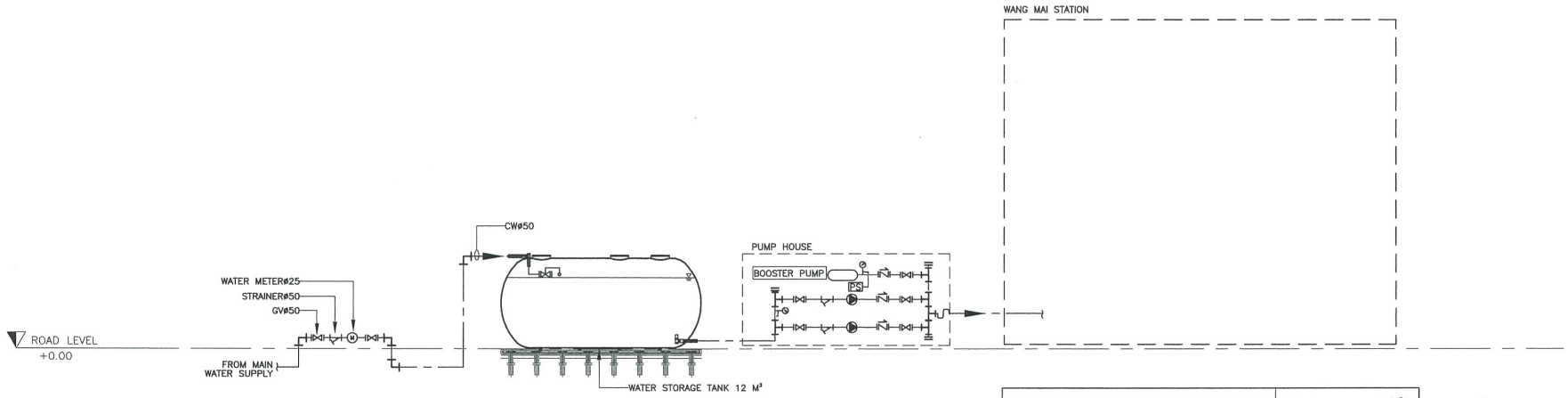
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE S-02 BAN NA (1) PLUMBING AND SANITARY SYSTEM COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S2-PS-001	SCALE: NTS. SHEET NO.: 8

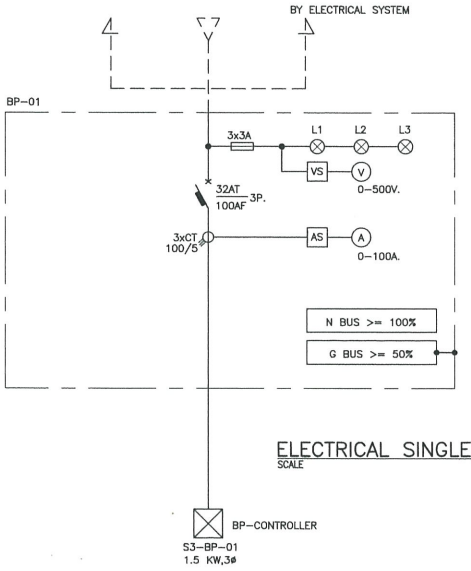


LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S3-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

\\EC-DS-MEP\1485-SCR\03-DRAWING\CAD\S-03 ***** (2)\02-PS\SCR-S3-PS-001.DWG

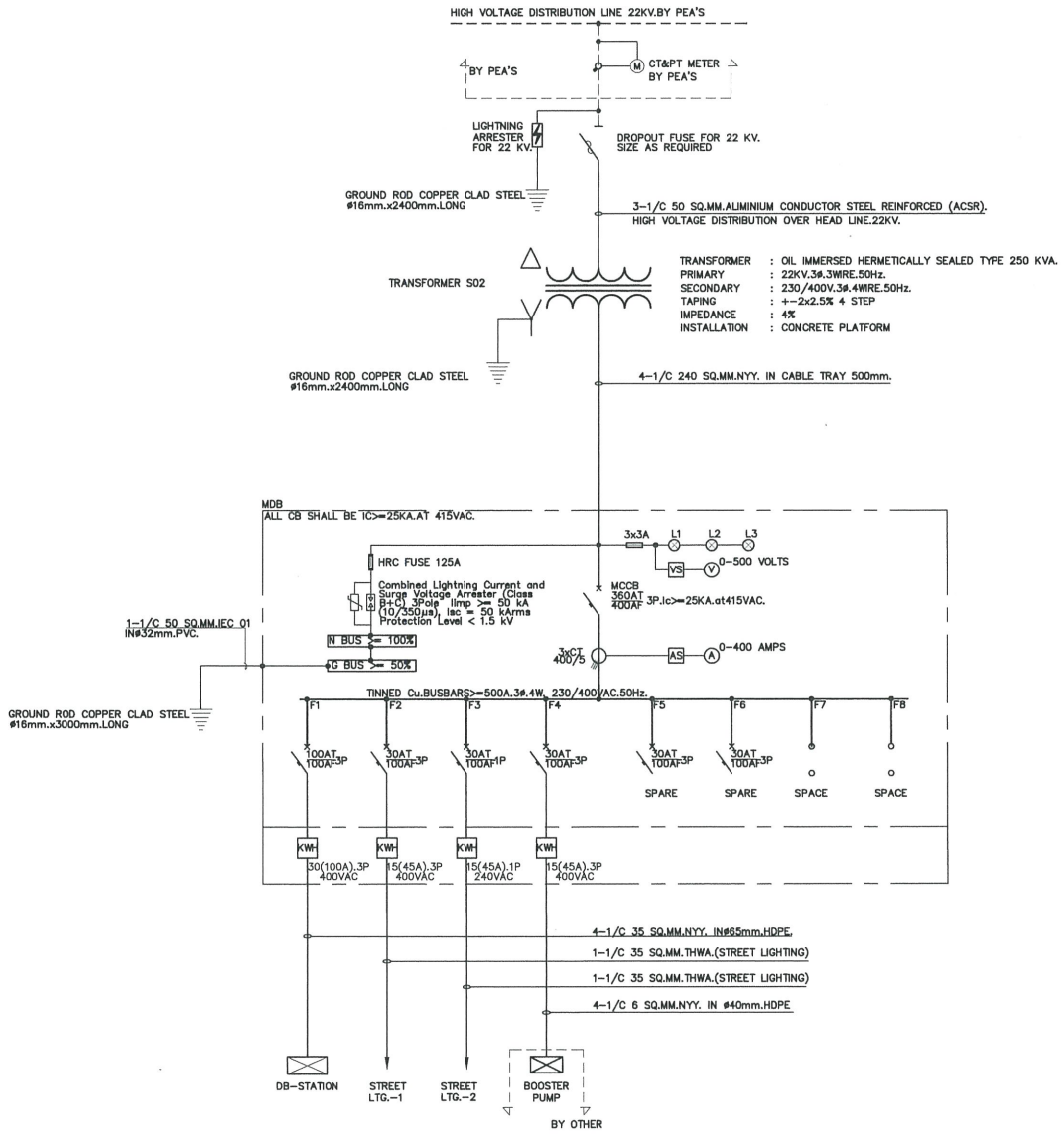
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
S-03 BAN NA (2)
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM SITE PLAN

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-S3-PS-001
SHEET NO.: 10



LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.

KINGDOM OF THAILAND
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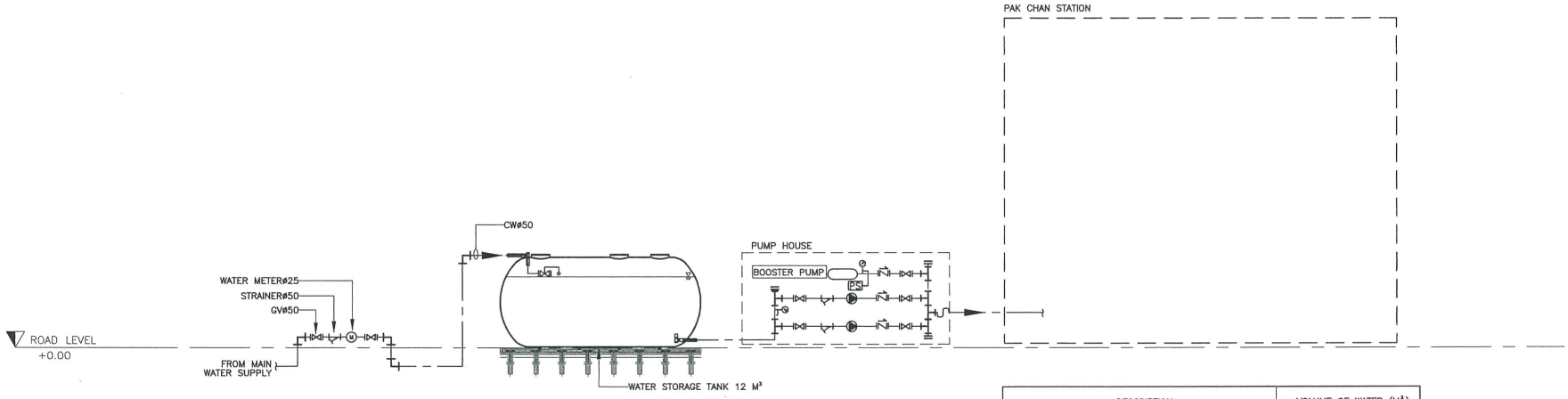
FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

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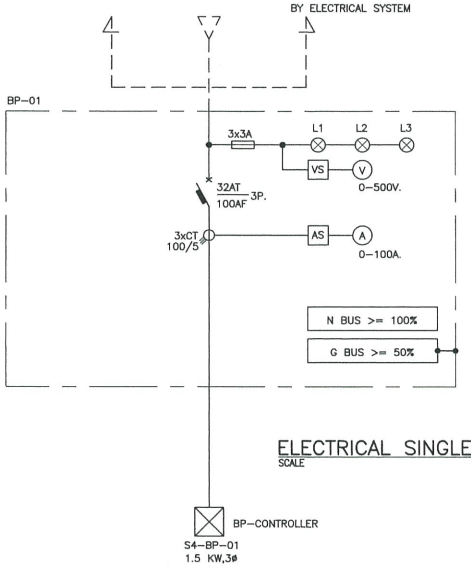
TITLE
S-04 PAK CHAN
ELECTRICAL SYSTEM
LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-S4-EE-001
SHEET NO.: 11

\AEC-DS-HEP\1465-SCR\03-DRAWING\CAD\S-04 (??????)\01EE\SCR-S4-EE-001.DWG



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S4-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

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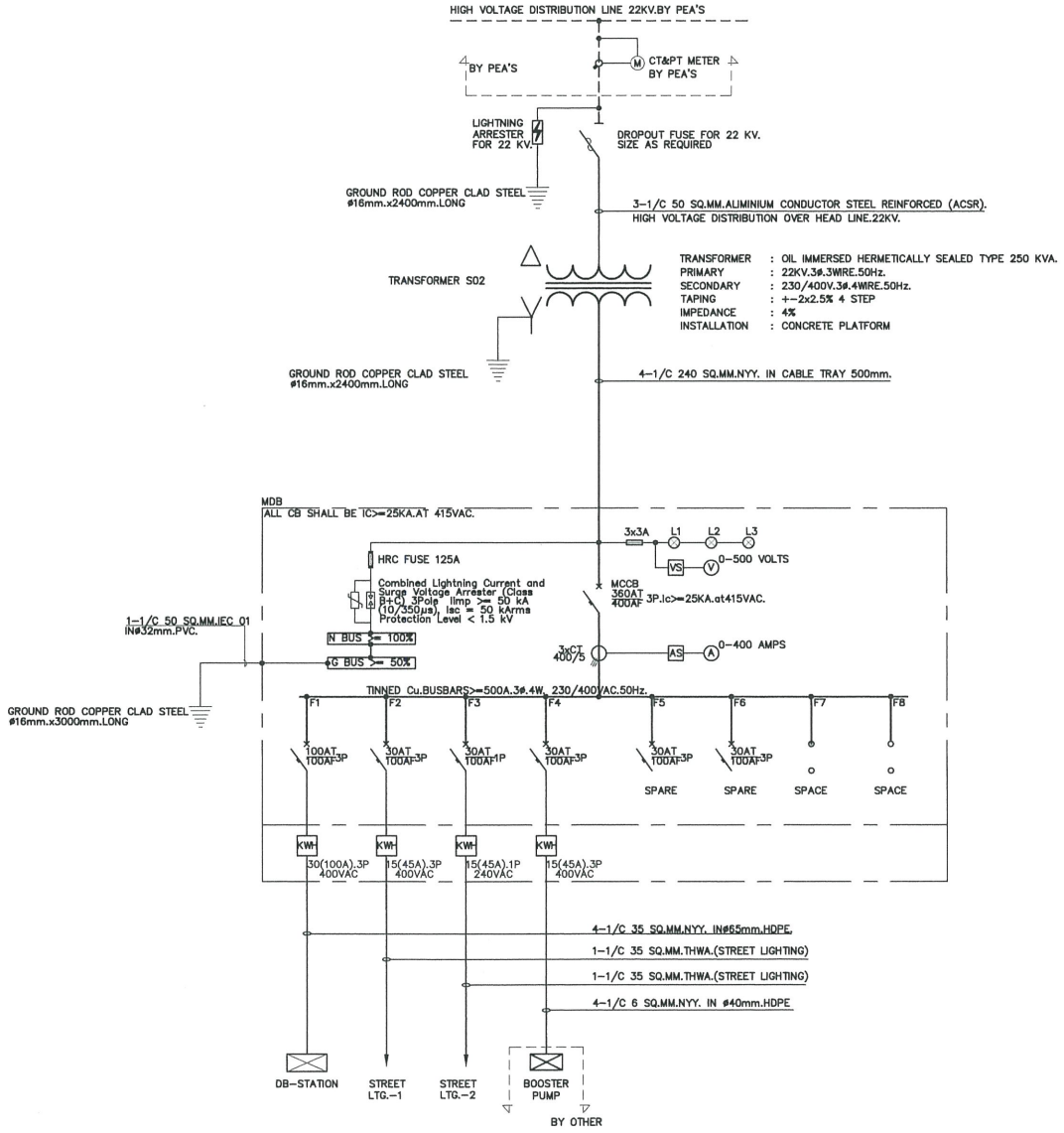
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
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FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

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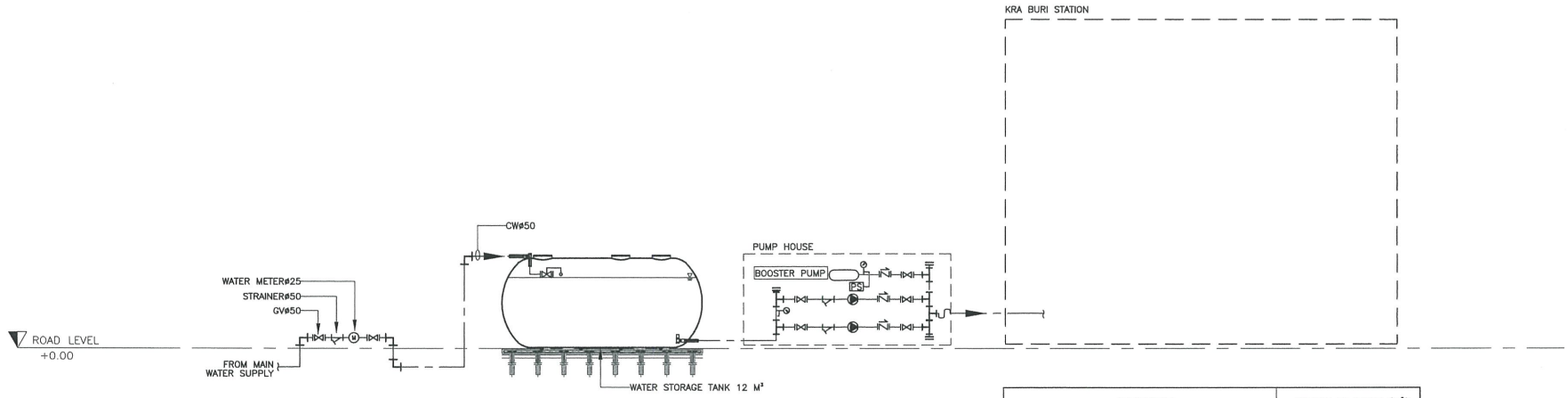
TITLE
S-04 PAK CHAN
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM SITE PLAN

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-S4-PS-001
SHEET NO.: 12

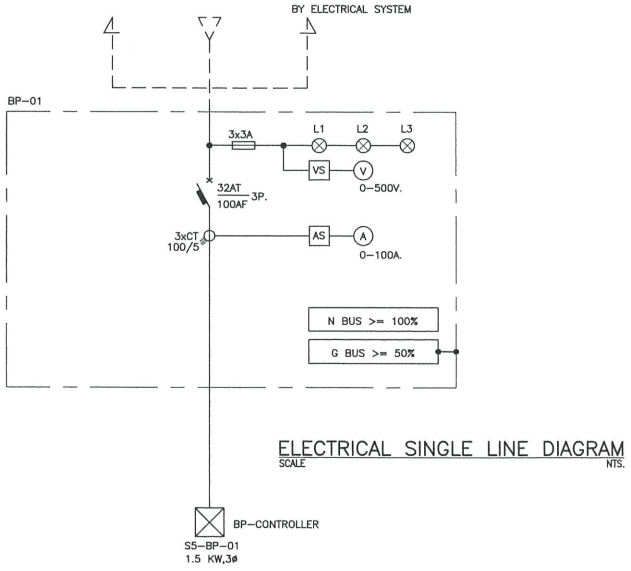


LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S5-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

\\EC-05-MEP\1485-SCR\03-DRAWING\CAD\S-05 (??????)\02 PS\SCR-S5-PS-001.DWG

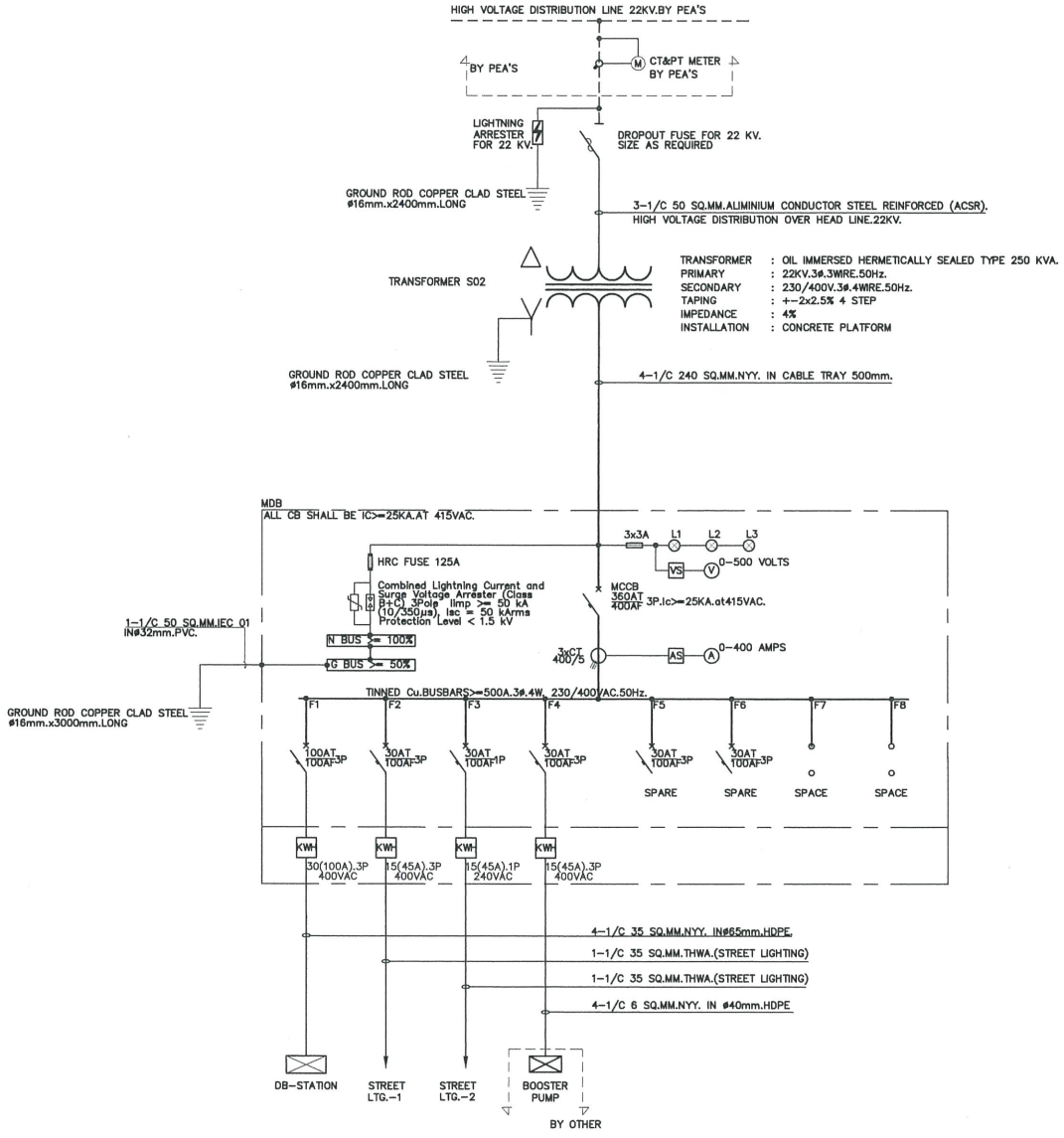
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

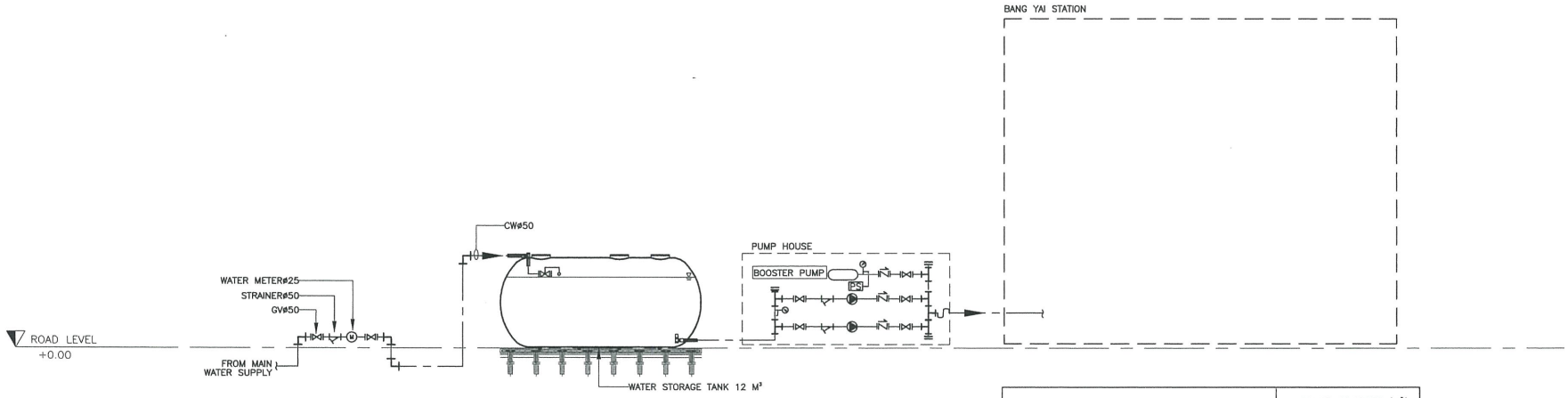
TITLE
S-05 KRA BUR
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM SITE PLAN

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-S5-PS-001
SHEET NO.: 14

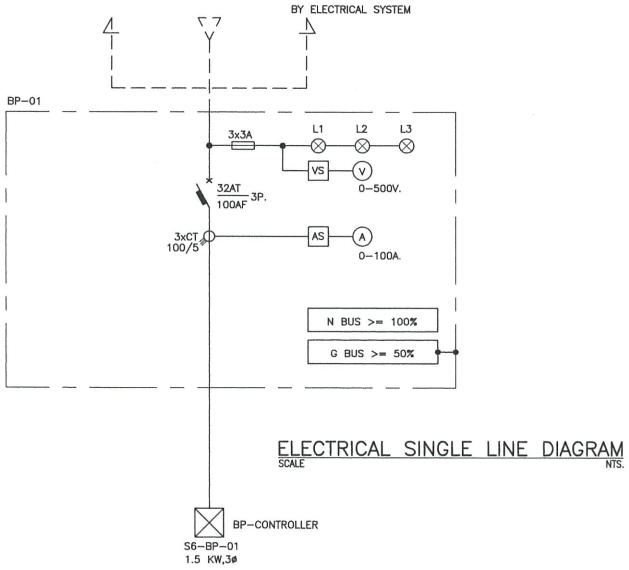


LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



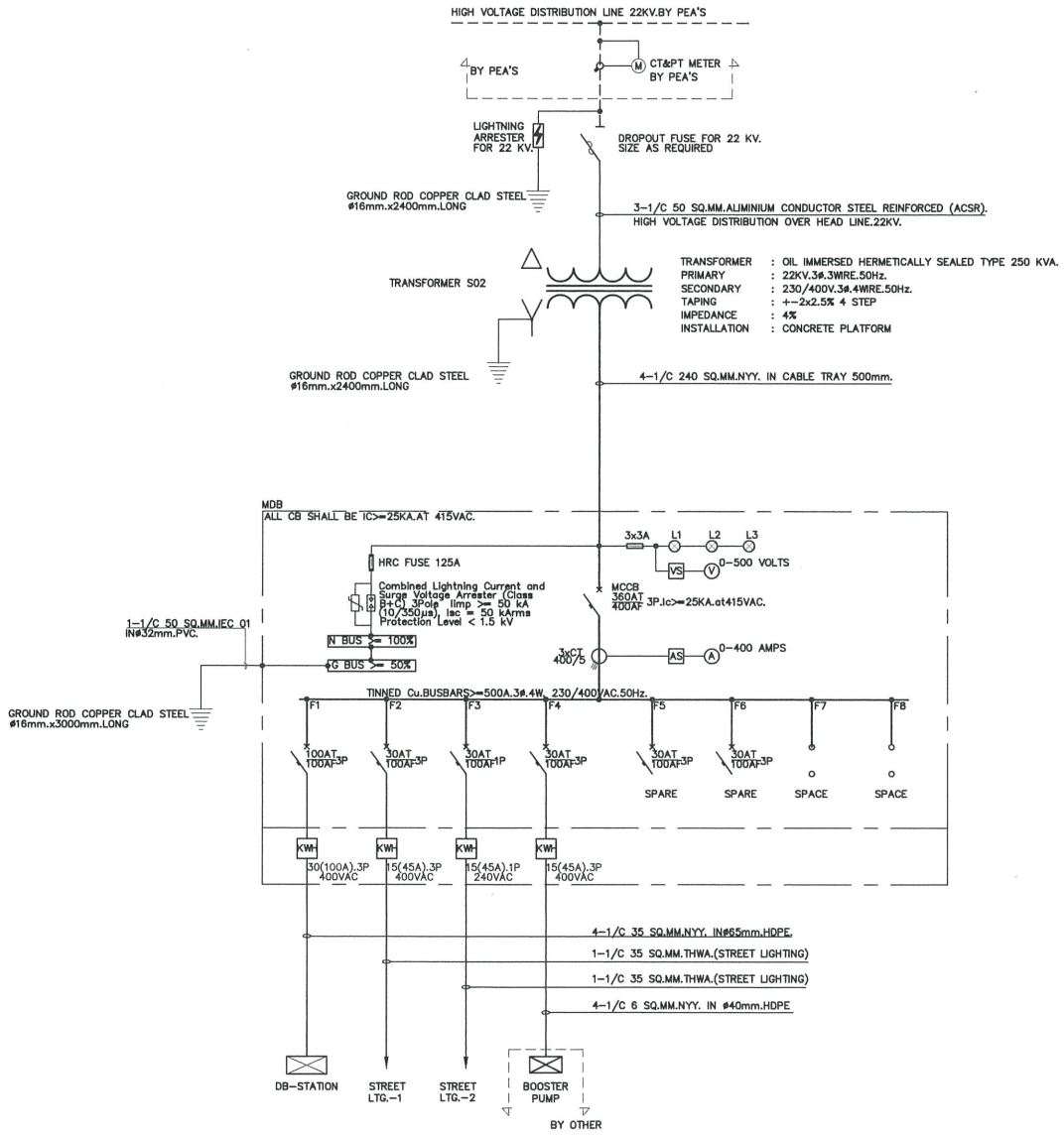
ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S6-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

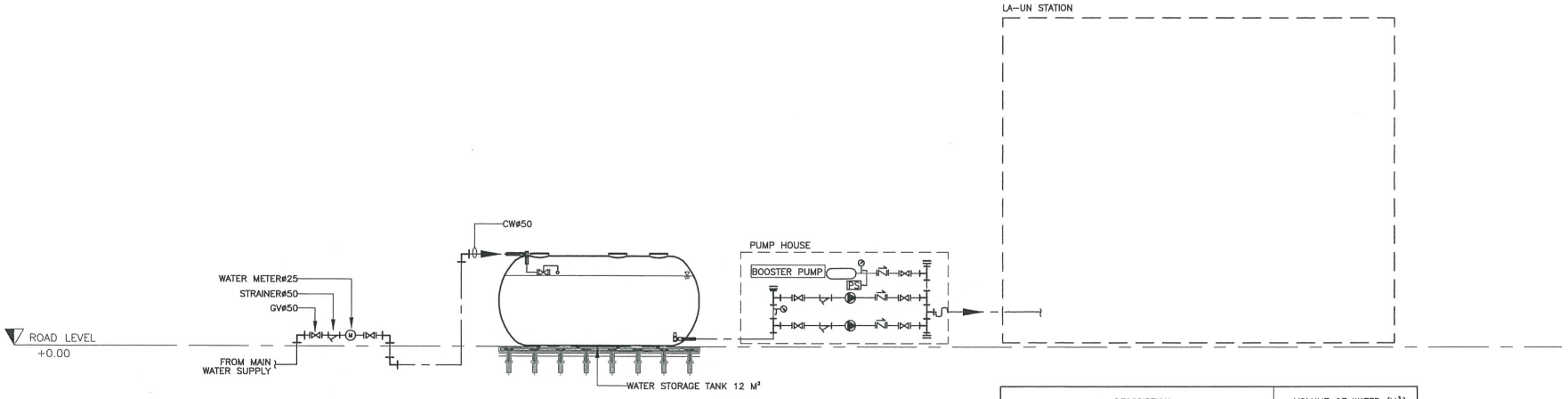
\AEC-DS-MEP\165-SCR\03-DRAWING\CAD\S-06 (??????)\02.PS\SCR-S6-PS-001.DWG



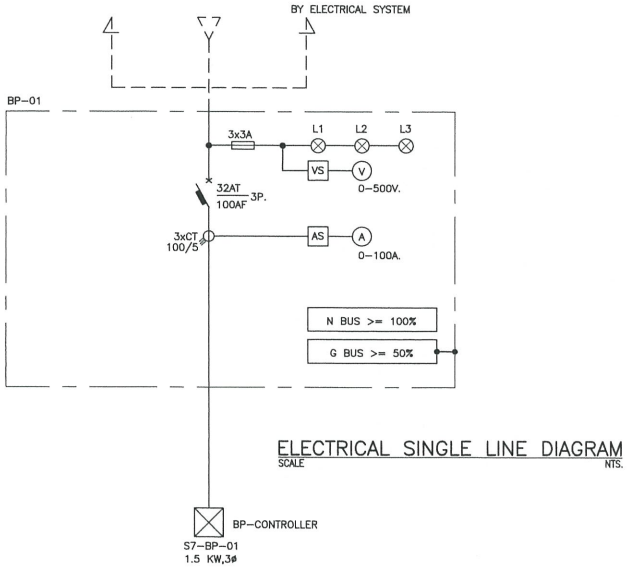
LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.

\VEC-05-HCPA\485-SCR\03-DRAWING\CAD\S-07 (??????)\01.EE\SCR-S7-EE-001.DWG



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	10.49
TOTAL WATER STORAGE TANK	12.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S7–BP–01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x230 LPM	25 m.	2x1.5 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

E:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\S-07 (TTTTTT)\02.PS\SCR-S7-PS-001.DWG

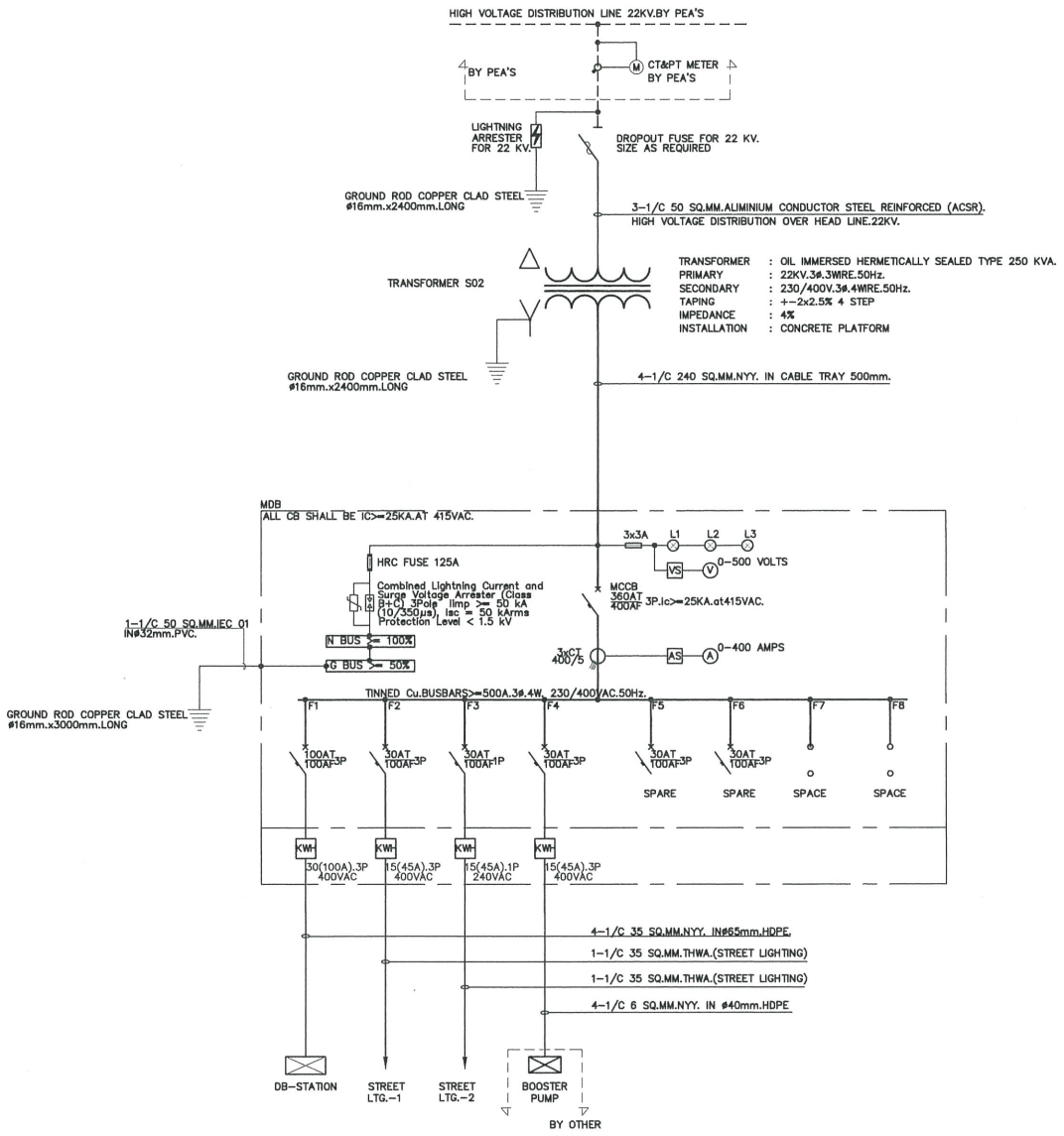
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
S–07 LA–UN
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM SITE PLAN

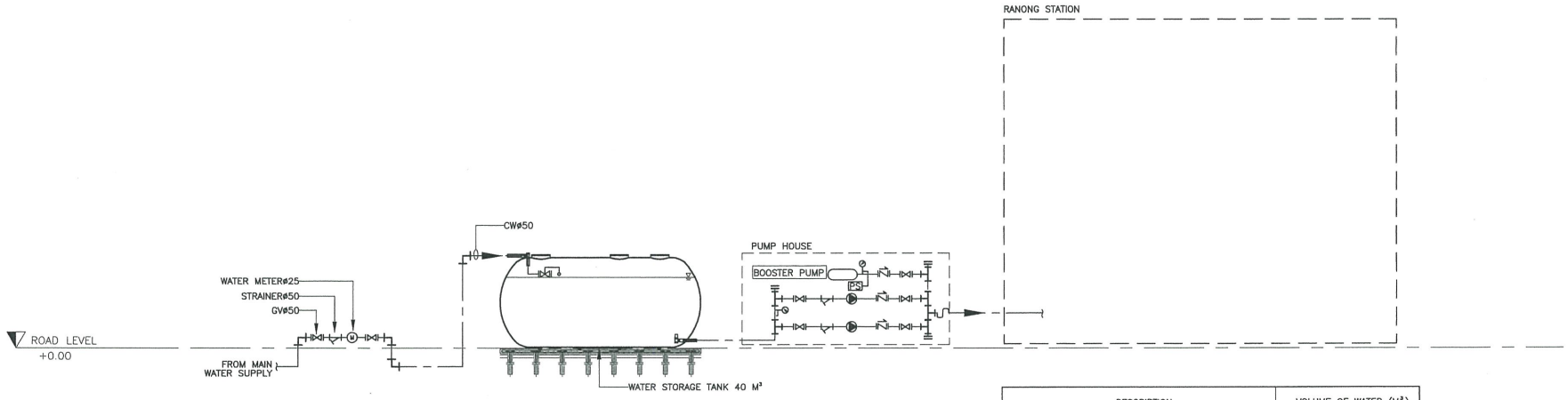
DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR–S7–PS–001
SHEET NO.: 18



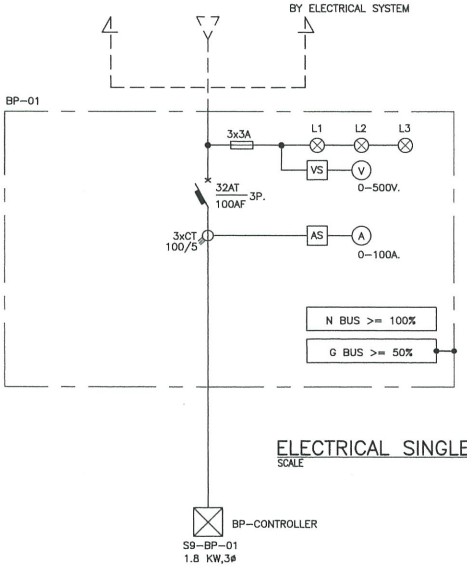
LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.

...\AEC-DS-WEP\1485-SCR\03-DRAWING\CAD\S-09 (*****)\01.EE\SCR-S9-EE-001.DWG



DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAY	38.92
TOTAL WATER STORAGE TANK	40.00



ELECTRICAL SINGLE LINE DIAGRAM
SCALE NTS.

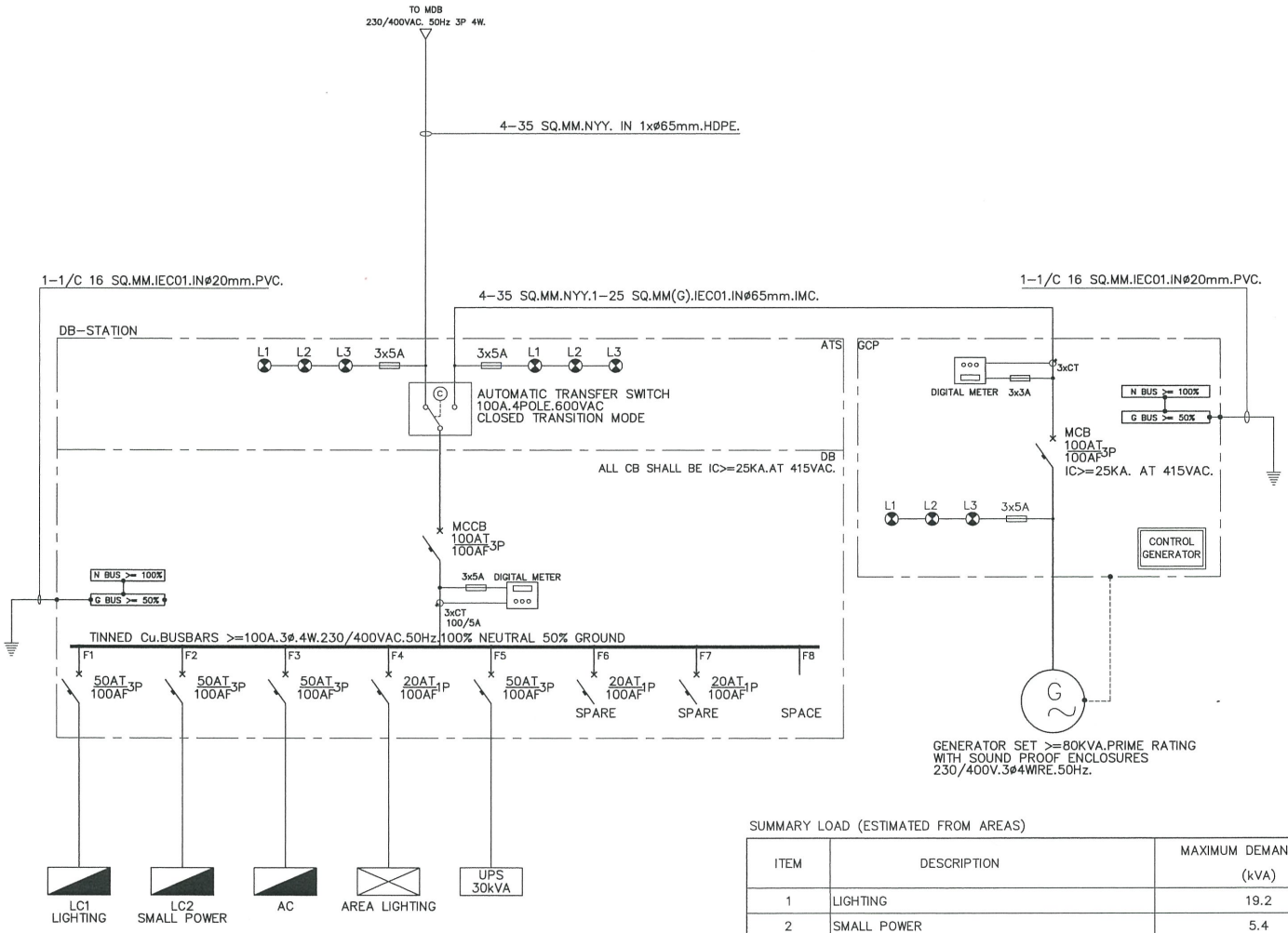
EQUIPMENT SCHEDULE

UNIT NO.	QUANTITY	DESCRIPTION	FLOW RATE	TOTAL DYNAMIC HEAD	APPROX. POWER CONSUMPTION	V/PH/HZ
S9-BP-01	1	BOOSTER PUMP (DUPLEX TYPE COMPLETED SET)	2x280 LPM	25 m.	2x1.8 KW.	380/3/50

COLD WATER SYSTEM RISER DIAGRAM SITE PLAN
SCALE NTS.

R:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\S-09 (?????)\02 PS\SCR-S9-PS-001.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: S-09 RANONG PLUMBING AND SANITARY SYSTEM COLD WATER SYSTEM RISER DIAGRAM SITE PLAN	DATE: FEBRUARY 2018 DWG. NO.: SCR-S9-PS-001	SCALE: NTS. SHEET NO.: 20



SUMMARY LOAD (ESTIMATED FROM AREAS)

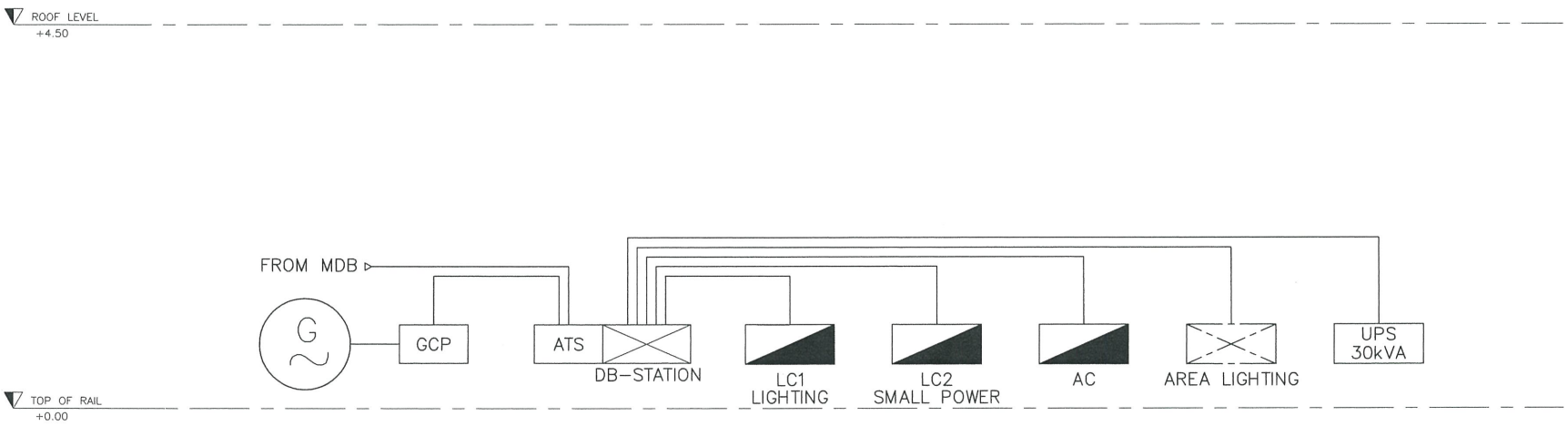
ITEM	DESCRIPTION	MAXIMUM DEMAND LOAD (kVA)
1	LIGHTING	19.2
2	SMALL POWER	5.4
3	AIR CONDITION,VENTILATION	5.0
TOTAL LOAD		29.6
125% TOTAL LOAD		37

LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

SCALE NTS.

R:\AEC-DS-MEP\165-SCR\03-DRAWING\CAD\STATION-TYPE A\01EE\SCR-SA-EE-001.DWG

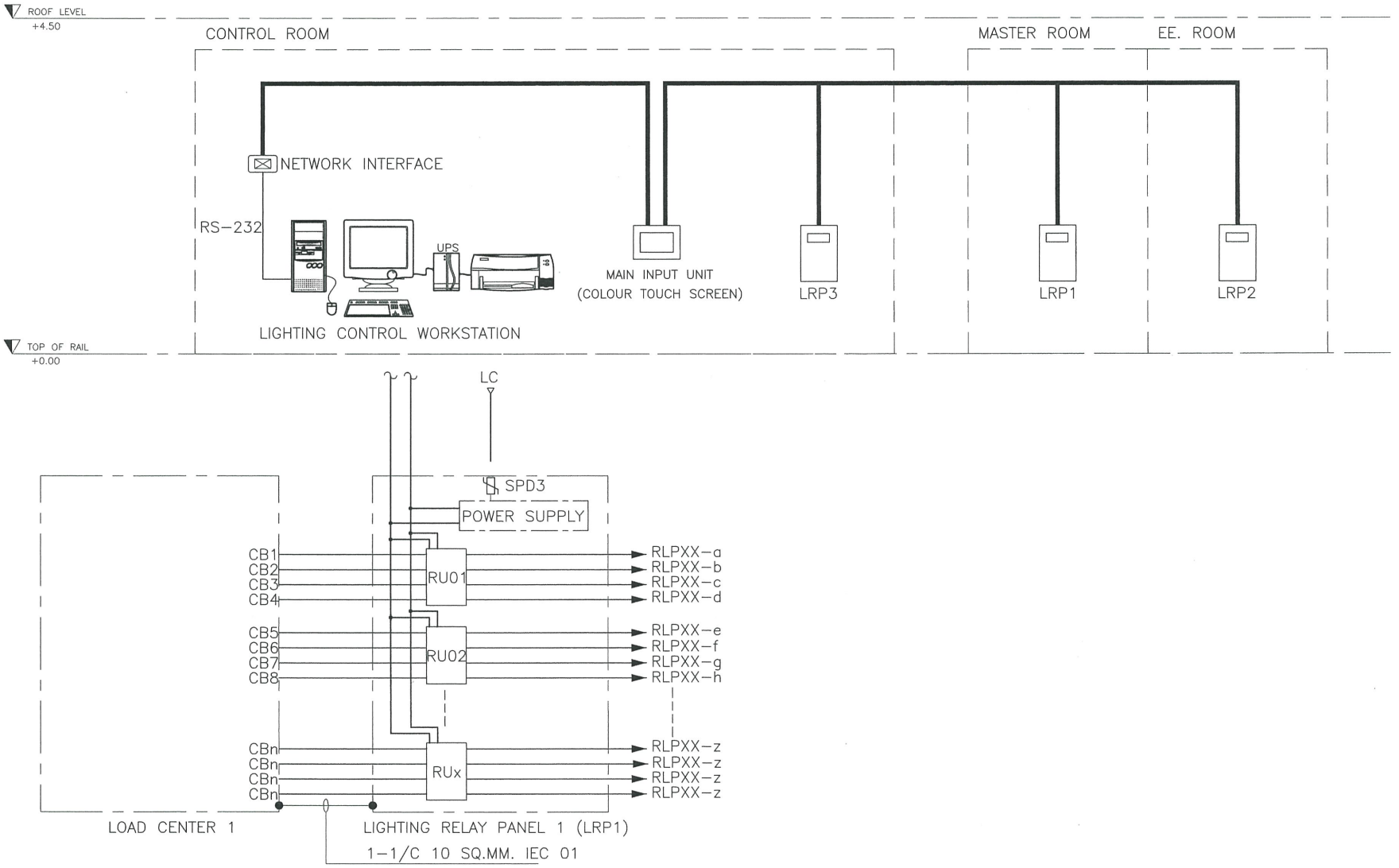
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: STATION TYPE A ELECTRICAL SYSTEM LV. POWER DISTRIBUTION SYSTEM SINGLE LINE AND RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-001	SCALE: NTS. SHEET NO.: 21



LV. POWER DISTRIBUTION SYSTEM RISER DIAGRAM
SCALE NTS.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM LV. POWER DISTRIBUTION SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR–SA–EE–002	SCALE: NTS. SHEET NO.: 22

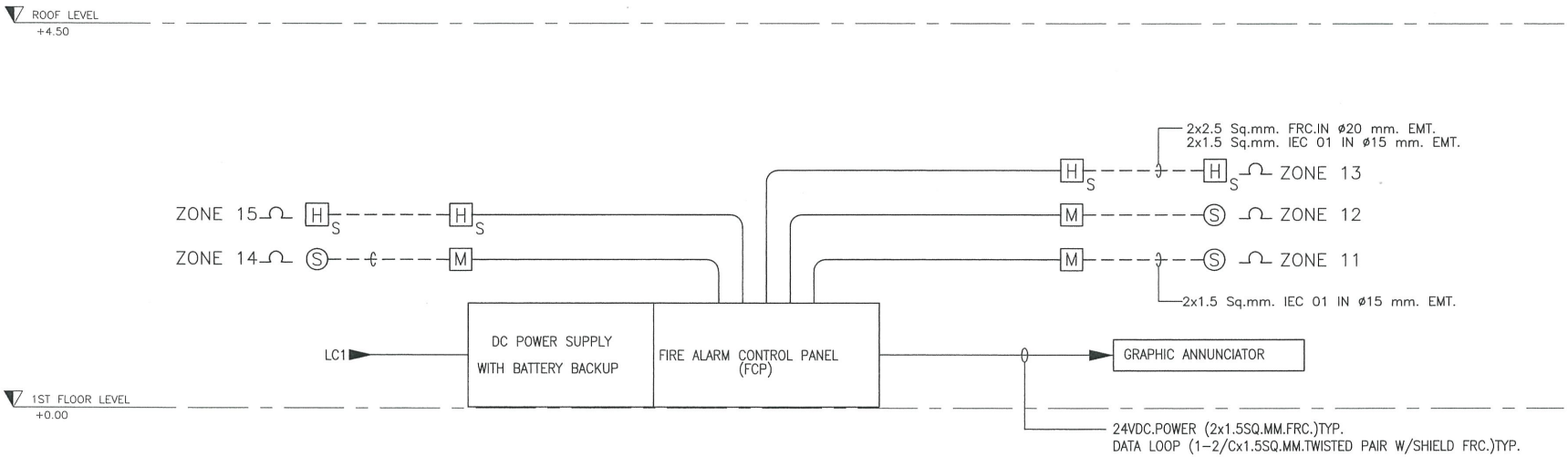
R:\AEC-05-MER\465-SCR\03-DRAWING\CAD\STATION-TYPE A\01.EE\SCR-SA-EE-002.DWG



LIGHTING CONTROL SYSTEM
SCALE NTS.

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM LIGHTING CONTROL SYSTEM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-003	SCALE: NTS. SHEET NO.: 23

R:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\STATION-TYPE A\01 EE\SCR-SA-EE-003.DWG

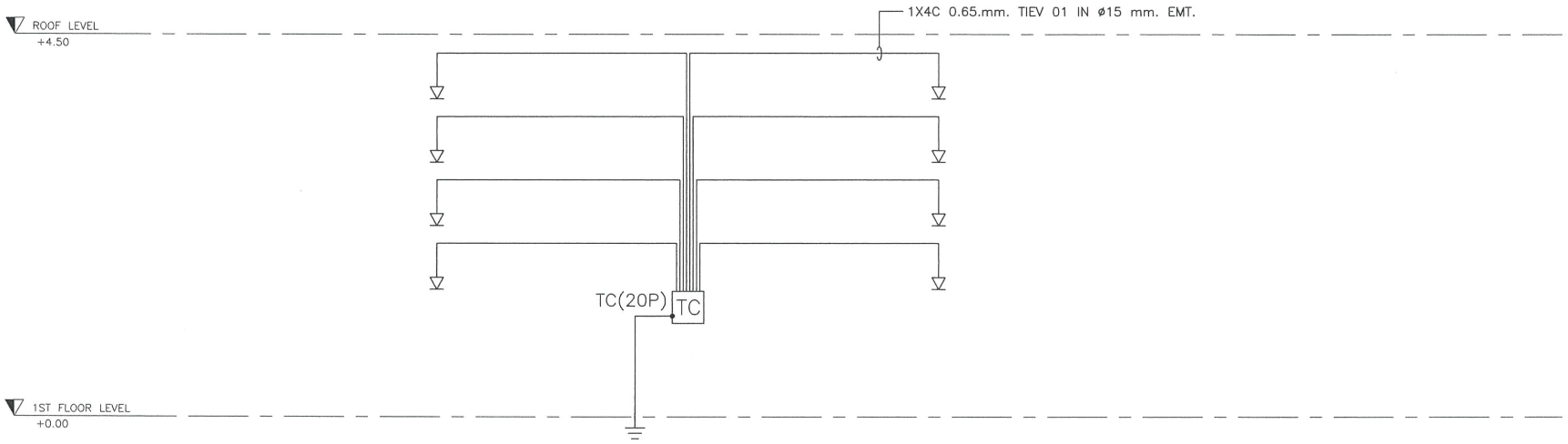


FIRE ALARM SYSTEM RISER DIAGRAM
SCALE NTS.

FCP	FIRE ALARM CONTROL PANEL WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
ANN	GRAPHIC ANNUNCIATOR WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
FTB	FIRE AMARM TERMINAL BOX WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
(H)	HEAT DETECTOR,COMBINATION TYPE (FIXED TEMPERATURE AT 58°C AND RATE-OF-RISE TEMPERATURE) WITH LED ALARM INDICATION SURFACE MOUNTED
(S)	SMOKE DETECTOR , PHOTOELECTRIC TYPE WITH LED ALARM INDICATION SURFACE MOUNTED
M	MANUAL STATION , DOUBLE ACTION TYPE WALL MOUNTED AT 1.50 M. AFF.
H S	ELECTRONIC HORN WITH STROBE WALL MOUNTED AT 1.50 M. AFF.
T	FIRE TELEPHONE JACK WITH FIRE EMERGENCY PHONE WALL MOUNTED AT 1.50 M. AFF.
	END-OF-LINE RESISTOR CONNECTED TO END OF LINE AT THE LAST EQUIPMENT OF LOOP
CM	ALARM CONTROL MODULE MOUNTED IN FIRE ALARM TERMINAL BOX
MM	INITIATING DEVICES MONITOR MODULE MOUNTED IN FIRE ALARM TERMINAL BOX

R:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\STATION-TYPE A\01.EE\SCR-SA-EE-004.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM FIRE ALARM SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-004	SCALE: NTS. SHEET NO.: 24



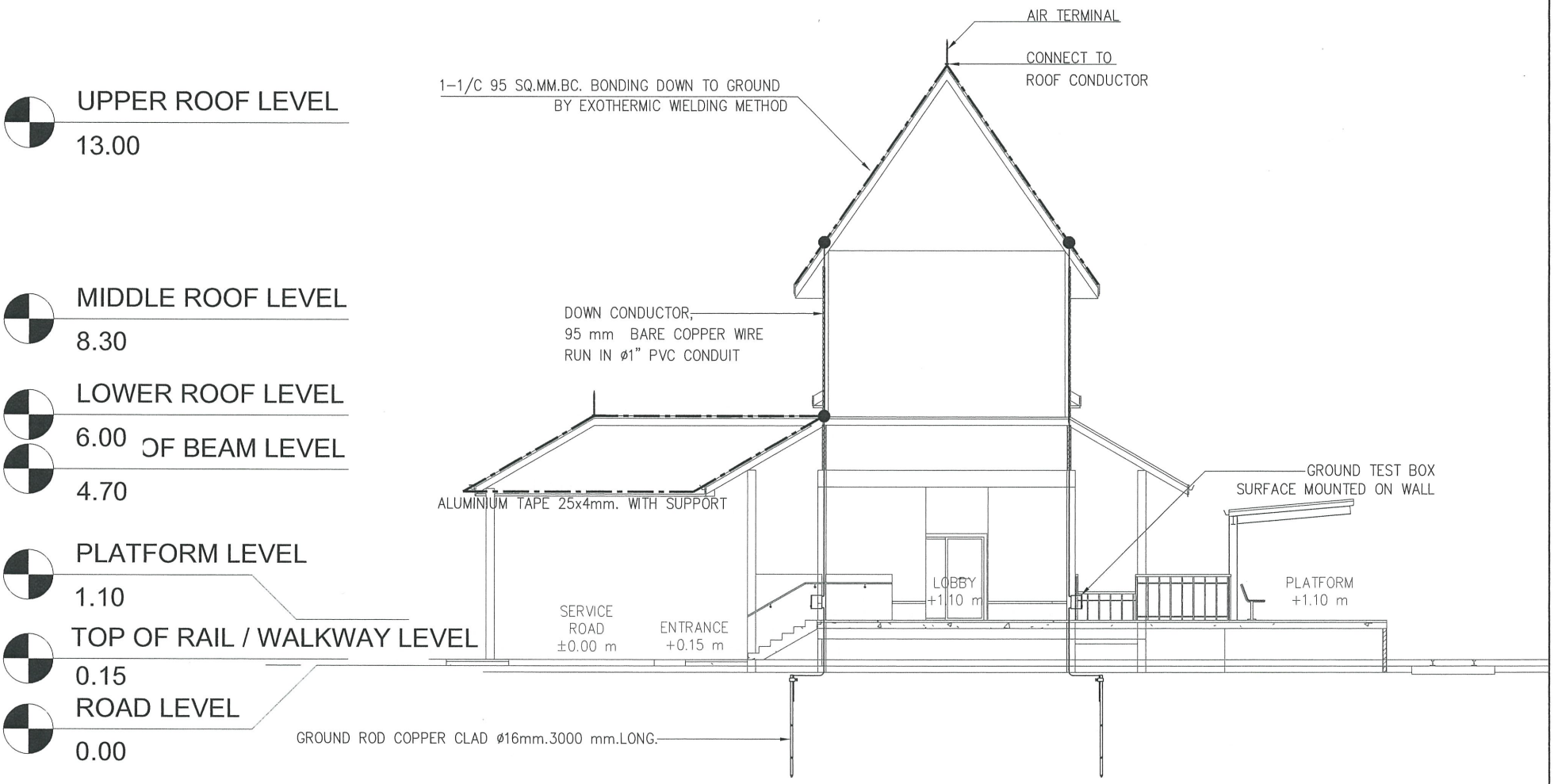
TELEPHONE SYSTEM SYMBOLS

PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
MDF	MAIN DISTRIBUTION FRAME
OTC	OUTDOOR TELEPHONE CABINET
TC	TELEPHONE TERMINAL
▽	TELEPHONE OUTLET (RJ11)
▽	FLOOR TELEPHONE OUTLET (RJ11)
$▽_P$	PUBLIC TELEPHONE OUTLET (RJ11)

PUBLIC TELEPHONE SYSTEM RISER DIAGRAM
SCALE NTS.

R:\AEC-05-MEP\465-SCR\03-DRAWING\CAD\STATION-TYPE A\DIEV\SCR-SA-EE-005.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM PUBLIC TELEPHONE SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-005	SCALE: NTS. SHEET NO.: 25

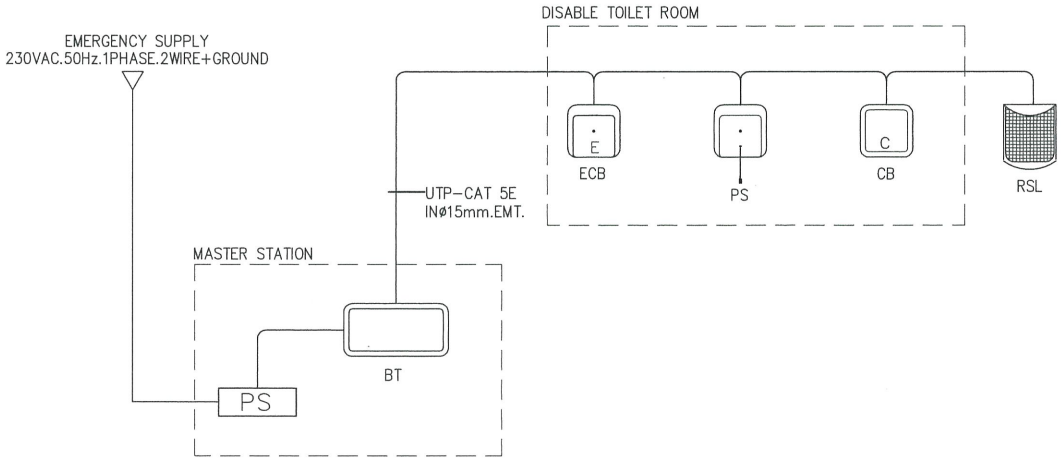


LIGHTNING PROTECTION SYSTEM RISER DIAGRAM
SCALE NTS.

R:\AEC-05-MEP\1455-SCR\03-DRAWING\CAD\STATION-TYPE A\01.EE\SCR-SA-EE-006.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM LIGHTNING PROTECTION SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-006	SCALE: NTS. SHEET NO.: 26

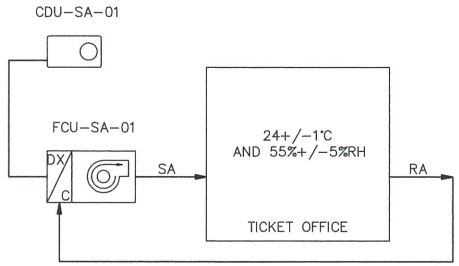
SYMBOL	DESCRIPTION
	BASE TERMINAL (BT)
	ROOM SIGNAL LAMP (RSL)
	PULL SWITCH (PS)
E	EMERGENCY CALL BUTTON (ECB)
C	CANCEL BUTTON (CB)
PS	POWER SUPPLY 24VDC

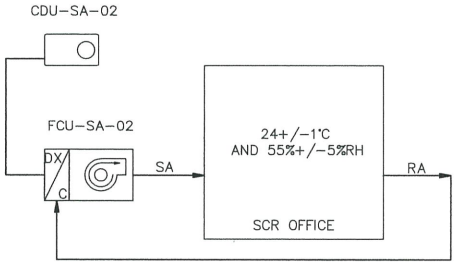


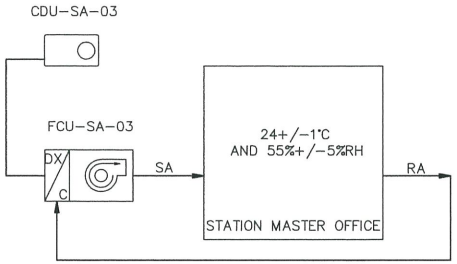
EMERGENCY CALL SYSTEM DIAGRAM
SCALE NTS.

R:\AEC-05-MEP\1465-SCR\03-DRAWING\CAD\STATION-TYPE A\01 EE\SCR-SA-EE-007.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A ELECTRICAL SYSTEM EMERGENCY CALL SYSTEM DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-EE-007	SCALE: NTS. SHEET NO.: 27





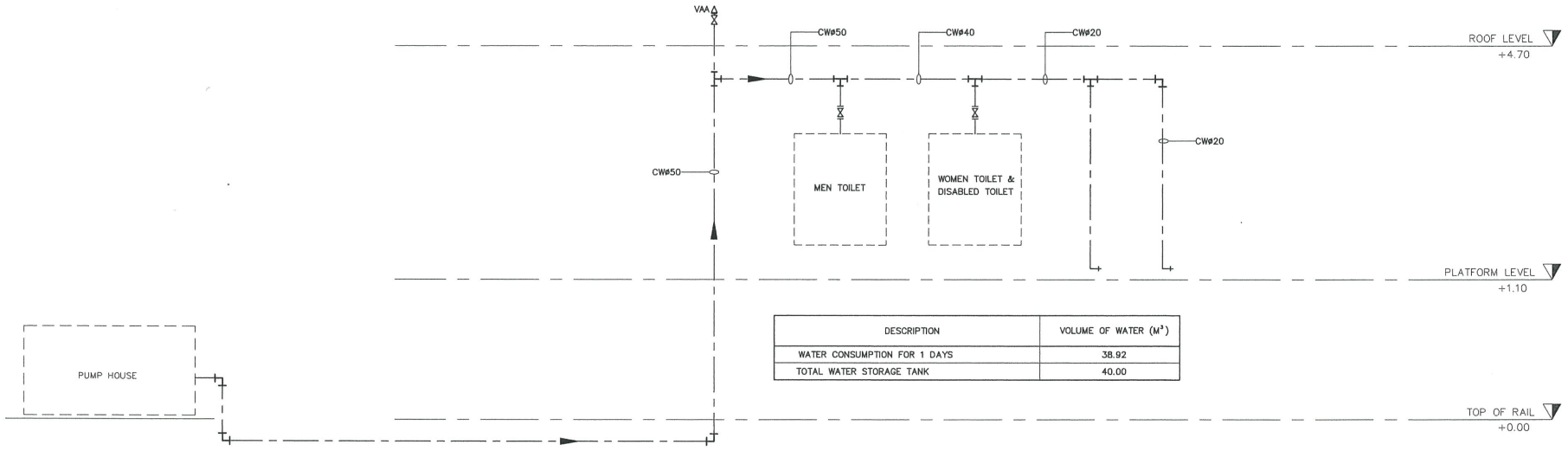


AIR CONDITIONING SYSTEM																
Item	Unit no.	Q'ty	Type	Room Service	Arae			Supply air	Supply air	Cooling Capacity				Entering Air temp		power	Remark
					H	Arae	Volume			Sensible		Total					
		(unit)			m	m2	m3	(m3/h)	(CFM)	(Kw)	(Kw)	(BTU/h)	(Ton.)	DB(C)	WB(C)	V/Ph/Hz	
	Type A Station																
1	FCU-SA-01	1	CT	Ticket office	2.9	11.00	31.90	418.22	246.15	1.49	2.16	7,385	0.62	28.4	19.6	220/1/50	
2	FCU-SA-02	1	CT	SCR office	2.9	16.00	46.40	580.86	341.88	2	3	10,256	0.85	28.5	20.5	220/1/50	
3	FCU-SA-03	1	CT	Station master	2.9	18.00	52.20	669.92	394.30	2.31	3.46	11,829	0.99	28.5	19.8	220/1/50	

AIR CONDITIONING SYSTEM SCHEMATIC DIAGRAM
SCALE NTS.

R:\AEC-DS-MEP\1465-SCR\03-DRAWING\CAD\STATION-TYPE A\02.ME\SCR-SA-ME-001.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A AIR CONDITIONING AND VENTILATION SYSTEM AIR CONDITIONING SCHEMATIC DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SA-ME-001	SCALE: NTS. SHEET NO.: 28



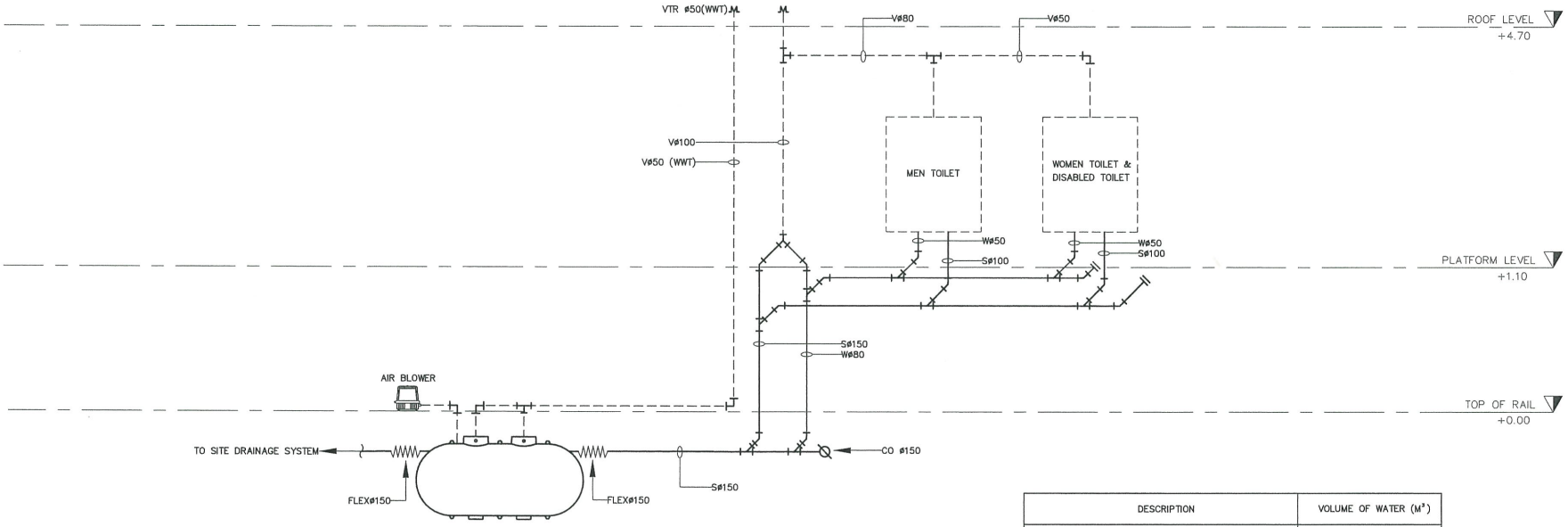
DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAYS	38.92
TOTAL WATER STORAGE TANK	40.00

COLD WATER SYSTEM RISER DIAGRAM

SCALE NTS.

R:\AEC-DS-MEP\165-SCR\03-DRAWING\CAD\STATION-TYPE A\03.PS\SCR-S9-PS-001.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE A PLUMBING AND SANITARY SYSTEM COLD WATER SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-S9-PS-001	SCALE: NTS. SHEET NO.: 29



DESCRIPTION	VOLUME OF WATER (M^3)
WASTEWATER GENERATED FOR 1 DAYS	38.92
WASTEWATER TREATMENT TANK	40.00

EQUIPMENT SCHEDULE

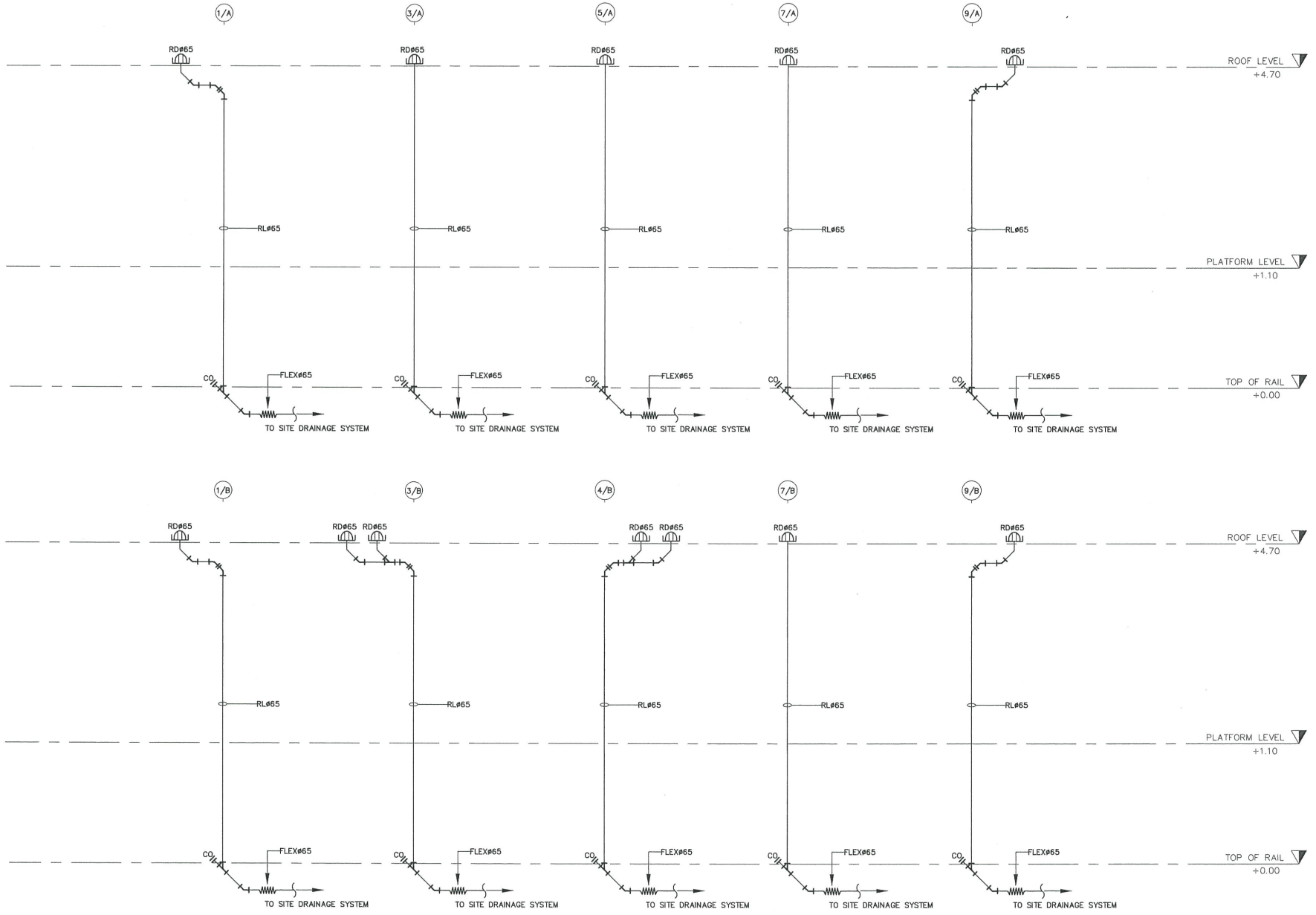
WASTEWATER TREATMENT TANK SCHEDULE								
UNIT NO.	QUANTITY	CAPACITY (CU.M.)	INLET PIPE (MM.)	OUTLET PIPE (MM.)	VENT PIPE (MM.)	AIR PIPE (MM.)	POWER V/Ph/Hz	APPROX. MOTOR (KW)
WWT-01	1	40	150	150	50	25	220/1/50	0.75

SOIL,WASTE AND VENT SYSTEM RISER DIAGRAM

SCALE NTS.

R:\AEC-DS-MEP\165-SCR\03-DRAWING\CAD\STATION-TYPE A\03.PS\SCR-SA-PS-002.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: STATION TYPE A PLUMBING AND SANITARY SYSTEM SOIL, WASTE AND VENT SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 SCALE: NTS. DWG. NO.: SCR-S9-PS-002 SHEET NO.: 30

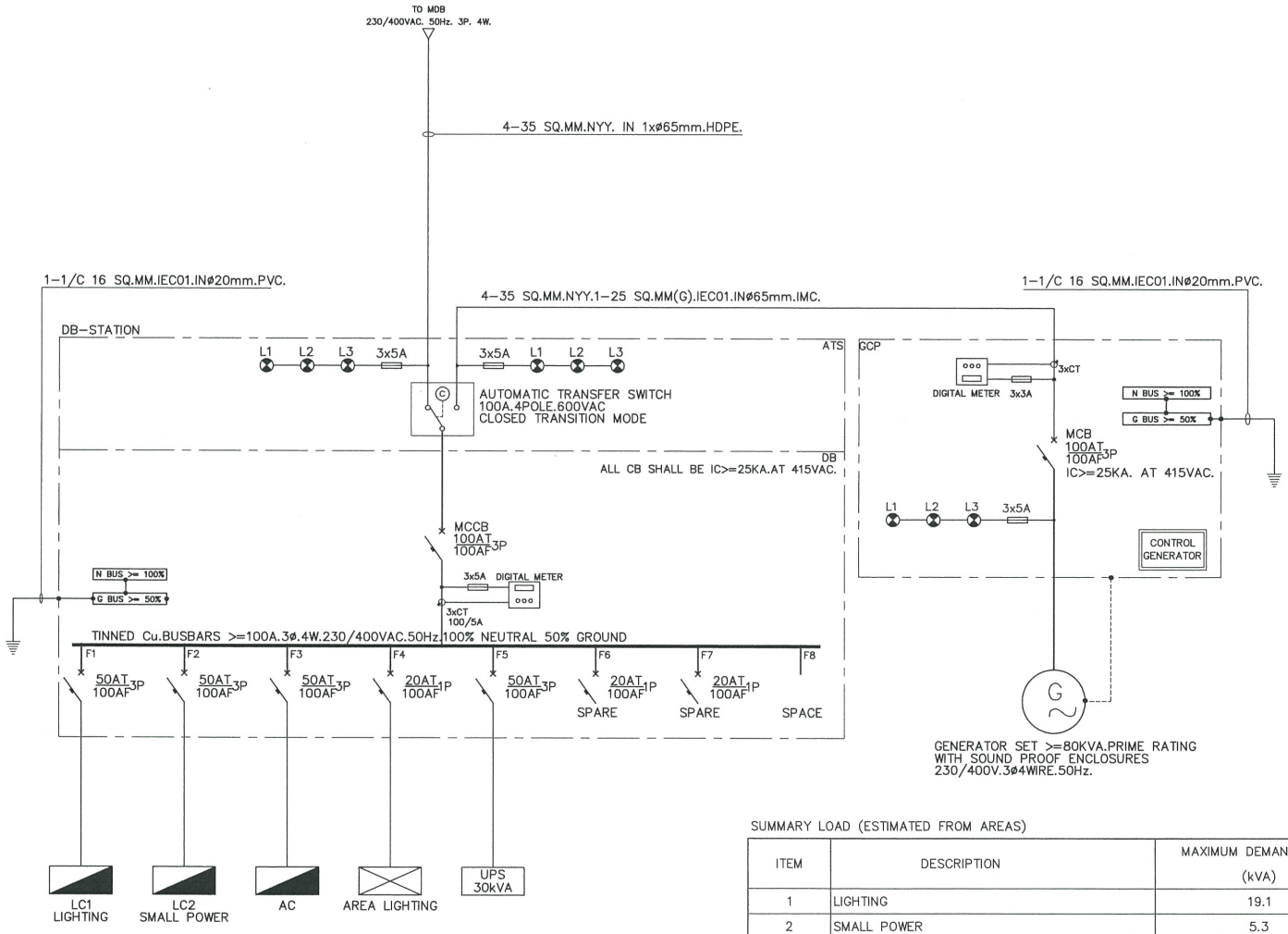


RAIN LEADER SYSTEM RISER DIAGRAM

SCALE NTS.

R:\AEC-05-MEP\465-SCR\03-DRAWING\CAD\STATION-TYPE A\03PS\SCR-SA-PS-003.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: STATION TYPE A PLUMBING AND SANITARY SYSTEM RAIN LEADER SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-S9-PS-003	SCALE: NTS. SHEET NO.: 31

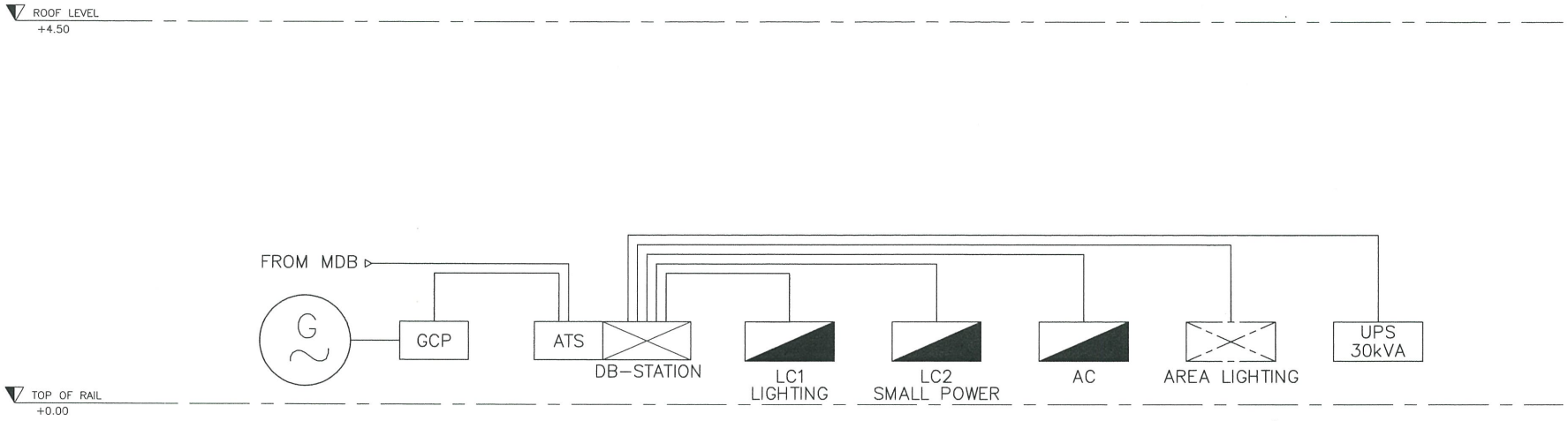


SUMMARY LOAD (ESTIMATED FROM AREAS)

ITEM	DESCRIPTION	MAXIMUM DEMAND LOAD (kVA)
1	LIGHTING	19.1
2	SMALL POWER	5.3
3	AIR CONDITION,VENTILATION	4.9
	TOTAL LOAD	29.3
	125% TOTAL LOAD	36.6

LV. POWER DISTRIBUTION SYSTEM SINGLE LINE DIAGRAM

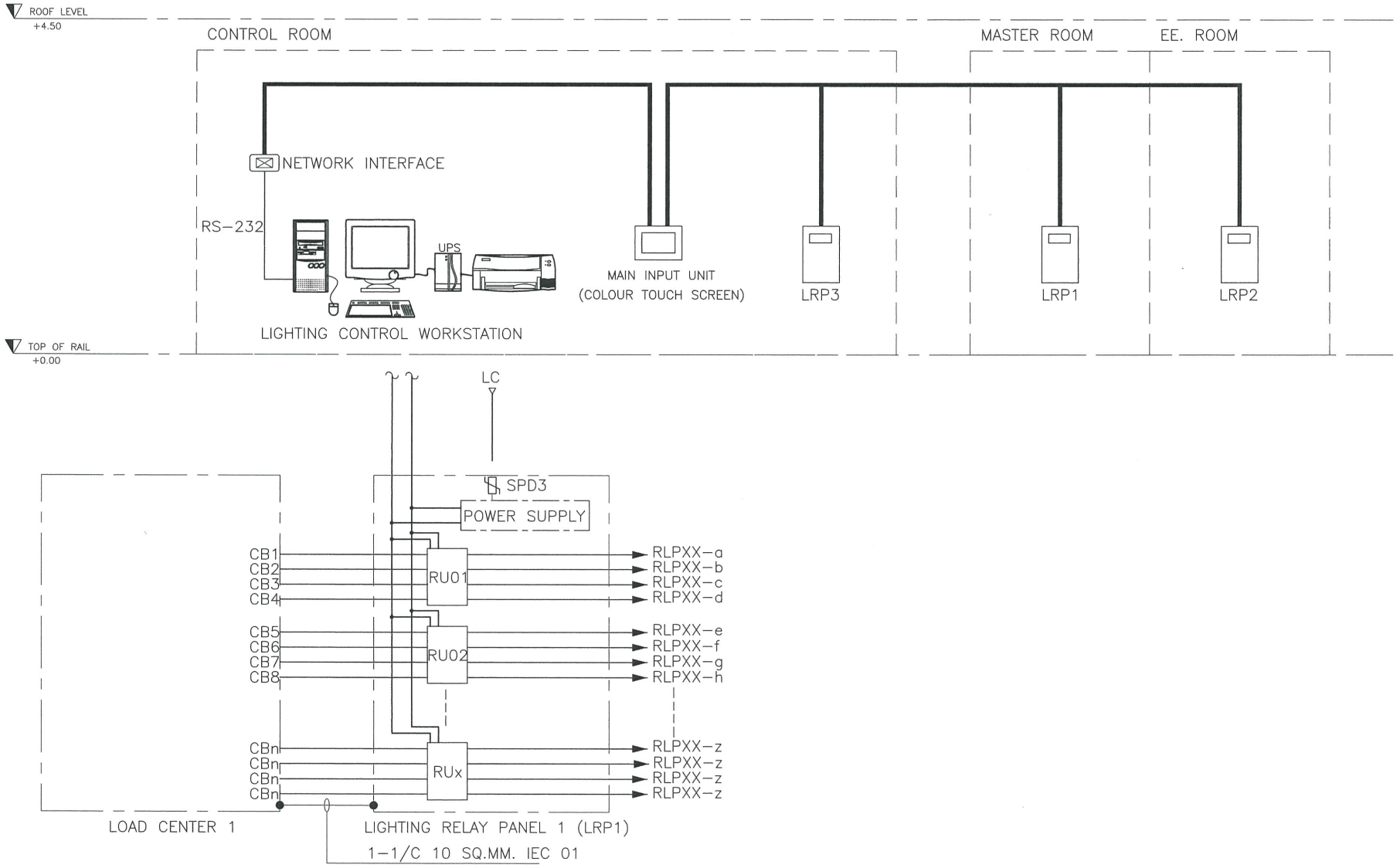
SCALE NTS.



LV. POWER DISTRIBUTION SYSTEM RISER DIAGRAM
SCALE NTS.

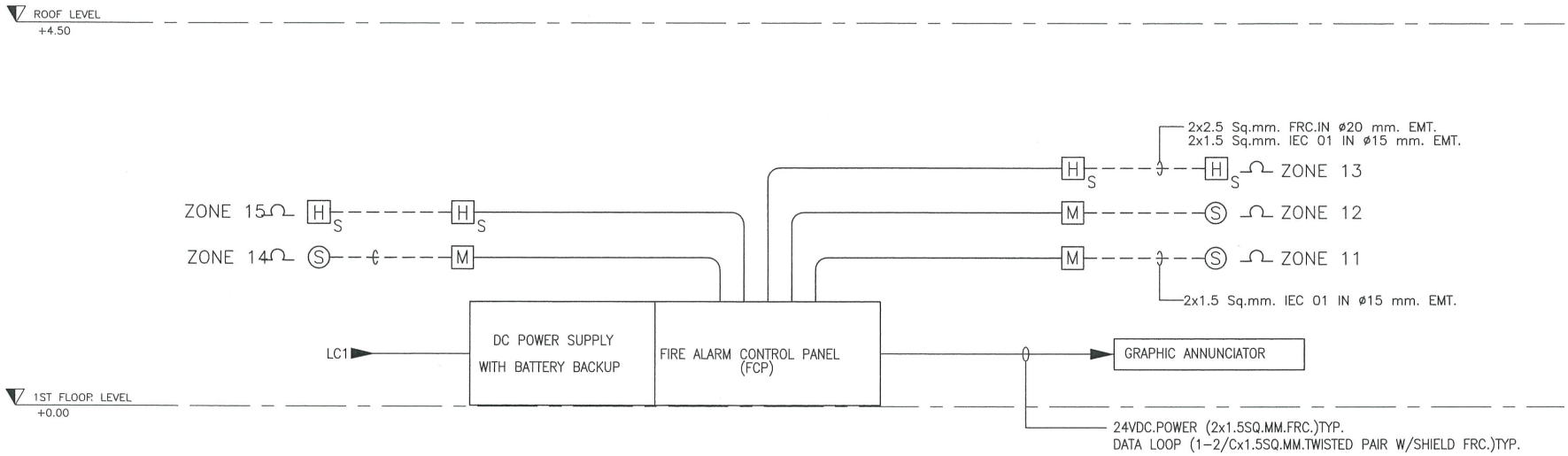
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE B ELECTRICAL SYSTEM LV. POWER DISTRIBUTION SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR–SB–EE–002	SCALE: NTS. SHEET NO.: 33



LIGHTING CONTROL SYSTEM
SCALE NTS.

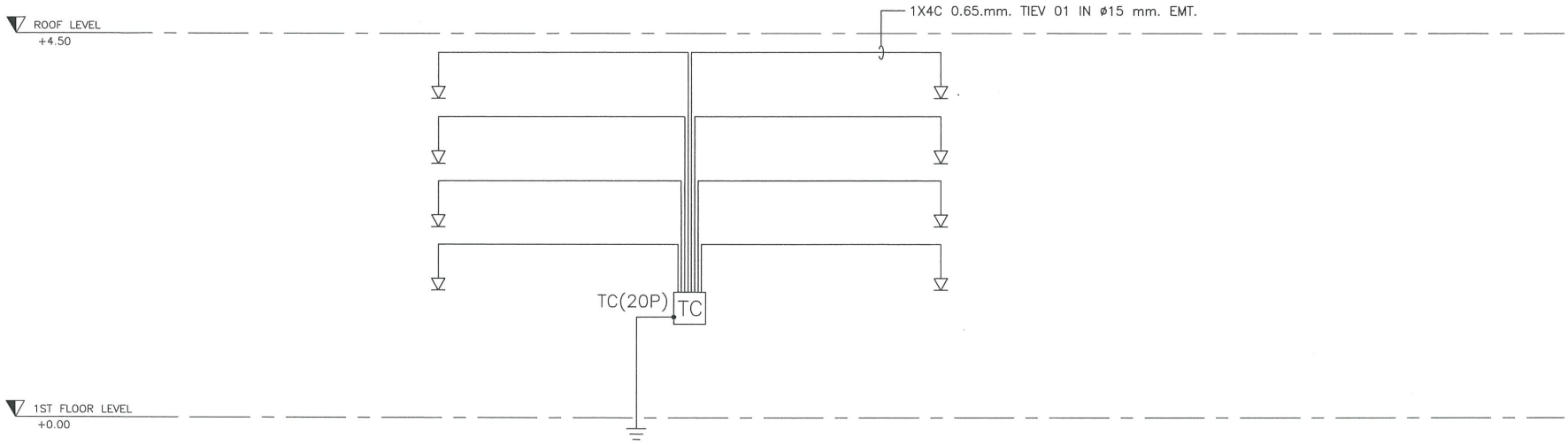
I:\AEC-03-MEP\148S-SCR\03-DRAWINGS\CAD\STATION-TYPE B\01. EE\SCR-SB-EE-003.DWG



FCP	FIRE ALARM CONTROL PANEL WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
ANN	GRAPHIC ANNUNCIATOR WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
FTB	FIRE AMARM TERMINAL BOX WALL MOUNTED AT 1.80 M. AFF.TO THE TOP OF PANEL
(H)	HEAT DETECTOR,COMBINATION TYPE (FIXED TEMPERATURE AT 58°C AND RATE-OF-RISE TEMPERATURE) WITH LED ALARM INDICATION SURFACE MOUNTED
(S)	SMOKE DETECTOR , PHOTOELECTRIC TYPE WITH LED ALARM INDICATION SURFACE MOUNTED
M	MANUAL STATION , DOUBLE ACTION TYPE WALL MOUNTED AT 1.50 M. AFF.
H S	ELECTRONIC HORN WITH STROBE WALL MOUNTED AT 1.50 M. AFF.
T	FIRE TELEPHONE JACK WITH FIRE EMERGENCY PHONE WALL MOUNTED AT 1.50 M. AFF.
	END-OF-LINE RESISTOR CONNECTED TO END OF LINE AT THE LAST EQUIPMENT OF LOOP
CM	ALARM CONTROL MODULE MOUNTED IN FIRE ALARM TERMINAL BOX
MM	INITIATING DEVICES MONITOR MODULE MOUNTED IN FIRE ALARM TERMINAL BOX

FIRE ALARM SYSTEM RISER DIAGRAM
SCALE NTS.

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TELEPHONE SYSTEM SYMBOLS

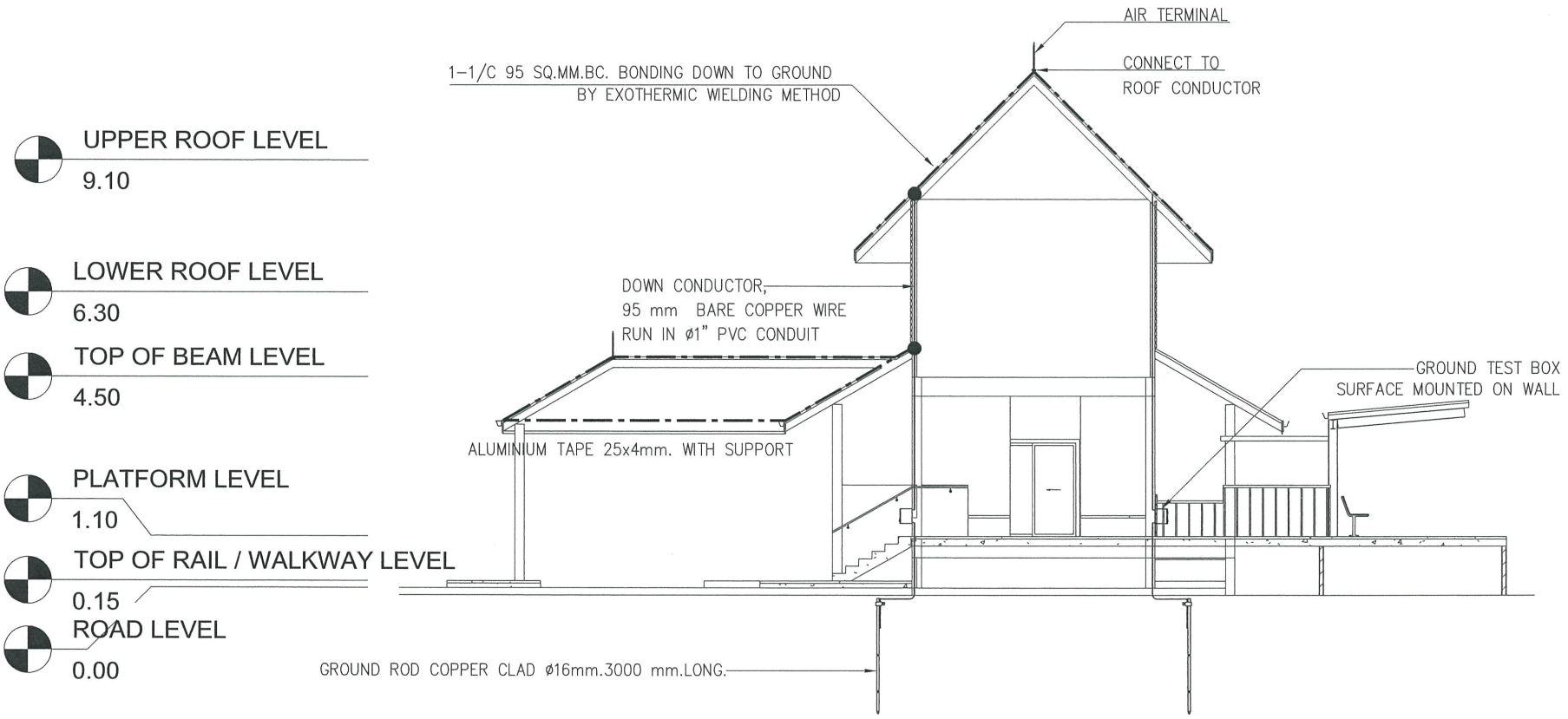
PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
MDF	MAIN DISTRIBUTION FRAME
OTC	OUTDOOR TELEPHONE CABINET
TC	TELEPHONE TERMINAL
▽	TELEPHONE OUTLET (RJ11)
▽	FLOOR TELEPHONE OUTLET (RJ11)
$▽_P$	PUBLIC TELEPHONE OUTLET (RJ11)

PUBLIC TELEPHONE SYSTEM RISER DIAGRAM

SCALE NTS.

I:\AEC-03-MEP\1465-SCR\03-DRAWING\CAD\STATION-TYPE B\01.EE\SCR-SB-EE-005.DWG

otp KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	ABC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE STATION TYPE B ELECTRICAL SYSTEM PUBLIC TELEPHONE SYSTEM RISER DIAGRAM	DATE: FEBRUARY 2018 DWG. NO.: SCR-SB-EE-005	SCALE: NTS. SHEET NO.: 36



LIGHTNING PROTECTION SYSTEM RISER DIAGRAM
SCALE NTS.

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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

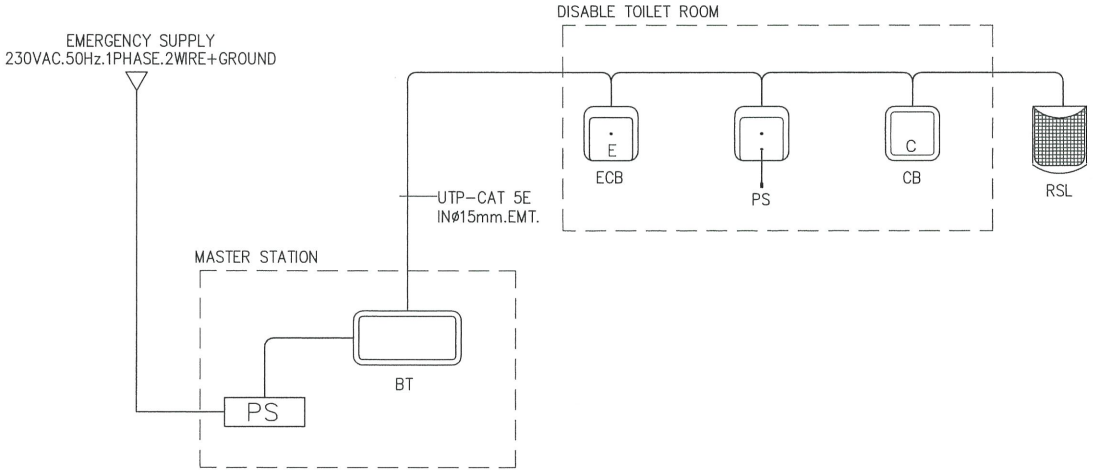
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

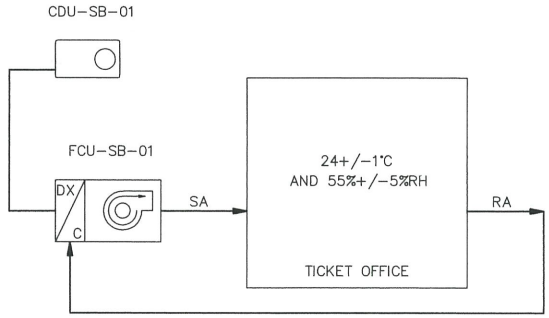
TITLE
STATION TYPE B
ELECTRICAL SYSTEM
LIGHTNING PROTECTION SYSTEM RISER DIAGRAM

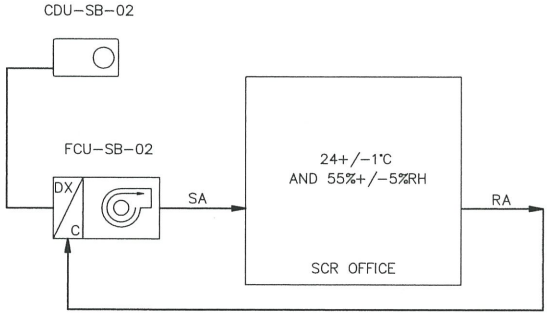
DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-SB-EE-006
SHEET NO.: 37

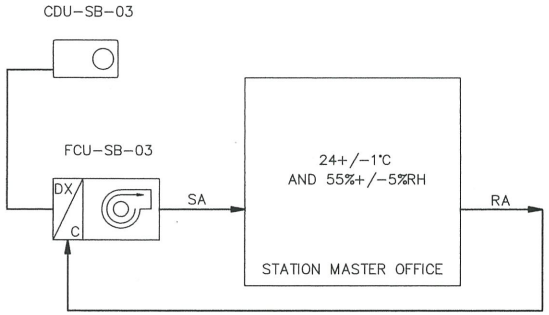
SYMBOL	DESCRIPTION
	BASE TERMINAL (BT)
	ROOM SIGNAL LAMP (RSL)
	PULL SWITCH (PS)
E	EMERGENCY CALL BUTTON (ECB)
C	CANCEL BUTTON (CB)
PS	POWER SUPPLY 24VDC



EMERGENCY CALL SYSTEM DIAGRAM
SCALE NTS.



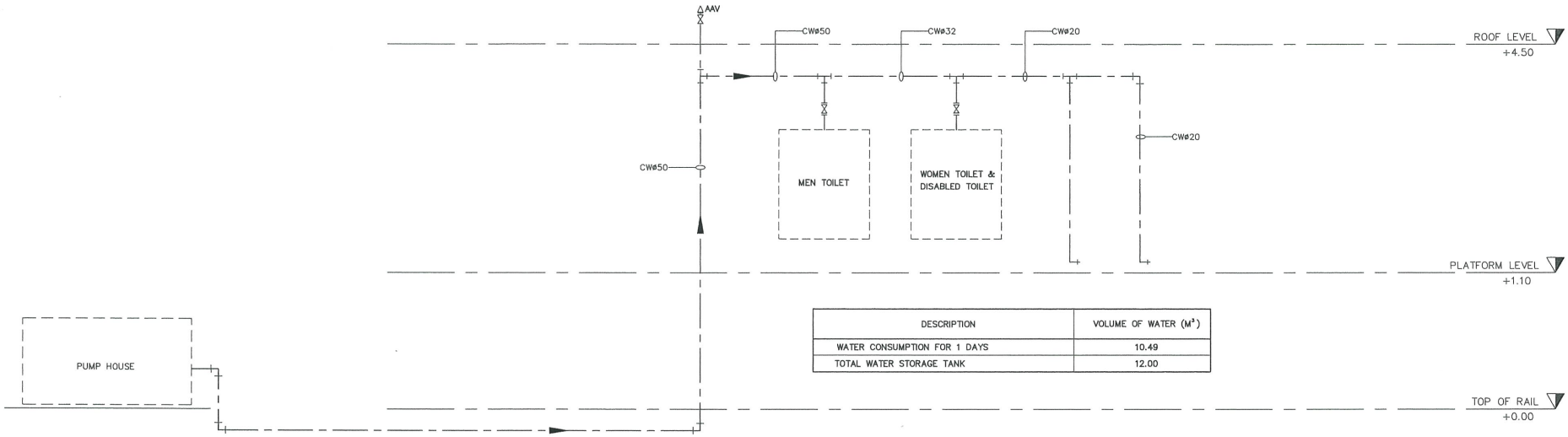




AIR CONDITIONING SYSTEM																
Item	Unit no.	Q'ty	Type	Room Service	Arae			Supply air	Supply air	Cooling Capacity				Entering Air temp		power	Remark
					H	Arae	Volume			Sensible		Total				V/Ph/Hz	
		(unit)			m	m2	m3	(m3/h)	(CFM)	(Kw)	(Kw)	(BTU/h)	(Ton.)	DB(C)	WB(C)		
	Type B Station																
1	FCU-SB-01	1	CT	Ticket office	2.9	11.00	31.90	360.13	211.97	1.24	1.86	6,359	0.53	28.2	20.2	220/1/50	
2	FCU-SB-02	1	CT	SCR office	2.9	16.00	46.40	925.50	544.73	3.38	4.78	16,342	1.36	28.1	20.1	220/1/50	
3	FCU-SB-03	1	CT	Station master	2.9	18.00	52.20	576.99	339.60	2.08	2.98	10,188	0.85	28.1	20.1	220/1/50	

AIR CONDITIONING SYSTEM SCHEMATIC DIAGRAM
SCALE NTS.

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DESCRIPTION	VOLUME OF WATER (M^3)
WATER CONSUMPTION FOR 1 DAYS	10.49
TOTAL WATER STORAGE TANK	12.00

COLD WATER SYSTEM RISER DIAGRAM

SCALE NTS.

I:\AEC-03-MEP\1465-SCR\03-DRAWINGS\CAD\STATION-TYPE B\03.PS\SCR-SB-PS-001.DWG

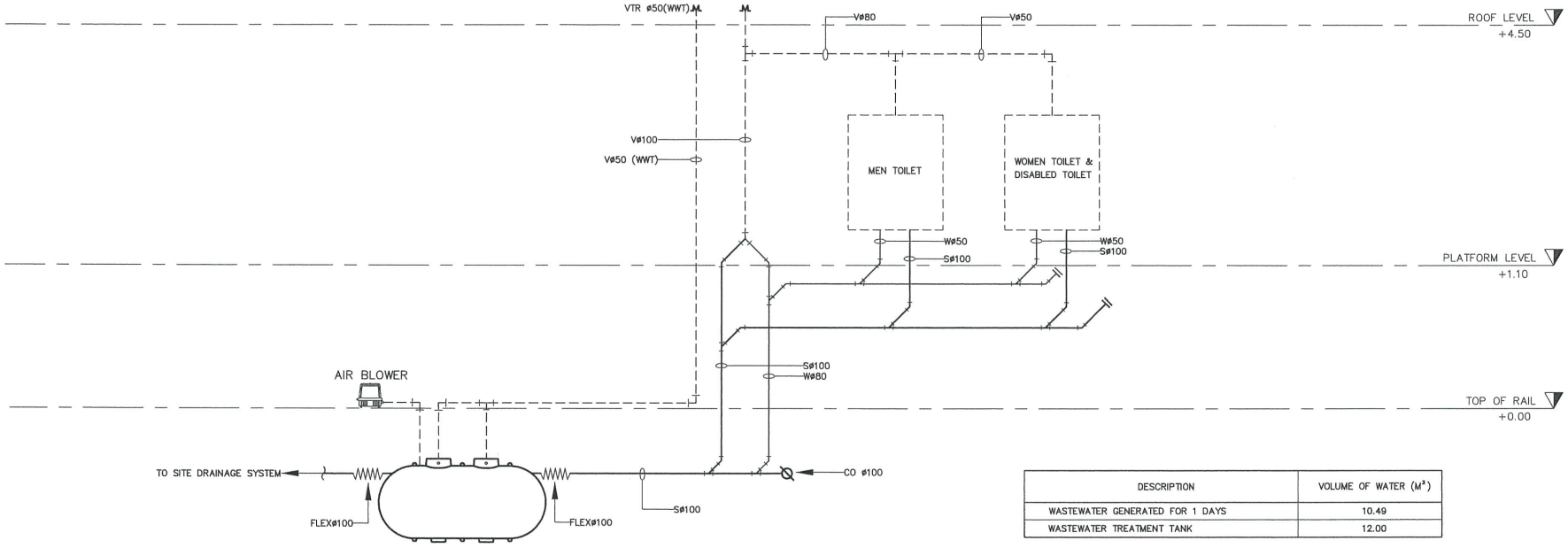
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

ABC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
STATION TYPE B
PLUMBING AND SANITARY SYSTEM
COLD WATER SYSTEM RISER DIAGRAM

DATE:	SCALE:
FEBRUARY 2018	NTS.
DWG. NO.: SCR-SB-PS-001	SHEET NO.: 40



DESCRIPTION	VOLUME OF WATER (M^3)
WASTEWATER GENERATED FOR 1 DAYS	10.49
WASTEWATER TREATMENT TANK	12.00

EQUIPMENT SCHEDULE

WASTEWATER TREATMENT TANK SCHEDULE								
UNIT NO.	QUANTITY	CAPACITY (CU.M.)	INLET PIPE (MM.)	OUTLET PIPE (MM.)	VENT PIPE (MM.)	AIR PIPE (MM.)	POWER V/Ph/Hz	APPROX. MOTOR (KW)
WWT-01	1	12.00	100	100	50	25	220/1/50	0.75

SOIL,WASTE AND VENT SYSTEM RISER DIAGRAM

SCALE NTS.

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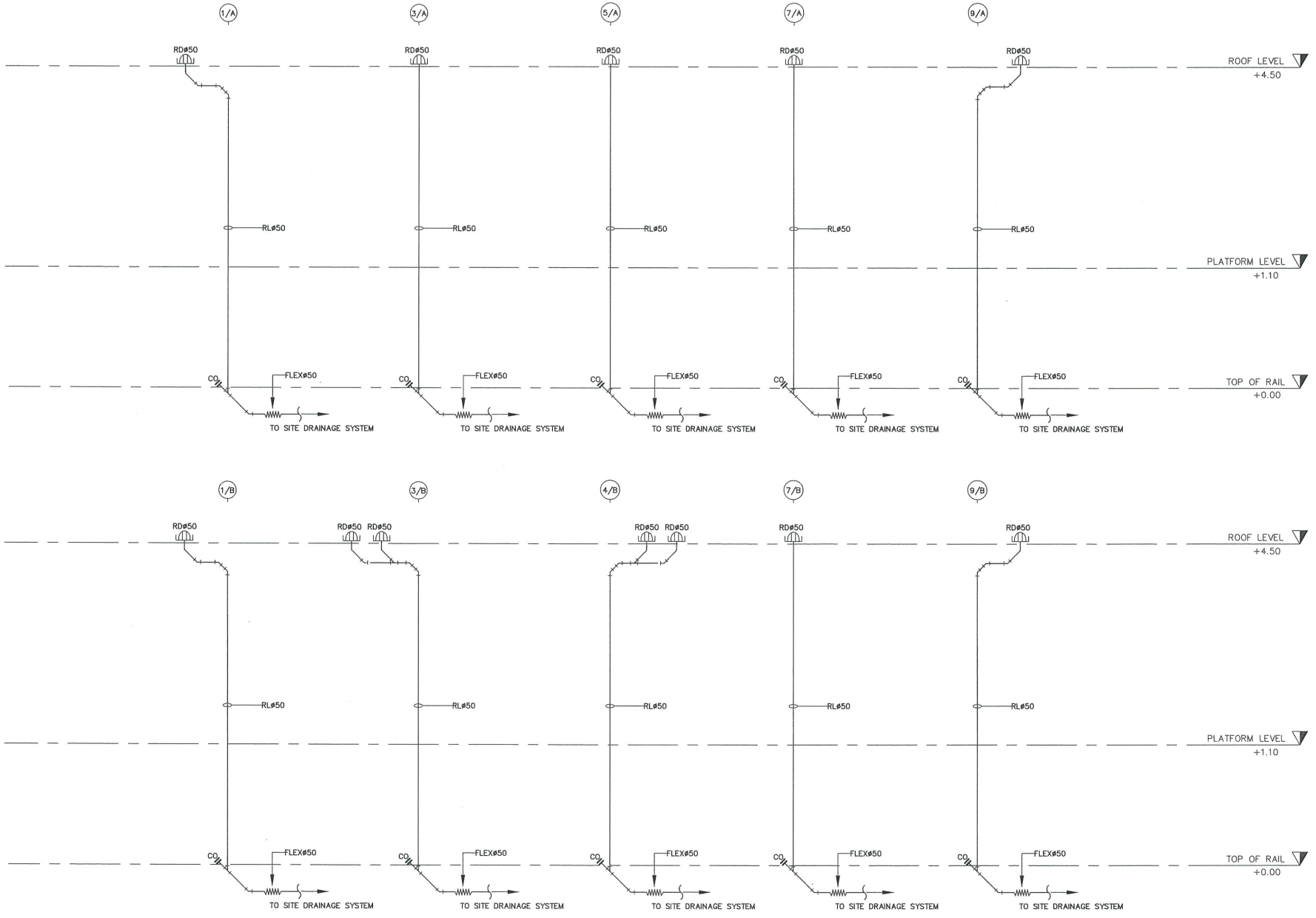
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE
STATION TYPE B
PLUMBING AND SANITARY SYSTEM
SOIL, WASTE AND VENT SYSTEM RISER DIAGRAM

DATE: FEBRUARY 2018
SCALE: NTS.
DWG. NO.: SCR-SB-PS-002
SHEET NO.: 41



RAIN LEADER SYSTEM RISER DIAGRAM

SCALE NTS.

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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

ABC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

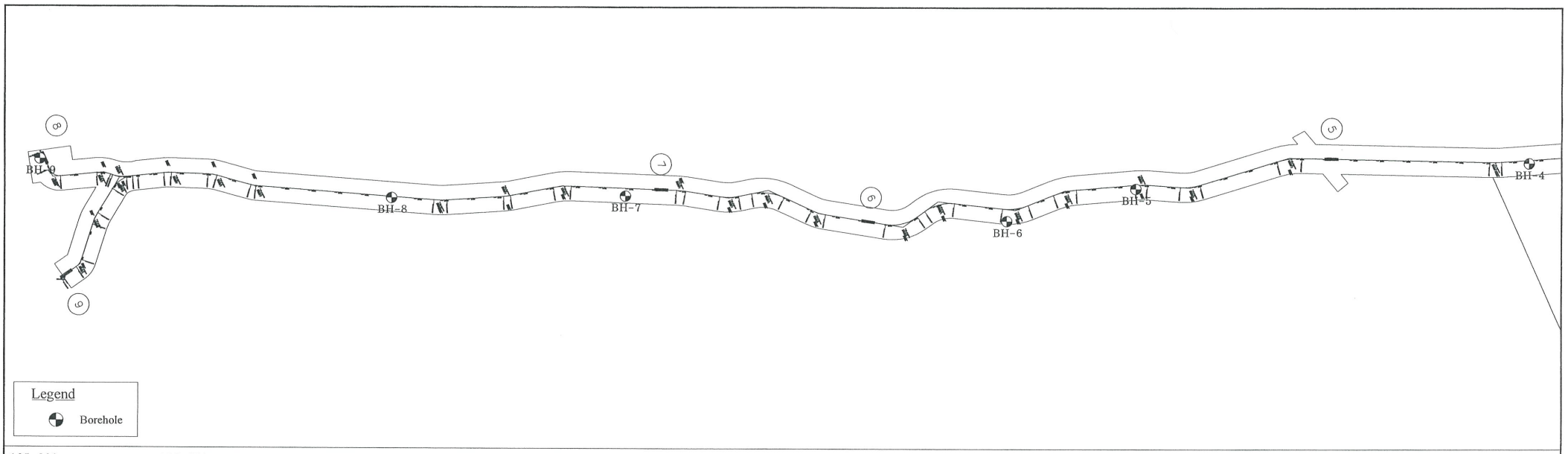
TITLE
STATION TYPE B
RAIN LEADER SYSTEM RISER DIAGRAM
PLUMBING AND SANITARY SYSTEM

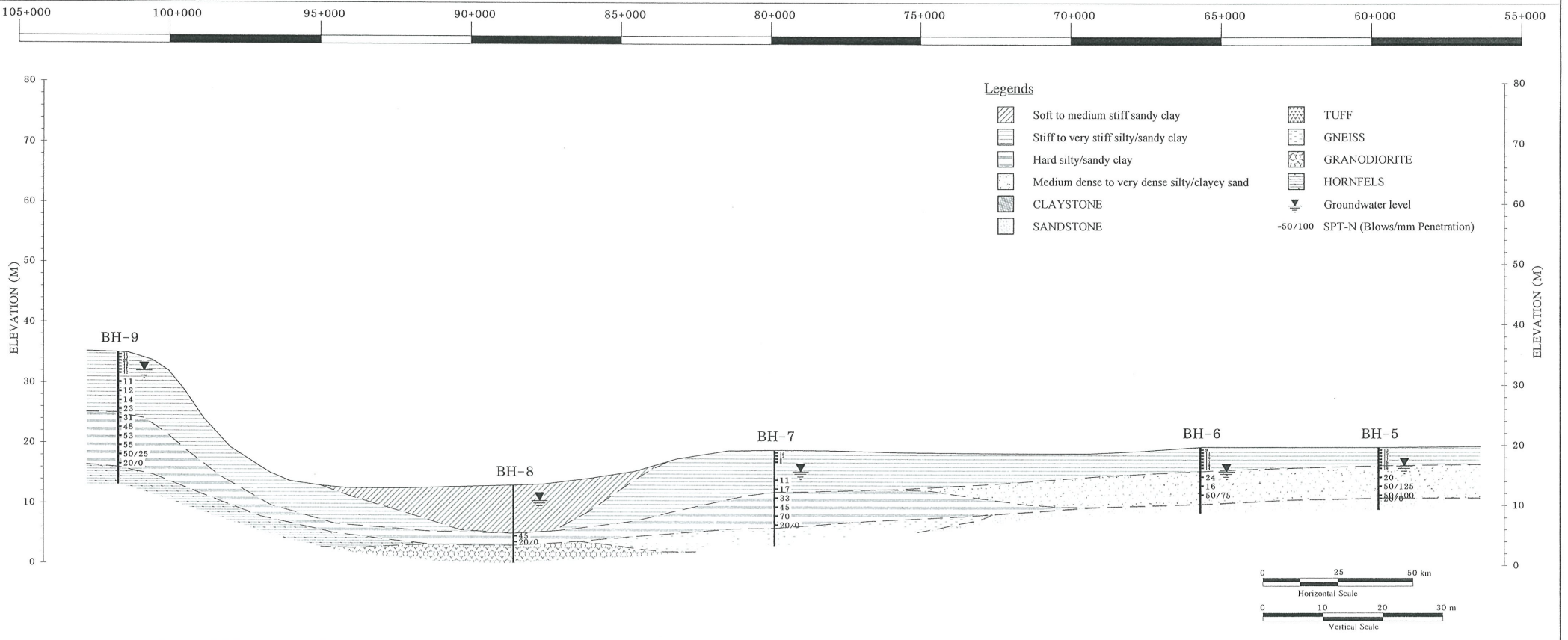
DATE: FEBRUARY 2018	SCALE: NTS.
DWG. NO.: SCR-SB-PS-003	SHEET NO.: 42

INFORMATION

LIST OF DRAWINGS

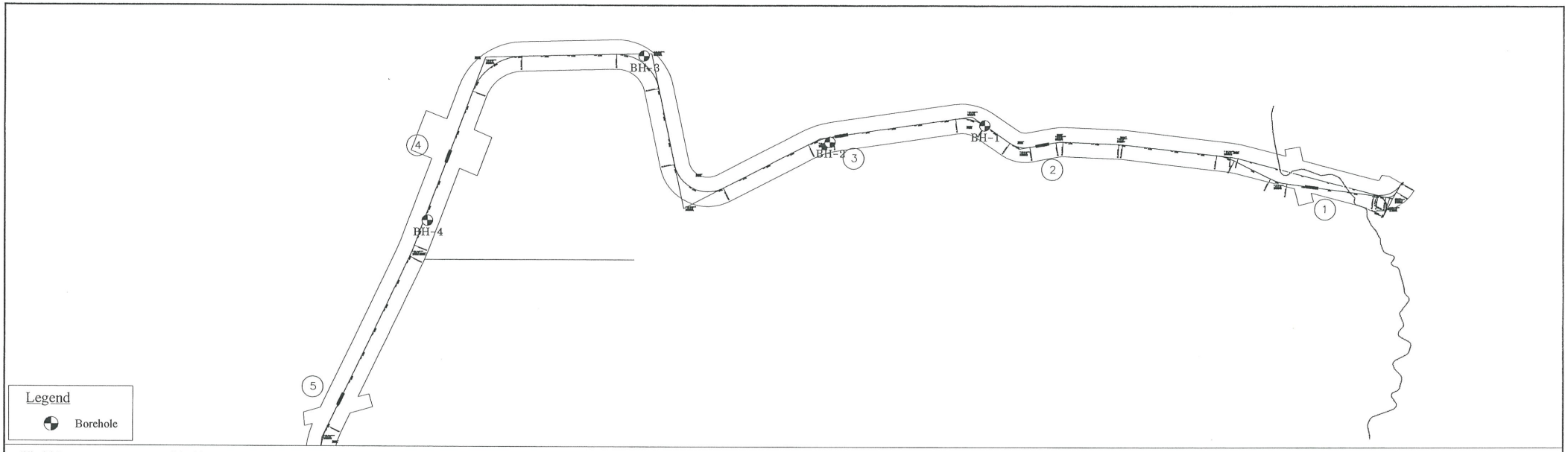
SHEET NO.	ITEM	DWG. NO.
001	LIST OF DRAWINGS	SCR-I-001
002	BOREHOLE AND SOIL PROFILE ALONG TRACK ROUTE	SCR-I-002
003	BOREHOLE AND SOIL PROFILE ALONG TRACK ROUTE	SCR-I-003
004	BOREHOLE LOG (PAGE 1 OF 3)	SCR-I-004
005	BOREHOLE LOG (PAGE 2 OF 3)	SCR-I-005
006	BOREHOLE LOG (PAGE 3 OF 3)	SCR-I-006
007	SUMMARY OF TEST PIT ALONG TRACK ROUTE	SCR-I-007
008	SOURCES OF CONSTRUCTION MATERIALS (PAGE 1 OF 7)	SCR-I-008
009	SOURCES OF CONSTRUCTION MATERIALS (PAGE 2 OF 7)	SCR-I-009
010	SOURCES OF CONSTRUCTION MATERIALS (PAGE 3 OF 7)	SCR-I-010
011	SOURCES OF CONSTRUCTION MATERIALS (PAGE 4 OF 7)	SCR-I-011
012	SOURCES OF CONSTRUCTION MATERIALS (PAGE 5 OF 7)	SCR-I-012
013	SOURCES OF CONSTRUCTION MATERIALS (PAGE 6 OF 7)	SCR-I-013
014	SOURCES OF CONSTRUCTION MATERIALS (PAGE 7 OF 7)	SCR-I-014
015	TYPICAL CROSS SECTION OF TRACKBED EARTH FILL	SCR-I-015
016	TYPICAL CROSS SECTION OF TRACKBED EARTH CUT	SCR-I-016
017	TRANSITION STRUCTURE BETWEEN BRIDGE ABUTMENT AND TRACKBED EMBANKMENT	SCR-I-017
018	RECOMMENDED TYPES OF SLOPE PROTECTION AND EROSION CONTROL FOR ROCK/EARTH CONDITION	SCR-I-018
019	SLOPE PROTECTION TYPE 1A, 1B	SCR-I-019
020	SLOPE PROTECTION TYPE 2	SCR-I-020
021	SLOPE PROTECTION TYPE 3	SCR-I-021
022	SLOPE PROTECTION TYPE 4	SCR-I-022
023	SLOPE PROTECTION TYPE 5	SCR-I-023

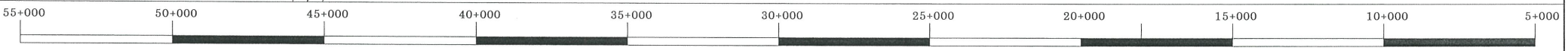


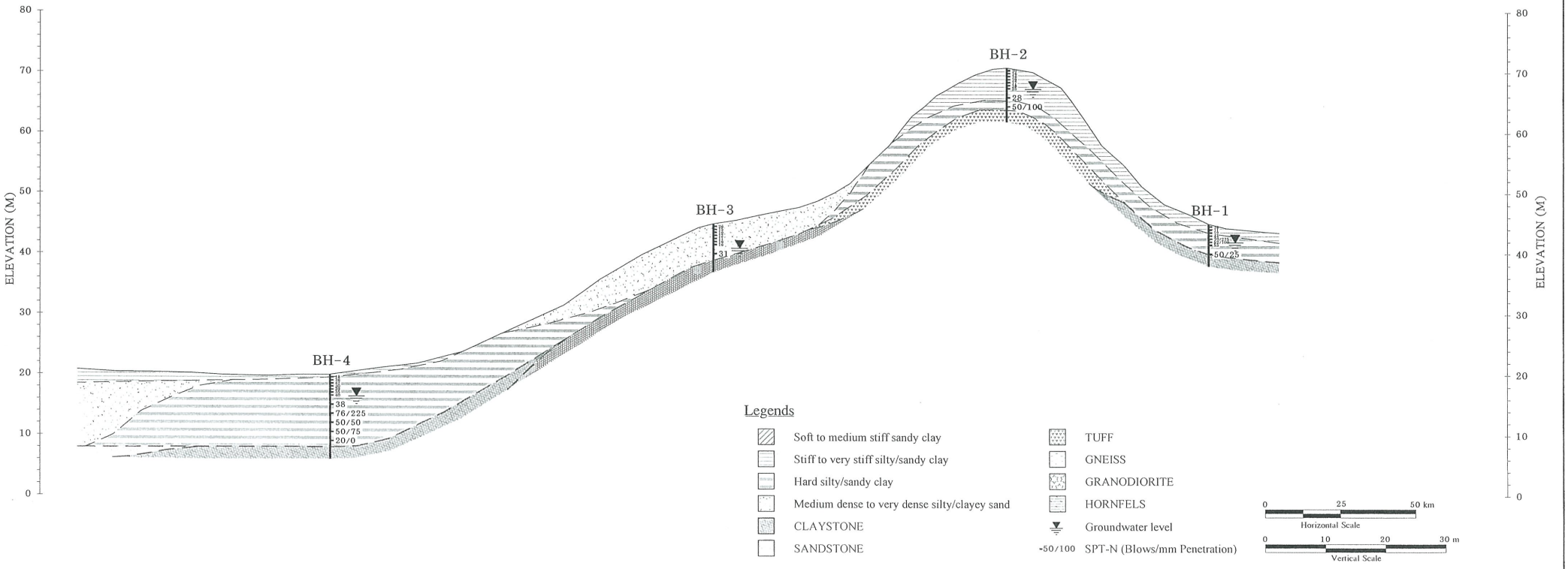


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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: BOREHOLE AND SOIL PROFILE ALONG TRACK ROUTE	DATE: FEBRUARY 2018 DWG. NO. SCR-I-002	SCALE: A3 NONE SHEET NO. 002

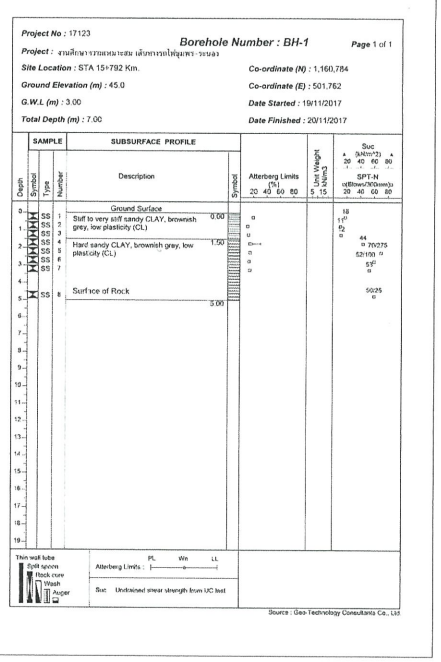


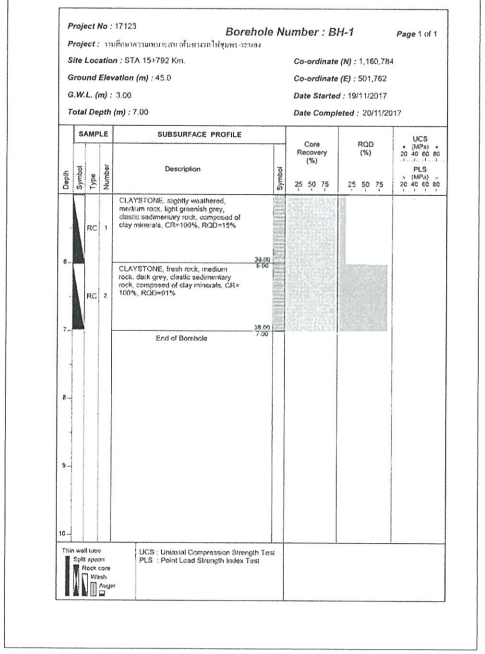


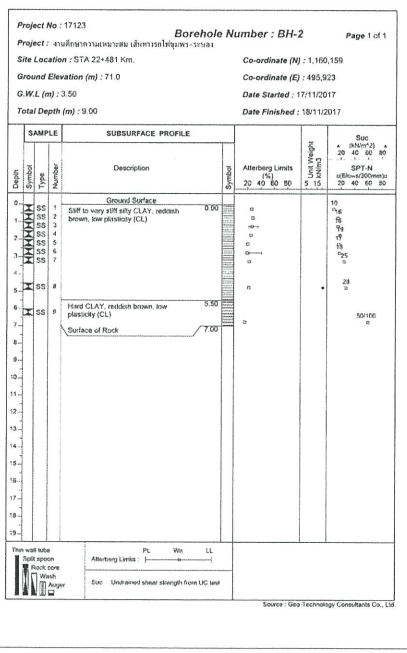


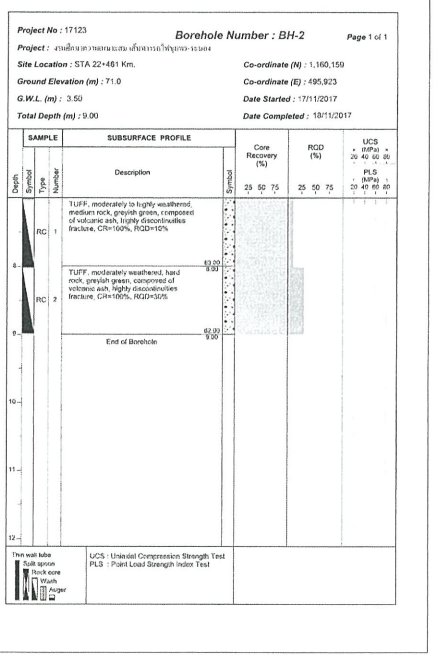
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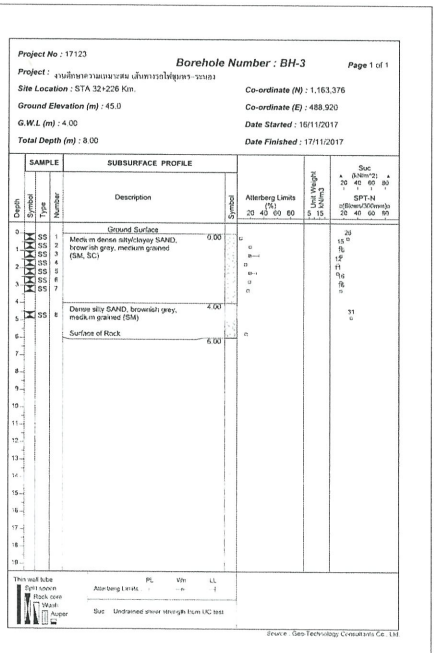
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: BOREHOLE AND SOIL PROFILE ALONG TRACK ROUTE	DATE: FEBRUARY 2018 DWG. NO.: SCR-I-003	SCALE: A3 NONE SHEET NO.: 003

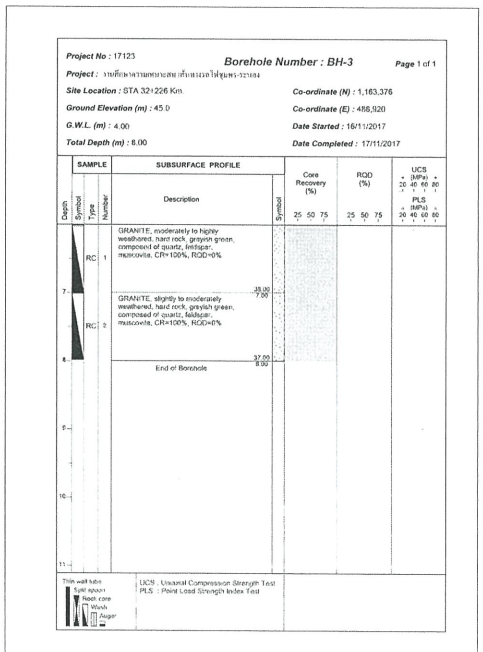


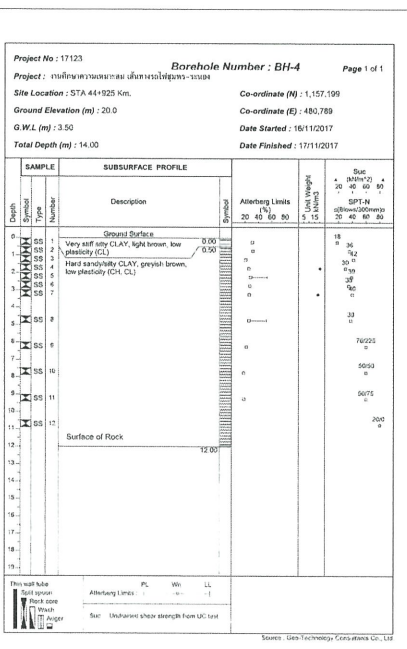


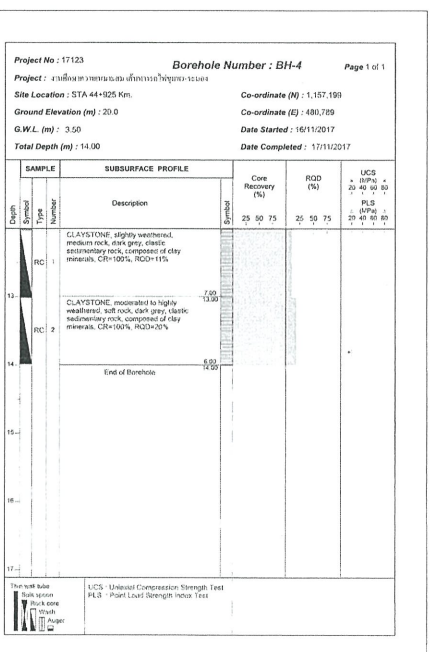












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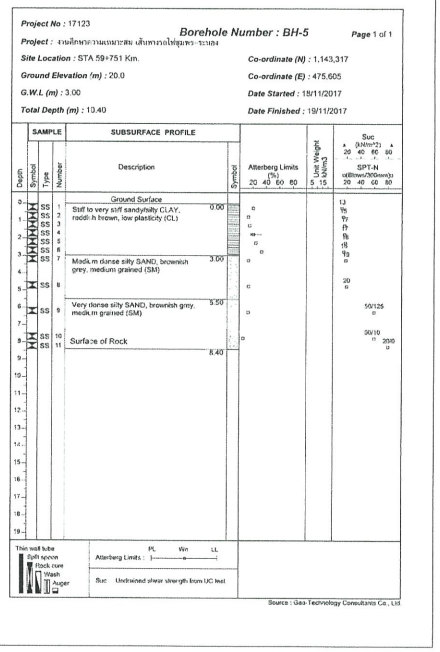
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

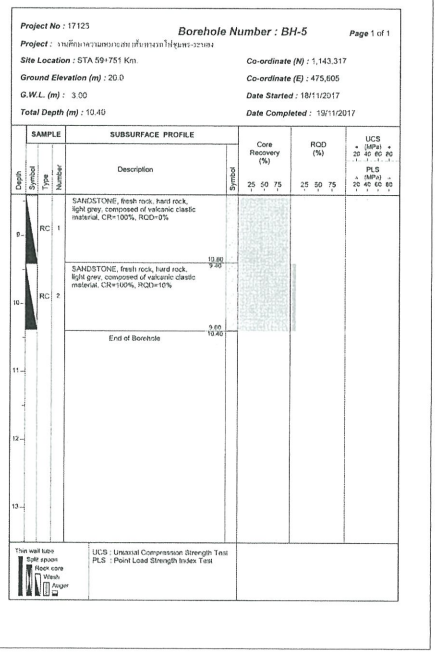
FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

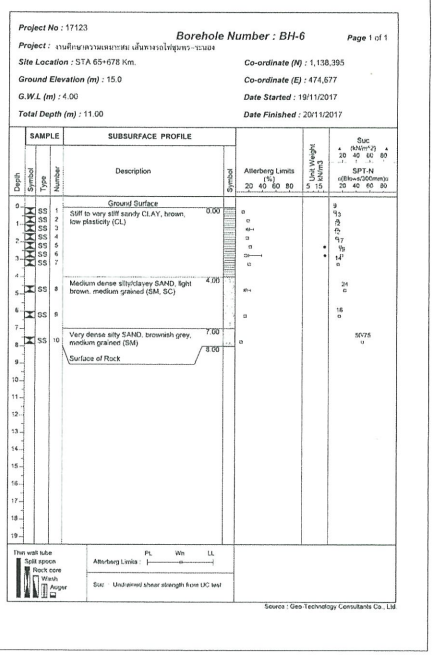
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

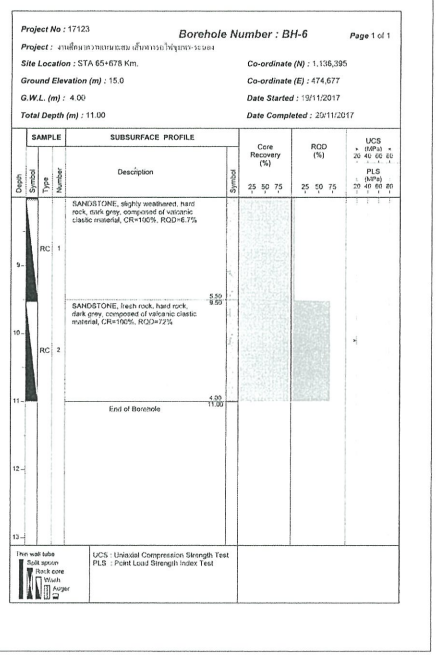
TITLE: BOREHOLE LOG (PAGE 1 OF 3)

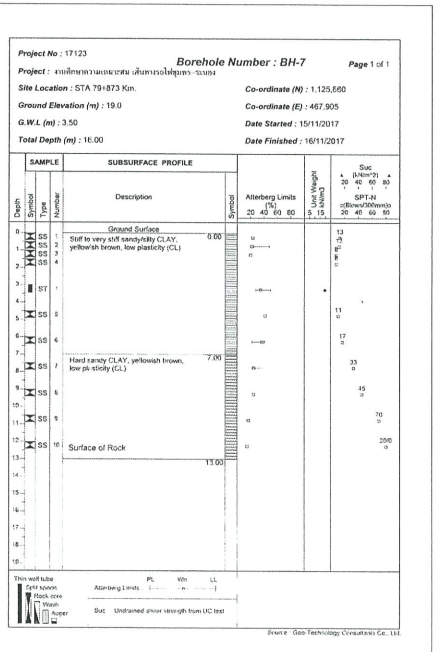
DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-I-004
SHEET NO.: 004

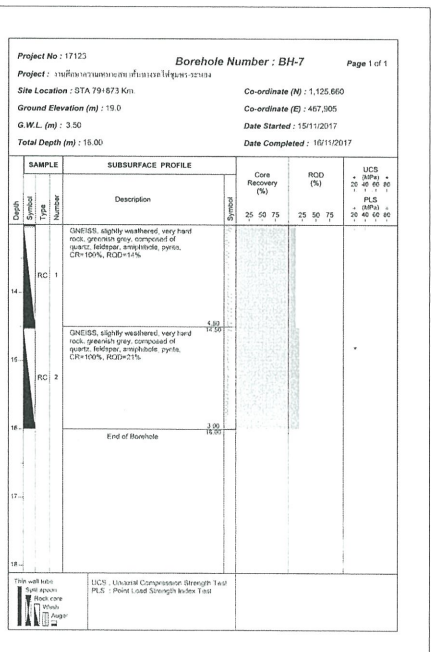


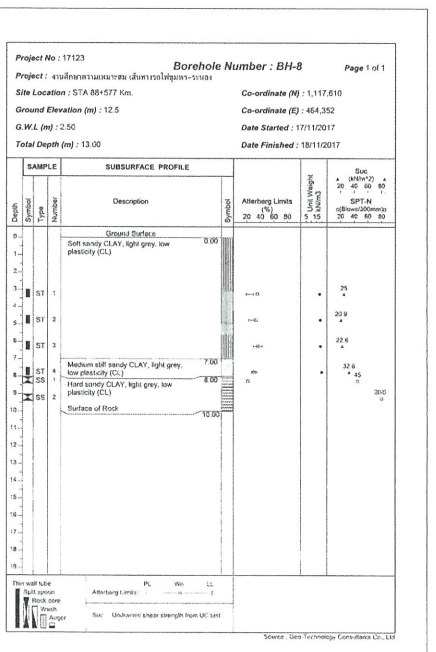


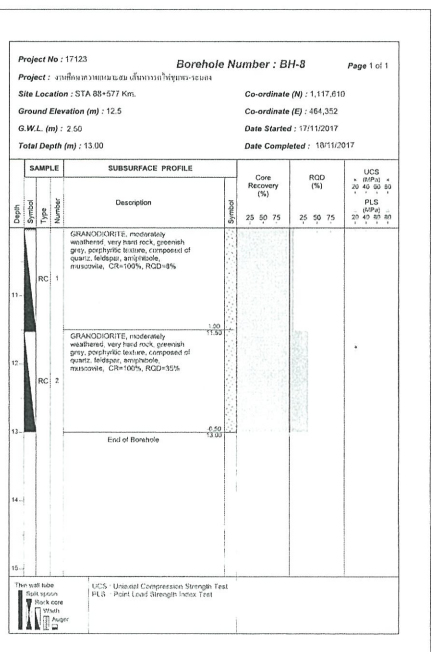












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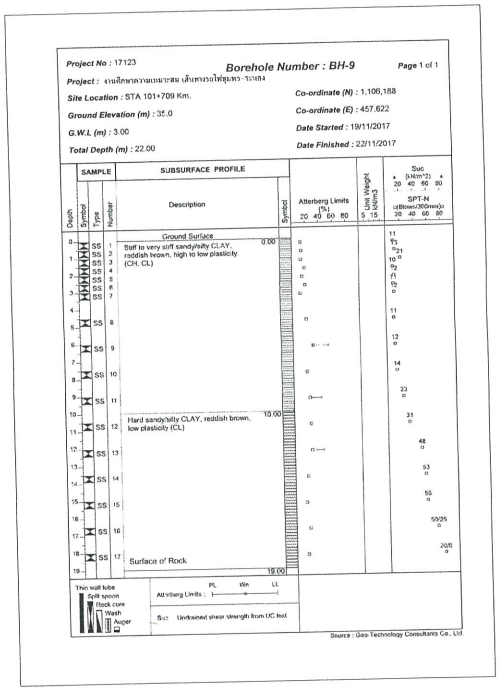
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: BOREHOLE LOG (PAGE 2 OF 3)

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO. SCR-I-005
SHEET NO. 005



Project No : 17123
Project : งานศึกษาความเหมาะสม เส้นทางรถไฟชุมพร-ระนอง
Site Location : STA 101+709 Km.
Ground Elevation (m) : 35.0
G.W.L (m) : 3.00
Total Depth (m) : 22.00

Borehole Number : BH-9

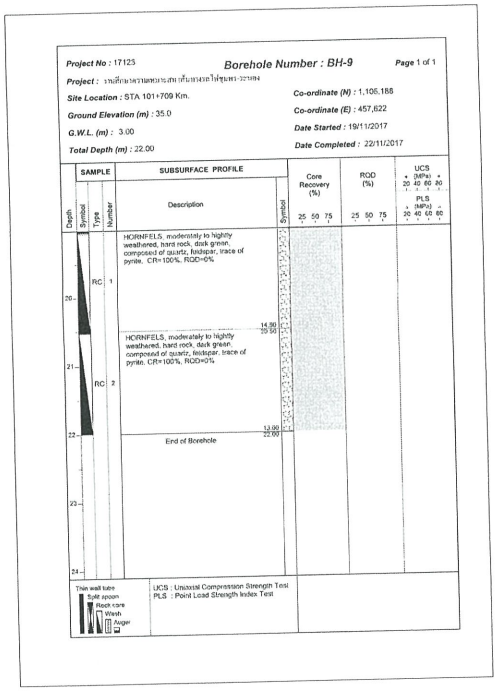
Page 1 of 1
Co-ordinate (N) : 1,106,188
Co-ordinate (E) : 457,622
Date Started : 19/11/2017
Date Finished : 22/11/2017

Depth	Symbol	Type	Number	Description	Symbol	Alterberg Limits PL / LL	Unit Weight kN/m3	Suc (kN/m2) / SPT-N (Blows/300mm)
0				Ground Surface				
0		SS	1	Stiff to very stiff sandy/silty CLAY, reddish brown, high to low plasticity (CH, CL)				11
1		SS	2					21
2		SS	3					10
3		SS	4					12
4		SS	5					11
5		SS	6					12
6		SS	7					14
7		SS	8					23
8		SS	9					31
9		SS	10					48
10		SS	11	10.00				53
11		SS	12	Hard sandy/silty CLAY, reddish brown, low plasticity (CL)				55
12		SS	13					50/25
13		SS	14					20/0
14		SS	15					
15		SS	16					
16		SS	17					
17				Surface of Rock				
18				19.00				
19								

Thin wall tube / Split spoon / Rock core / Wash / Auger

PL Wn LL
Alterberg Limits :
Suc : Undrained shear strength from UC test

Source : Geo-Technology Consultants Co., Ltd.



Project No : 17123
Project : งานศึกษาความเหมาะสม เส้นทางรถไฟชุมพร-ระนอง
Site Location : STA 101+709 Km.
Ground Elevation (m) : 35.0
G.W.L. (m) : 3.00
Total Depth (m) : 22.00

Borehole Number : BH-9

Page 1 of 1
Co-ordinate (N) : 1,106,188
Co-ordinate (E) : 457,622
Date Started : 19/11/2017
Date Completed : 22/11/2017

Depth	Symbol	Type	Number	Description	Symbol	Core Recovery (%)	RQD (%)	UCS (MPa) / PLS (MPa)
20		RC	1	HORNFELS, moderately to highly weathered, hard rock, dark green, composed of quartz, feldspar, trace of pyrite, CR=100%, RQD=0%				
				14.00 / 10.50				
21		RC	2	HORNFELS, moderately to highly weathered, hard rock, dark green, composed of quartz, feldspar, trace of pyrite, CR=100%, RQD=0%				
22				11.00 / 22.00 End of Borehole				
23								
24								

Thin wall tube / Split spoon / Rock core / Wash / Auger

UCS : Uniaxial Compression Strength Test
PLS : Point Load Strength Index Test

PROJECT\1453-SCR\DRAWINGS\03_PRELIM\INFORMATION\SCR-I-004-006.DWG

KINGDOM OF THAILAND
MINISTRY OF TRANSPORT

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: BOREHOLE LOG (PAGE 3 OF 3)

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-I-006
SHEET NO.: 006

Summary of Test Pit Results

Test Pit No.	Sta.	Sample Discription	Atterberg Limits (%)			Sieve Analysis % Passing (US Standard Sieve)									Classification			Compaction Test[1]		CBR Test[1]		Direct Shear		
															USCS	AASHTO	UIC 719R	MDD[2]	OMC[3]	CBR	Swell	c	c	Φ
			LL	PL	PI	1"	3/4"	1/2"	3/8"	#4	#10	#40	#100	#200	Group	Group	Class	(t/m^3)	(%)	(%)	(%)	(t/m^2)	(kPa)	(deg.)
TP-1	4+000	Silty CLAY	65.4	36.0	29.4					100	98	96	87	85	CH	A-7-5 (33)	QS1 [1.1]	1.415	28.2	2.5	2.298	3.95	38.7	10.0
TP-2	10+000	Sandy CLAY	37.5	20.0	17.5			100	90	88	81	74	69	65	CL	A-6 (9)	QS1 [1.1]	1.702	18.7	8.7	0.211			
TP-3	20+000	Silty SAND	54.4	32.8	21.6	100	92	87	84	63	42	31	25	23	SM	A-2-7 (1)	QS1 [1.3]	1.685	20.2	9.7	0.000	2.92	28.6	21.3
TP-4	30+000	Sandy CLAY	37.6	21.2	16.4					100	98	78	60	56	CL	A-6 (7)	QS1 [1.1]	1.711	18.0	7.1	0.145			
TP-5	41+000	Silty CLAY	54.0	31.0	23.0				100	99	98	96	84	81	CH	A-7-6 (22)	QS1 [1.1]	1.448	28.2	3.8	0.109	2.39	23.4	17.3
TP-6	52+000	Sandy CLAY	44.6	27.8	16.8					100	100	96	65	62	CL	A-7-6 (10)	QS1 [1.1]	1.565	22.9	6.6	0.138			
TP-7	58+000	Silty CLAY	36.5	21.2	15.3				100	100	100	97	83	79	CL	A-6 (11)	QS1 [1.1]	1.673	20.4	8.0	0.196	2.09	20.5	19.1
TP-8	76+000	Silty CLAY	60.2	36.8	23.4					100	100	99	96	95	CH	A-7-6 (35)	QS1 [1.1]	1.386	31.2	2.7	0.175			
TP-9	90+000	Sandy CLAY	56.4	29.3	27.1					100	100	76	65	63	CH	A-7-6 (16)	QS1 [1.1]	1.600	22.4	5.9	0.196	2.48	24.3	17.7
TP-10	99+000	Clayey SAND	34.5	22.7	11.8	100	94	90	88	84	78	60	48	46	SC	A-6 (2)	QS1 [1.1]	1.680	18.8	6.9	0.167			

Notes

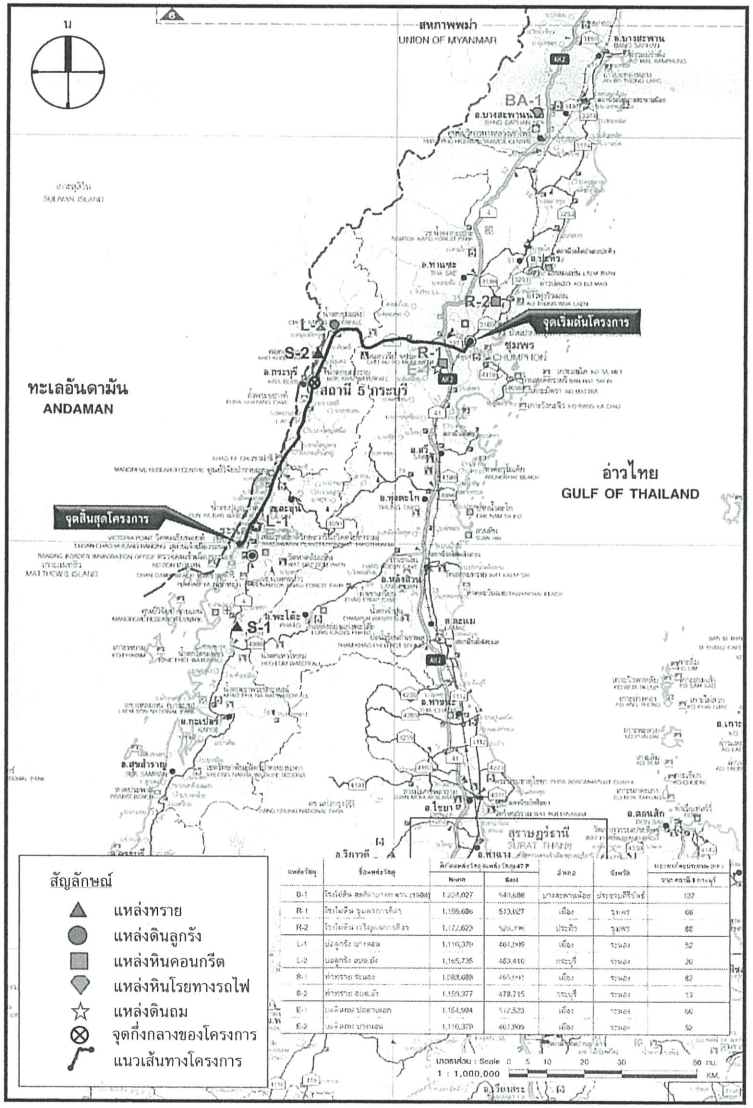
1 Compaction test followed AASHTO T 99 (Standard) and 4 days soaked CBR is reported at 95 % maximum dry density for each sample.

2 MDD : Maximum Dry Density

3 OMC : Optimum Moisture Content

4 Degree of dispersion
Non. = Nondispersive (% of dispersive < 30)
Int. = Intermediate (% of dispersive 30 - 50)
Disp. = Dispersive (% of dispersive > 50)

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แหล่งวัสดุ	ชื่อแหล่งวัสดุ	ปริมาณแหล่งวัสดุ ณ เดือน/ปี ที่สำรวจ 67 ลบ.ม.		อำเภอ	จังหวัด	ระยะทางขนส่งโดยประมาณ (กม.)
		Num	Best			จาก สถานี 5 กระบุรี
B-1	โรงโม่หิน สหกิจบางสะพาน จก. (1985)	1,204,027	543,686	บางสะพานน้อย	ประจวบคีรีขันธ์	137
R-1	โรงโม่หิน รุ่งเพชรการโยธา	1,195,686	513,027	เมือง	ระนอง	66
R-2	โรงโม่หิน เจริญผลการโยธา	1,172,623	520,XXX	ปะทิว	ชุมพร	88
L-1	บ่อลูกรัง บางหอน	1,110,379	461,909	เมือง	ระนอง	52
L-2	บ่อลูกรัง ละแม-2	1,165,735	483,810	กระบุรี	ระนอง	20
B-1	ท่าทราย ระแนะ	1,083,688	465,111	เมือง	ระนอง	82
B-2	ท่าทราย ละแม-2	1,150,377	478,715	กระบุรี	ระนอง	13
E-1	บ่อวัสดุ ปอดานอก	1,164,984	512,523	เมือง	ระนอง	60
E-2	บ่อวัสดุ บางหอน	1,110,379	461,909	เมือง	ระนอง	52

แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง

V:\PROJECT\1485-SCR\DRAWINGS\03_PRELIM\INFORMATION\SCR-I-008.DWG

KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SOURCES OF CONSTRUCTION MATERIALS (PAGE 1 OF 7)	DATE : FEBRUARY 2018 DWG NO. SCR-I-008	SCALE : A3 NONE SHEET NO. 008

ตารางที่ 1 สรุปรายชื่อแหล่งวัสดุก่อสร้างในแนวสายทาง

แหล่งวัสดุ	ชื่อแหล่งวัสดุ	พิกัดแหล่งวัสดุ (แหล่งวัสดุ) 47 P		อำเภอ	จังหวัด	ระยะทางโดยประมาณ (กม.)
		North	East			จาก สถานี 5 กระบุรี
B-1	โรงโม่หิน สหศิลาบางสะพาน (1986)	1,224,027	540,686	บางสะพานน้อย	ประจวบคีรีขันธ์	137
R-1	โรงโม่หิน ชุมพรการศิลา	1,155,686	513,027	เมือง	ชุมพร	66
R-2	โรงโม่หิน เจริญผลการศิลา	1,172,623	526,396	ประทิว	ชุมพร	88
L-1	บ่อลูกรัง บางนอน	1,110,379	461,909	เมือง	ระนอง	52
L-2	บ่อลูกรัง อบต.ยัง	1,165,735	483,410	กระบุรี	ระนอง	20
S-1	ท่าทราย ระนอง	1,083,688	455,991	เมือง	ระนอง	82
S-2	ท่าทราย อบต.ยัง	1,159,377	478,715	กระบุรี	ระนอง	13
E-1	บ่อดินถม บ่อดาบเอก	1,154,984	512,523	เมือง	ระนอง	66
E-2	บ่อดินถม บางนอน	1,110,379	461,909	เมือง	ระนอง	52

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รายละเอียดแหล่งหินโรยทาง (Ballast)

แหล่งวัสดุ	สถานที่	ราคา	อัตราการผลิต (ตัน/วัน)	ปริมาณสำรอง (ตัน)
B-1	โรงโม่หิน สหศิลาบางสะพาน (1986)	หินโรยทาง 350 บาท/ตัน	ตามสั่ง	เพียงพอ
	199 หมู่ 4 ต.ช้างแรก อ.บางสะพานน้อย	หิน 3/4" 250 บาท/ตัน		
	จ.ประจวบคีรีขันธ์ ทล.4 กิโลเมตรที่ 408+200	หินคลุก 120 บาท/ตัน		
	ขวาทาง ห่างถนน 3,700 เมตร			
	โทร. 032-558162, 087-5682162			





หมายเหตุ : - ราคาที่แสดงไม่รวมค่าขนส่งและ VAT



แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง โรงโม่หิน สหศิลาบางสะพาน (1986) (B-1)

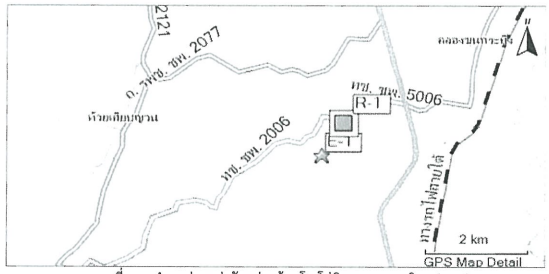
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SOURCES OF CONSTRUCTION MATERIALS (PAGE 3 OF 7)	DATE: FEBRUARY 2018 DWG. NO. SCR-I-010	SCALE: A3 NONE SHEET NO. 010

รายละเอียดแหล่งหินคลุกและหินคอนกรีต

แหล่งวัสดุ	สถานที่		ราคา	อัตราการผลิต (ตัน/วัน)	ปริมาณสำรอง (ตัน)
R-1	โรงโม่หิน ชุมพรการศิลา	หิน 3/4"	280 บาท/ตัน	ตามสั่ง	เพียงพอ
	14 หมู่ที่ 4 ต.ขุนกระทิง อเมือง จ.ชุมพร	หินคลุก	200 บาท/ตัน		
	ทล.41 กิโลเมตรที่ 6+000				
	ซ้ายทาง ห่างถนน 1600 เมตร				
	โทร. 077-630238				
					
R-2	โรงโม่หิน เจริญผลการศิลา	หิน 3/4"	280 บาท/ลบ.ม	ตามสั่ง	เพียงพอ
	119 หมู่ 10 ต.สะพลี อ.ประทิว จ.ชุมพร	หินคลุก	180 บาท/ลบ.ม		
	ทล.3180 ตอน ทล.4 - บ้านท่าเสม็ด กิโลเมตรที่ 9+000				
	ซ้ายทาง ห่างถนน 100 เมตร				
	โทร.077-560219				
					

หมายเหตุ : - ราคาที่แสดงไม่รวมค่าขนส่งและ VAT



แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง โรงโม่หิน ชุมพรการศิลา (R-1)

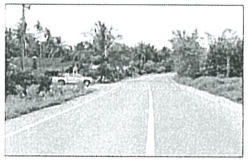


แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง โรงโม่หิน เจริญผลการศิลา (R-2)

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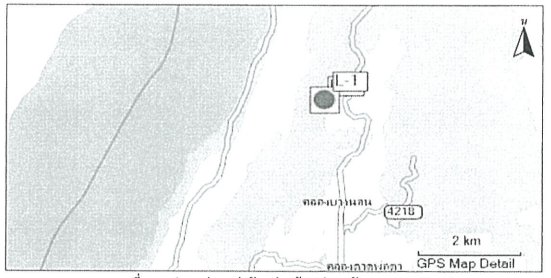
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SOURCES OF CONSTRUCTION MATERIALS (PAGE 4 OF 7)	DATE: FEBRUARY 2018 DWG. NO. SCR-I-011	SCALE: A3 NONE SHEET NO. 011

รายละเอียดแหล่งลูกรัง

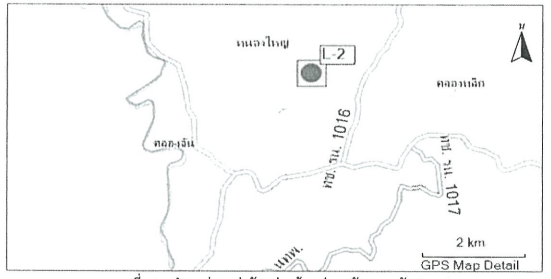
แหล่งวัสดุ	สถานที่		ราคา	อัตราการผลิต (ลบ.ม./วัน)	ปริมาณสำรอง
L-1	บ่อลูกรัง บางนอน	ลูกรัง	40 บาท/ลบ.ม	ตามสั่ง	61 ไร่
	หมู่ 1 บ้านบางนอน ต.บางนอน อ.เมือง จ.ระนอง				
	ทล.4 ตอน ชุมพร-ระนอง กิโลเมตรที่ 587+200				
	ขวาทาง ห่างถนน 600 เมตร				
	โทร. 095-7825829				
					
L-2	บ่อลูกรัง อบต.ยัง	ลูกรัง	350 บาท/คัน	ตามสั่ง	25 ไร่
	หมู่ 3 บ้านปากจั่น ต.ปากจั่น อ.กระบุรี จ.ระนอง				
	ทล.1016 ตอนบ้านรังแตน-ทล.4 กิโลเมตรที่ 1+700				
	ขวาทาง ห่างถนน 1.3 กิโลเมตร				
	โทร. 080-8932639, 082-2870697				
					

หมายเหตุ : - ราคาที่แสดงไม่รวมค่าขนส่งและ VAT

- ราคา บาท/คัน เป็นราคาหินลูกรังต่อรถบรรทุกสิบล้อที่มีความจุ ประมาณ 12 ลบ.ม.



แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง บ่อลูกรัง บางนอน (L-1)



แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง บ่อลูกรัง อบต.ยัง (L-2)

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รายละเอียดแหล่งทราย

แหล่งวัสดุ	สถานที่		ราคา	อัตราการผลิต (ลบ.ม./วัน)	ปริมาณสำรอง
S-1	ท่าทราย ระนอง	ทรายหยาบ	330 บาท/ลบ.ม.	300-400	227 ไร่
	24/9 หมู่ 1 ตำบลราชกรูด อำเภอเมือง จังหวัดระนอง	ทรายถม	150 บาท/ลบ.ม.		
	ทล. 4 ตอน พังงา-ระนอง กิโลเมตรที่ 618+000				
	ขวาทาง ห่างถนน 200 เมตร				
	โทร. 077-862222, 093-6685613				



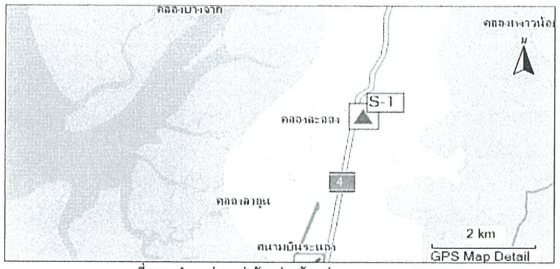


S-2	ท่าทราย อบต.ยัง	ทรายหยาบ	400 บาท/ลบ.ม.	200-350	21 ไร่
	หมู่ 4 บ้านนาล่าง ต.มะมุ อ.กระบุรี จ.ระนอง	ทรายถม	250 บาท/ลบ.ม.		
	ทล.4 ตอน ชุมพร-ระนอง กิโลเมตรที่ 530+300				
	ขวาทาง ห่างถนน 1.1 กิโลเมตร				
	โทร. 080-8932639, 082-2870697				

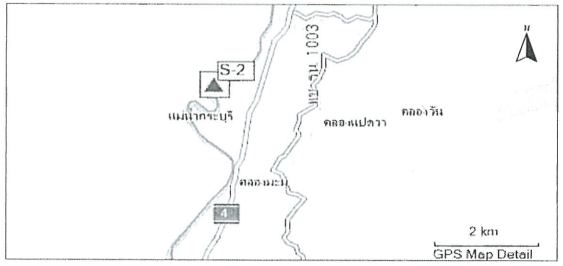




หมายเหตุ :
- ราคาที่แสดงไม่รวมค่าขนส่งและ VAT
- ราคา บาท/คัน เป็นราคาทรายถมต่อรถบรรทุกสิบล้อที่มีความจุ ประมาณ 12 ลบ.ม.



แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง ท่าทราย ระนอง (S-1)

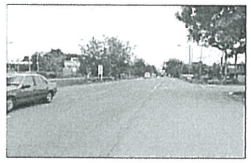


แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง ท่าทราย อบต.ยัง (S-2)

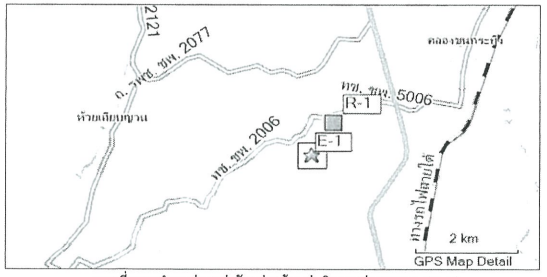
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SOURCES OF CONSTRUCTION MATERIALS (PAGE 6 OF 7)	DATE: FEBRUARY 2018 DWG. NO. SCR-I-013	SCALE: A3 NONE SHEET NO. 013

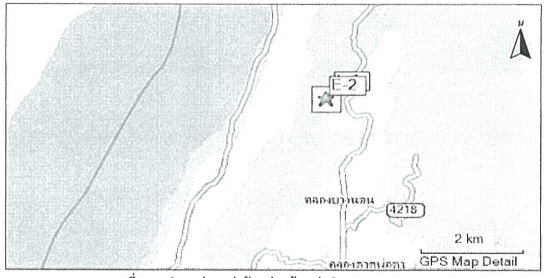
รายละเอียดแหล่งดินถม

แหล่งวัสดุ	สถานที่		ราคา	อัตราการผลิต (ลบ.ม./วัน)	ปริมาณสำรอง
E-1	**บ่อดินถม บ่อตาบเอก**	ดินถม	300 บาท/คัน	ตามสั่ง	10 ไร่
	หมู่ 8 ต.ชุมกระพิง อ.เมือง จ.ชุมพร				
	ทล.41 ตอน ชุมพร-สุราษฎร์ธานี กิโลเมตรที่ 6+000				
	ซ้ายทาง ห่างถนน 2.4 กิโลเมตร				
	โทร. 095-2561648, 085-6556391				
					
E-2	**บ่อดินถม บางนอน**	ดินถม	40 บาท/ลบ.ม	ตามสั่ง	61 ไร่
	หมู่ 1 บ้านบางนอน ต.บางนอน อ.เมือง จ.ระนอง				
	ทล.4 ตอน ชุมพร-ระนอง กิโลเมตรที่ 587+200				
	ขวาทาง ห่างถนน 600 เมตร				
	โทร. 095-7825829				
					

หมายเหตุ :
- ราคาที่แสดงไม่รวมค่าขนส่งและ VAT
- ราคา บาท/คัน เป็นราคาดินถมต่อรถบรรทุกสิบล้อที่มีความจุ ประมาณ 12 ลบ.ม.



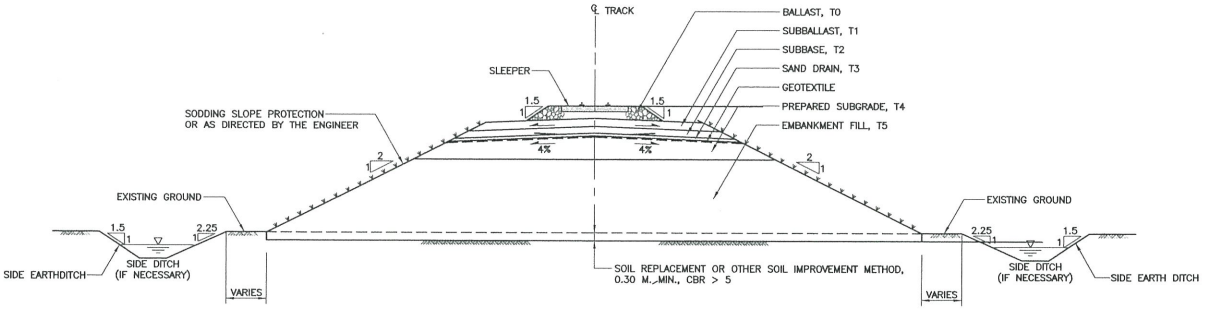
แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง บ่อดินถม บ่อตาบเอก (E-1)



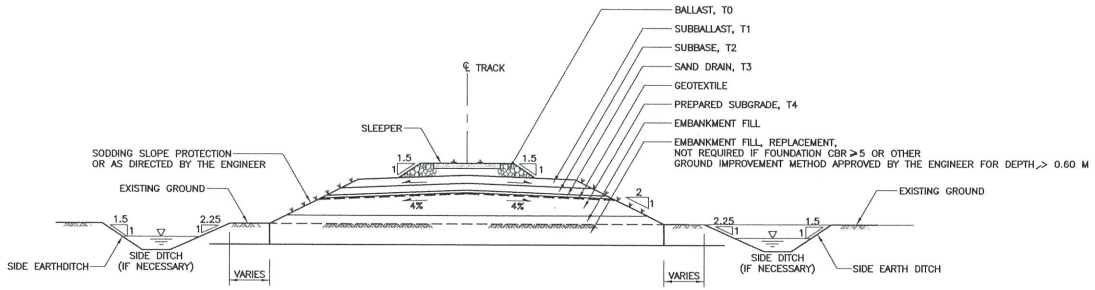
แผนที่แสดงตำแหน่งแหล่งวัสดุก่อสร้าง บ่อดินถม บางนอน (E-2)

V:\PROJECT\1455-SCR\DRAWINGS\03 PRELIM\INFORMATION\SCR-I-014.DWG

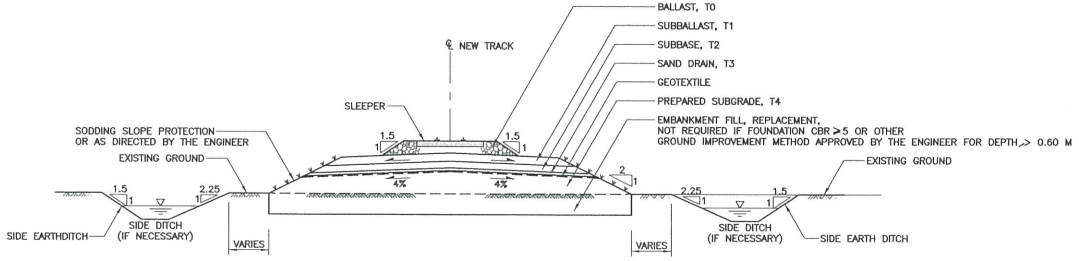
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SOURCES OF CONSTRUCTION MATERIALS (PAGE 7 OF 7)	DATE: FEBRUARY 2018 DWG. NO. SCR-I-014	SCALE: A3 NONE SHEET NO. 014



DETAIL A1 – TYPICAL CROSS SECTION OF FILL SECTION FOR T5 ⩾ 1.00 M
NOT TO SCALE



DETAIL A2 – TYPICAL CROSS SECTION OF FILL SECTION FOR T5 < 1.00 M
NOT TO SCALE



DETAIL A3 – TYPICAL CROSS SECTION OF FILL SECTION FOR T5 = 0
NOT TO SCALE

TABLE : LAYERS OF TRACKBED

NO.	LAYER	MATERIAL TYPE	MIN CBR	THICK	MIN LAYER THICKNESS BASED ON UIC 719R SOIL CLASS OF SUBGRADE (mm.)
					QS1
0	BALLAST			T0	300
1.1	SUBALLAST	CRUSHED ROCK	80	T1	300
1.2	SUBBASE	SOIL AGGREGATE	25	T2	200
2.1	SAND DRAIN	CLEAN SAND		T3	100
2.2	GEOTEXTILE	NON–WOVEN			R
3.1	PREPARED SUBGRADE	SELECTED MATERIAL	10	T4	500
3.2	EMBANKMENT FILL	FILL MATERIAL	5	T5	C

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. THE DESIGN IS BASED ON UIC 719R AND STRESS WAVE CONSIDERATION RECOMMENDED BY AREMA, AND TO SUIT THE CONSTRUCTION MATERIALS USED IN THAILAND.
3. R = REQUIRED, C = CONDITION OF EXISTING GROUND SOIL OR EMBANKMENT HEIGHT.

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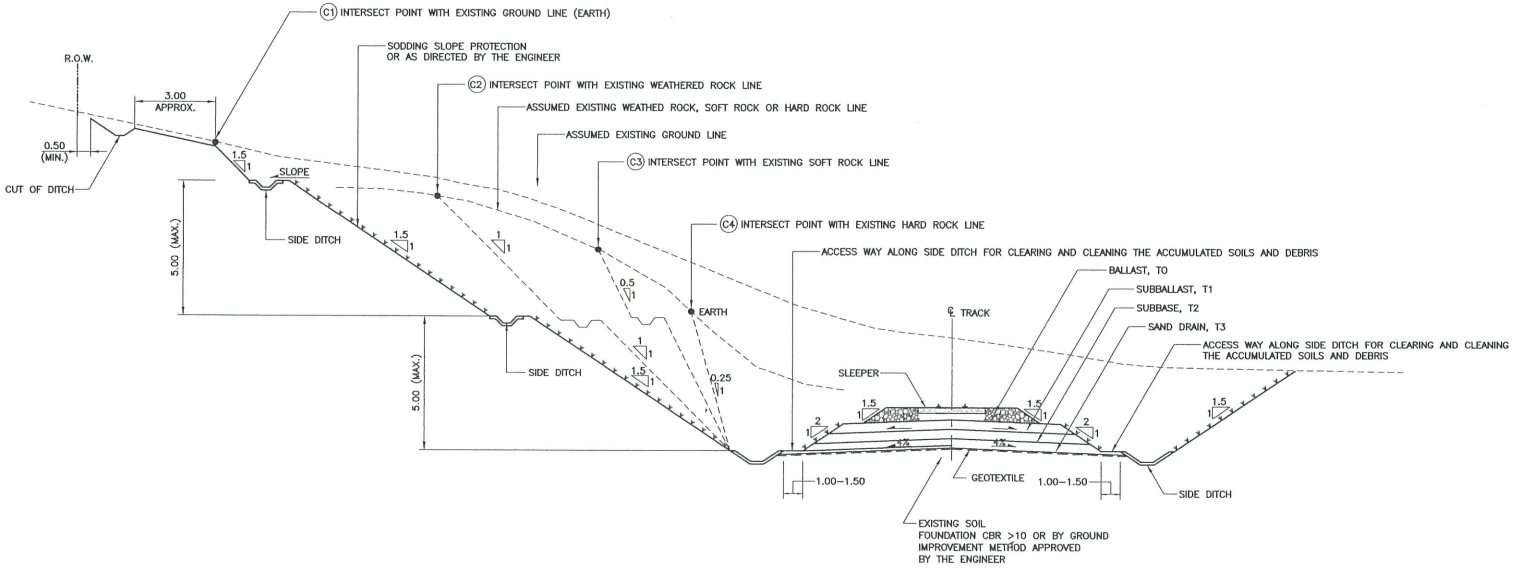
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN
OF
CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL CROSS SECTION OF TRACKBED EARTH FILL

DATE:	SCALE:
FEBRUARY 2018	A3 NONE
DWG. NO.: SCR–I–015	SHEET NO.: 015



DETAIL B TYPICAL CROSS SECTION OF TRACKBED CUT SECTION
NOT TO SCALE

TABLE : LAYERS OF TRACKBED

NO.	LAYER	MATERIAL TYPE	MIN CBR	THICK	MIN LAYER THICKNESS BASED ON UIC 719R SOIL CLASS OF SUBGRADE (mm.)
					QS1
0	BALLAST			T0	300
1.1	SUBALLAST	CRUSHED ROCK	80	T1	300
1.2	SUBBASE	SOIL AGGREGATE	25	T2	200
2.1	SAND DRAIN	CLEAN SAND		T3	100
2.2	GEOTEXTILE	NON–WOVEN			R
3.1	PREPARED SUBGRADE	SELECTED MATERIAL	10	T4	500
3.2	EMBANKMENT FILL	FILL MATERIAL	5	T5	C

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. THE DESIGN IS BASED ON UIC 719R AND STRESS WAVE CONSIDERATION RECOMMENDED BY AREMA, AND TO SUIT THE CONSTRUCTION MATERIALS USED IN THAILAND.
3. R = REQUIRED, C = CONDITION OF EXISTING GROUND SOIL OR EMBANKMENT HEIGHT.

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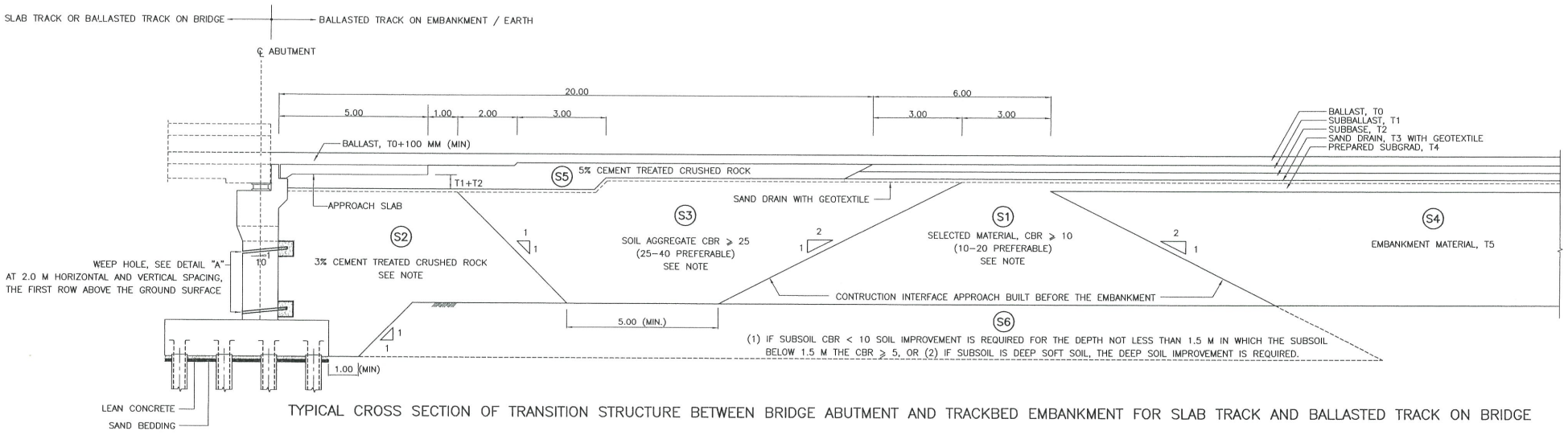
KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

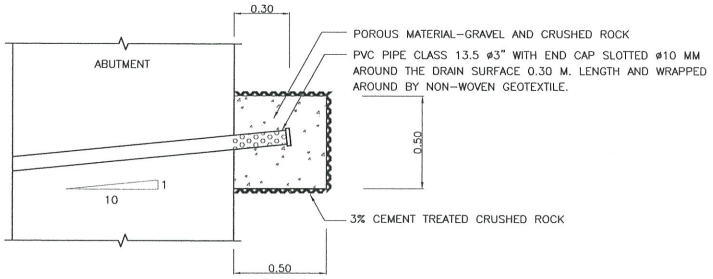
AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

TITLE: TYPICAL CROSS SECTION OF TRACKBED EARTH CUT

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG NO.: SCR–I–016
SHEET NO.: 016



TYPICAL CROSS SECTION OF TRANSITION STRUCTURE BETWEEN BRIDGE ABUTMENT AND TRACKBED EMBANKMENT FOR SLAB TRACK AND BALLASTED TRACK ON BRIDGE



DETAIL "A" WEEP HOLE

NOTE :

1. THE PURPOSE OF THE TRANSITION STUCTURE BETWEEN BRIDGE ABUTMENT AND TRACKBED EMBANKMENT IS DESIGNED TO MINIMIZE THE DIFFERENTIAL SETTLEMENT TO PROVIDE A SMOOTH TRANSITION DUE TO THE STRUCTURAL STIFFNESS BETWEEN THE INFRASTRUCTURES, WHEREAS THE BRIDGE ABUTMENT IS VERY HIGH STIFFNESS, AND THE TRACKBED EMBANKMENT IS LOWER STIFFNESS. THEREFORE THE CONSTRUCTION MATERIAL OF THE ZONE OF TRANSITION STUCTURE WHICH IS THE QUALITY (CBR) GIVEN IN THE DRAWING SHALL NOT BE REPLACED BY THE HIGHER OR EQUAL QUALITY MATERIAL WHERE IS FAR AWAY FROM THE BRIDGE ABUTMENT.
2. STAGE OF CONSTRUCTION
   - 2.1 THE EMBANKMENT OF SECTION S1 (SELECTED MATERIAL CBR ⩾ 10, 95% MODIFIED PROCTOR COMPACTION) IS CONSTRUCTED AND INTERFACES ARE MADE.
   - 2.2 SECTION S2 IS CONSTRUCTED BY COMPACTED 3% CEMENT TREATED CRUSHED ROCK OF 95% MODIFIED PROCTOR COMPACTION.
   - 2.3 SECTION S3 (SOIL AGGREGATE CBR ⩾ 25, 95% MODIFIED PROCTOR COMPACTION) IS CONSTRUCTED IN BETWEEN SECTION S1 AND S2.
   - 2.4 SECTION S4 (FILL MATERIAL AND THE LAYERS OF TRACKBED EMBANKMENT AS SHOWN IN THE TABLE) IS CONSTRUCTED.
   - 2.5 SECTION S5 AS STIFF SUBBALLAST IS CONSTRUCTED BY COMPACTED 5% CEMENT TREATED CRUSHED ROCK OF 100% MODIFIED PROCTOR COMPACTION.
   - 2.6 THE SUBSOIL FOUNDATION (S6), THE CBR ⩾ 10 (95% STANDARD PROCTOR COMPACTION) IS REQUIRED FOR A DEPTH OF NOT LESS THAN 1.5 M, IF NOT SOIL REPLACEMENT OR OTHER IMPROVEMENT METHOD SHALL BE DONE. THE SUBSOIL BELOW 1.5 M THE CBR ⩾ 5 IS ALSO REQUIRED. IF DEEP SOFT SOIL EXISTS, DEEP SOIL IMPROVEMENT METHODS (SUCH AS BEARING UNIT WITH PILES, JET GROUTING, SOIL CEMENT COLUMN) IS REQUIRED.
3. THE CRUSHED ROCK SHALL BE MIXED WITH PORTLAND CEMENT AS PERCENTAGE OF WEIGHT FOR SECTION S2 AND S5 AS INDICATED IN THE DRAWING AT THE SITE AREA OR THE PLANT APPROVED BY THE ENGINEER. THE CEMENT TREATED CRUSHED ROCK SHALL BE TESTED BY CYLINDER SAMPLES, THE 7 DAYS COMPRESSIVE STRENGTH SHALL BE NOT LESS THAN 2.4 MPA, THE PROCEDURE OF PREPARATION AND TESTING SAMPLE SHALL FOLLOW THE DOH SPECIFICATION (TOPIC OF CEMENT MODIFIED CRUSHED ROCK BASE).
4. THE THICKNESS OF BALLAST ON THE BRIDGE AND THE 8.00 M EXTENSION FROM THE ABUTMENT ON THE TRANSITION STRUCTURE SHALL BE NOT LESS THAN TO +100 MM.
5. THE DETAILS AT THE CONTACT LOCATION OF SLAB TRACK ON BRIDGE AND BALLASTED TRACK ON EMBANKMENT / EARTH FOR SMOOTH TRANSITION SHALL BE APPROVED BY THE ENGINEER.
6. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
7. R = REQUIRED, C = CONDITION OF EXISTING GROUND SOIL OR EMBANKMENT HEIGHT.

TABLE : LAYERS OF TRACKBED EMBANKMENT

NO.	LAYER	MATERIAL TYPE	MIN CBR	THICK	MIN LAYER THICKNESS BASED ON UIC 719R SOIL CLASS OF SUBGRADE (mm.)
					QS1
0	BALLAST			T0	300
1.1	SUBALLAST	CRUSHED ROCK	80	T1	300
1.2	SUBBASE	SOIL AGGREGATE	25	T2	200
2.1	SAND DRAIN	CLEAN SAND		T3	100
2.2	GEOTEXTILE	NON–WOVEN			R
3.1	PREPARED SUBGRADE	SELECTED MATERIAL	10	T4	500
3.2	EMBANKMENT FILL	FILL MATERIAL	5	T5	C

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RECOMMENDED TYPES OF SLOPE PROTECTION AND EROSION CONTROL

TYPE NO	ROCK / EARTH CONDITION			ROCKBOLT		SOIL NAIL		SLOPE PROTECTION		EROSION CONTROL	
	GEOLOGICAL MATERIAL	DEGREE OF WEATHERING OF ROCK	SLOPE GRADIENT (DEGREE)	ANCHORAGE LENGTH (M)	ANCHORAGE SPACING (M)	ANCHORAGE LENGTH (M)	ANCHORAGE SPACING (M)	TYPE	SPECT OR EQUIVALENT	TYPE	SPECT OR EQUIVALENT
1A	SILTSTONE, SHALE, SLATE, LIMESTONE, SANDSTONE	SLIGHTLY WEATHERED TO MODERATELY WEATHERED	25-90	2-3	2.8X2.8	-	-	WIRE MAT	CONTINUOUS BINDING MAT, Zn-Al 5%, DIAMETER ≥ 2.7 +/-0.1MM, TENSILE STRENGTH ≥ 350 N/SQ.MM	-	-
1B	BOULDER OF SILTSTONE, SHALE, SLATE, LIMESTONE, SANDSTONE	FRESH TO MODERATELY WEATHERED	25-90	2-3	2.8X2.8	-	-	HEAVY ROCKFALL PROTECTION MAT	DIAMETER ≥ 10 SQ.MM, TENSILE STRENGTH ≥ 1770 N/SQ.MM, HOT DIP GALVANIZED	-	-
2	BOULDER OFSILTSTONE, SHALE, SLATE, LIMESTONE, SANDSTONE WITH < 40% SOIL APPEARANCE	SLIGHTLY WEATHERED TO MODERATELY WEATHERED	25-65	2	2.8X2.8	-	-	WIRE MAT	CONTINUOUS BINDING MAT, Zn-Al 5%, DIAMETER ≥ 2.7 +/-0.1MM, TENSILE STRENGTH ≥ 350 N/SQ.MM	EROSION CONTROL MAT	HDPE OR PP, UV RESISTANT, THICKNESS ≥ 16 MM, TENSILE STRENGTH ≥ 0.5 KN/M
3	CLAYSTONE	FRESH TO HIGHLY WEATHERED	25-90	2	2.8X2.8	-	-	ROCK BOLT	-	SHOTCRETE	THICKNESS 100 MM WITH WIRE MESH # 6, WEEPHOLES SPACING 1.4x1.4 M
	HIGHLY FRACTURED SANDSTONE, SILTSTONE	HIGHLY WEATHERED TO COMPLETELY WEATHERED									
4	COMPLETELY WEATHERED ROCK AND SOIL OR SOIL WITH SMALL BOULDER	COMPLETELY WEATHERED	≤ 60	-	-	3	1.5x1.5	SOIL NAIL		EROSION CONTROL MAT	HDPE OR PP, UV RESISTANT, THICKNESS ≥ 16 MM, TENSILE STRENGTH ≥ 0.5 KN/M
5	EARTH / SOIL	-	≤ 60	-	-	3-10	1.5x1.5	SOIL NAIL	-	SHOTCRETE	THICKNESS 100 MM WITH WIRE MESH # 6, WEEPHOLES SPACING 1.4x1.4 M

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otp KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)

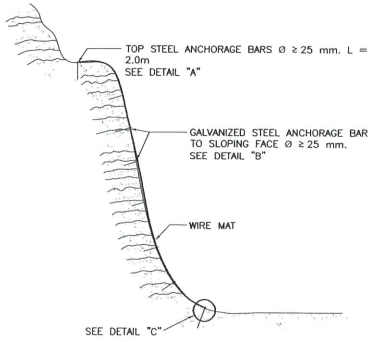
FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT

AEC Asian Engineering Consultants Corp., Ltd.
Infra Plus Consultanting Co., Ltd.
Enrich Consultants Co., Ltd.

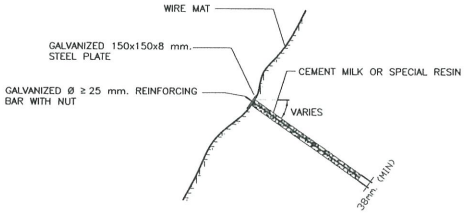
TITLE: RECOMMENDED TYPES OF SLOPE PROTECTION AND EROSION CONTROL FOR ROCK/EARTH CONDITION

DATE: FEBRUARY 2018
SCALE: A3 NONE
DWG. NO.: SCR-I-018
SHEET NO.: 018

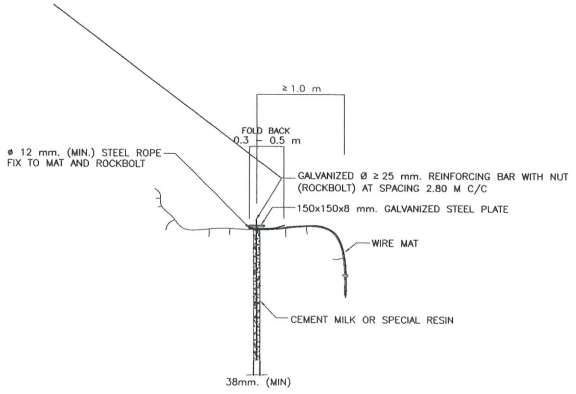
SLOPE PROTECTION TYPE 1A
ROCK BOLT AND WIRE MAT



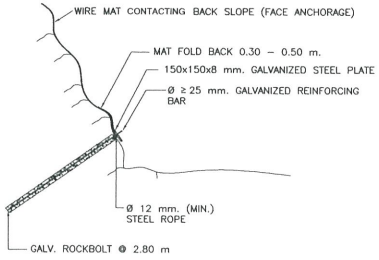
ANCHORAGE FOR ROCKY FACE BACK SLOPE



DETAIL "B" FACE ANCHORAGE FOR ROCKY BACE BACK SLOPE

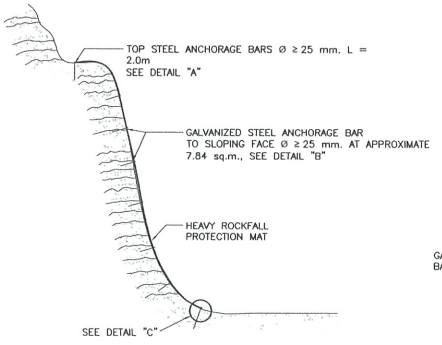


DETAIL "A" TOP ANCHORAGE

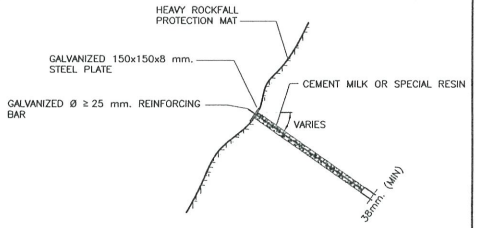


DETAIL "C" BOTTOM TREATMENT

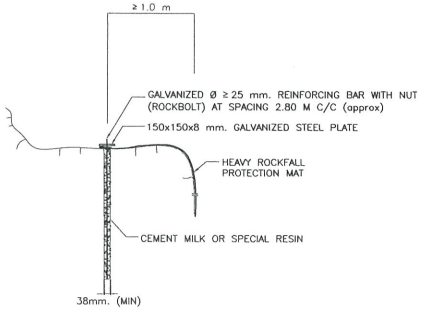
SLOPE PROTECTION TYPE 1B
ROCK BOLT AND HEAVY ROCKFALL PROTECTION (HRP) MAT



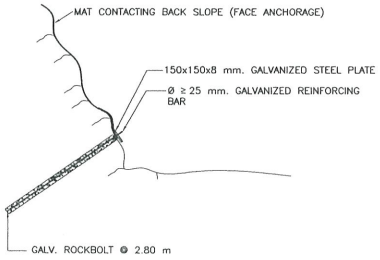
ANCHORAGE FOR ROCKY FACE BACK SLOPE



DETAIL "B" FACE ANCHORAGE FOR ROCKY FACE BACK SLOPE



DETAIL "A" TOP ANCHORAGE



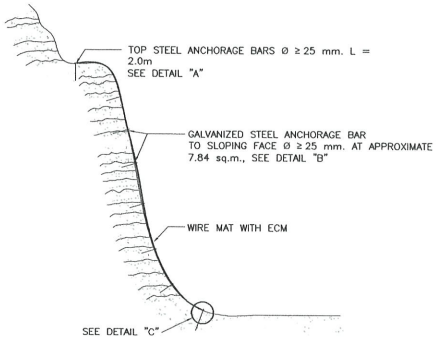
DETAIL "C" BOTTOM TREATMENT

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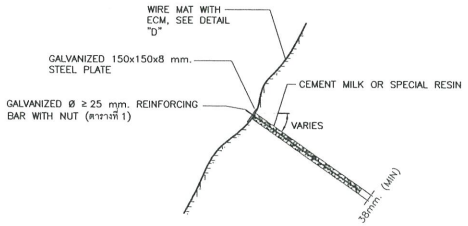
KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SLOPE PROTECTION TYPE 1A, 1B	DATE: FEBRUARY 2018 DWG.NO. SCR-I-019	SCALE: A3 NONE SHEET NO. 019

SLOPE PROTECTION TYPE 2

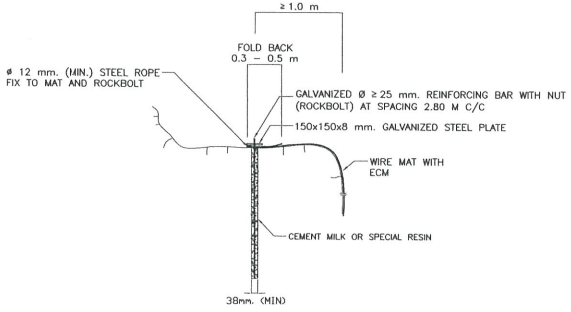
ROCK BOLT AND WIRE MAT WITH EROSION CONTROL MAT (ECM)



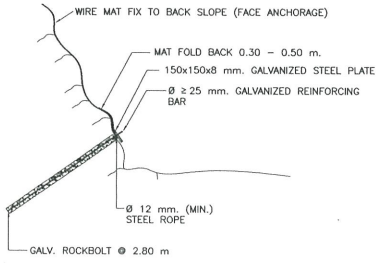
ANCHORAGE FOR ROCKY FACE BACK SLOPE



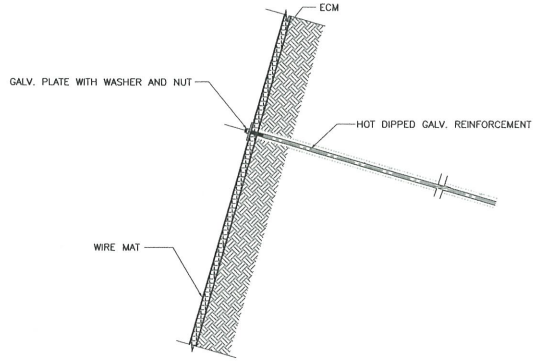
DETAIL "B" FACE ANCHORAGE FOR ROCKY FACE BACK SLOPE



DETAIL "A" TOP ANCHORAGE



DETAIL "C" BOTTOM TREATMENT

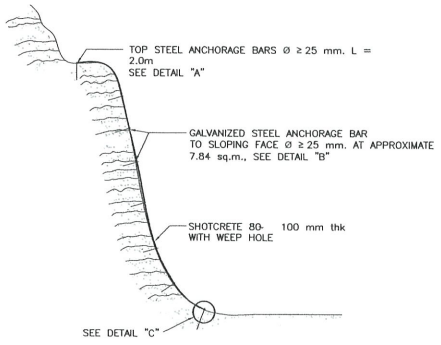


DETAIL "D" ECM INSTALLATION

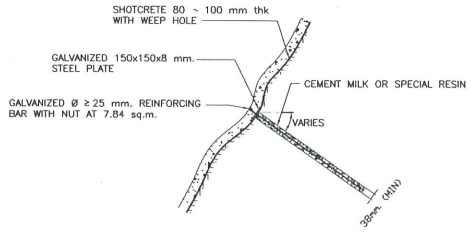
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SLOPE PROTECTION TYPE 2	DATE: FEBRUARY 2018 DWG NO.: SCR-I-020	SCALE: A3 NONE SHEET NO.: 020

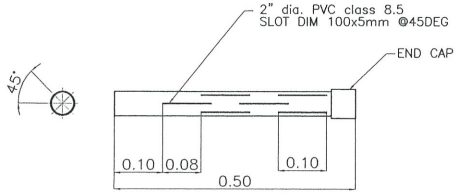
SLOPE PROTECTION TYPE 3
ROCK BOLT AND SHOTCRETE



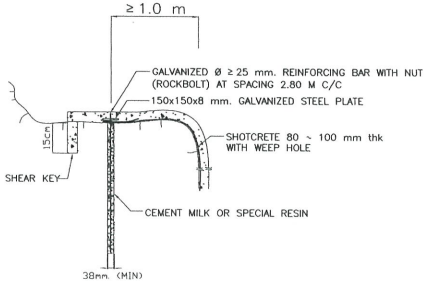
ANCHORAGE FOR ROCKY FACE BACK SLOPE



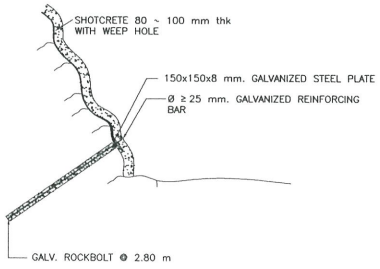
DETAIL "B" FACE ANCHORAGE FOR ROCKY FACE BACK SLOPE



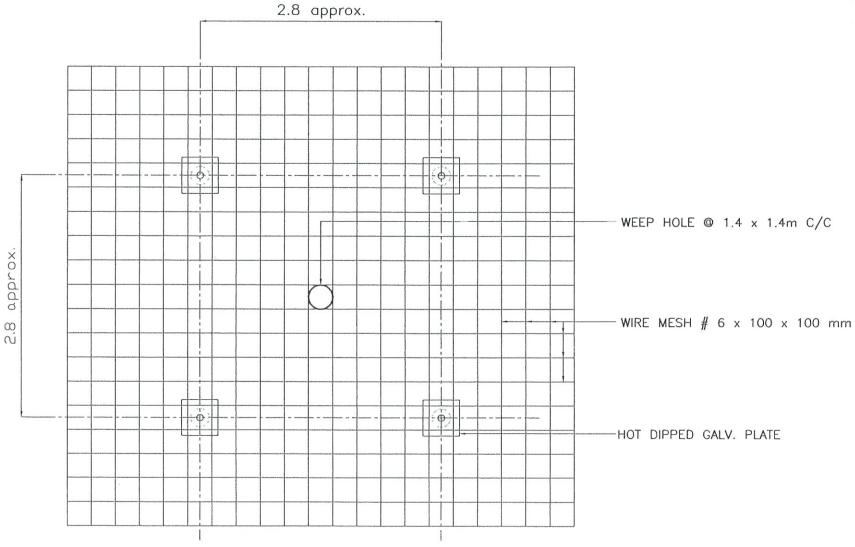
DETAIL OF WEEP HOLE



DETAIL "A" TOP ANCHORAGE



DETAIL "C" BOTTOM TREATMENT

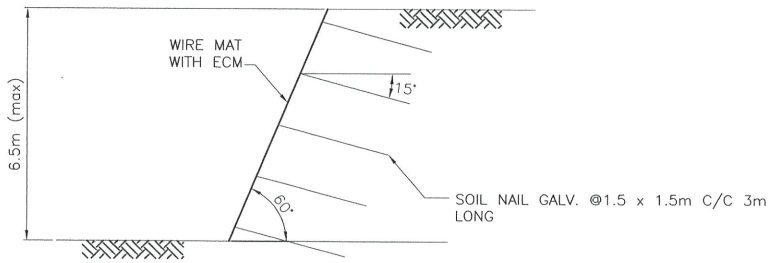


SHOTCRETE FACING

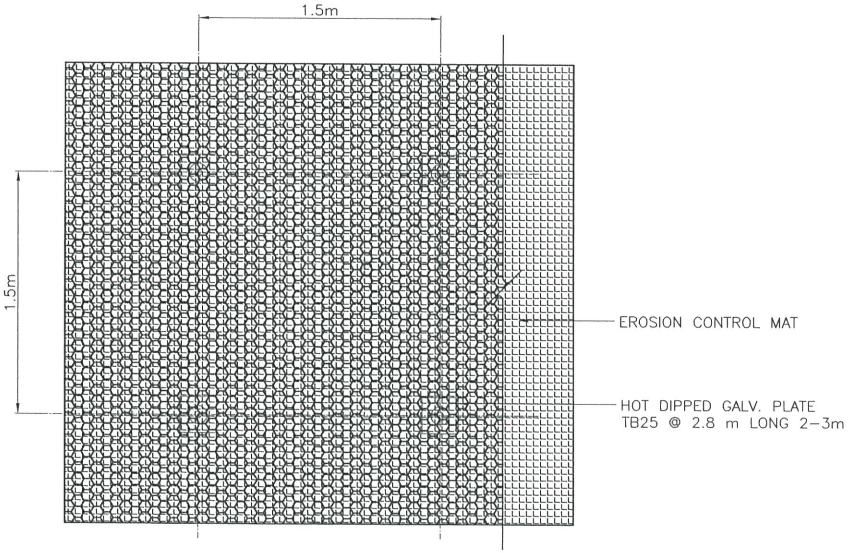
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SLOPE PROTECTION TYPE 3	DATE: FEBRUARY 2018 SCALE: A3 NONE DWG. NO. SCR-I-021 SHEET NO. 021

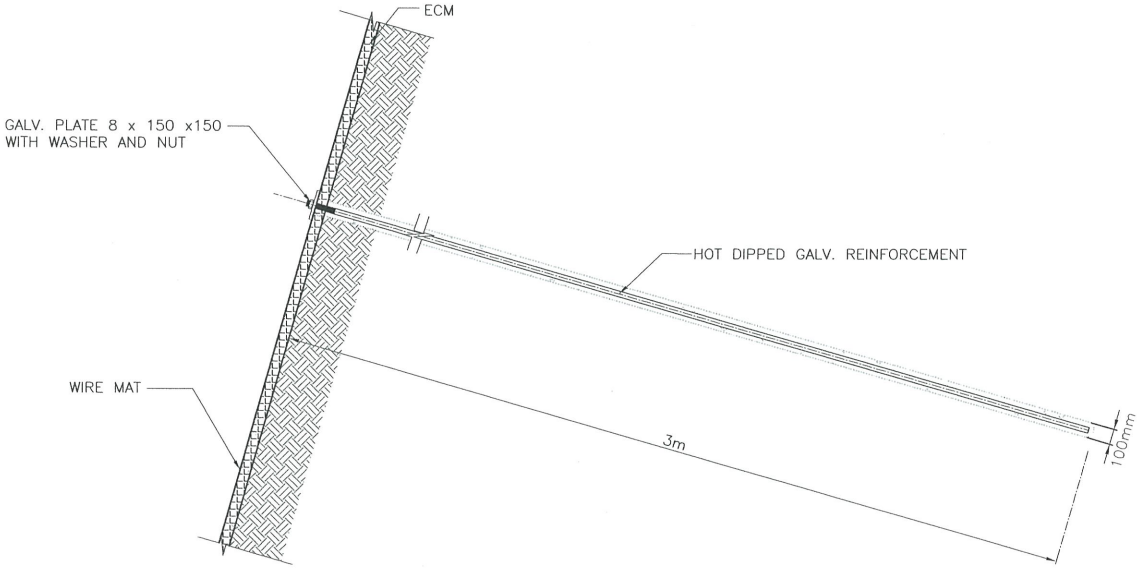
SLOPE PROTECTION TYPE 4
SOIL NAIL AND EROSION CONTROL MAT



SLOPE PROFILE



DETAIL OF SOFT FACING

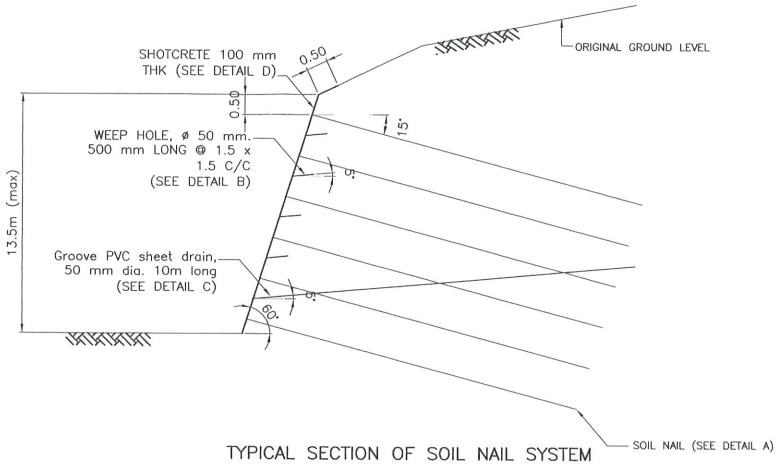


REINFORCEMENT COMPONENT

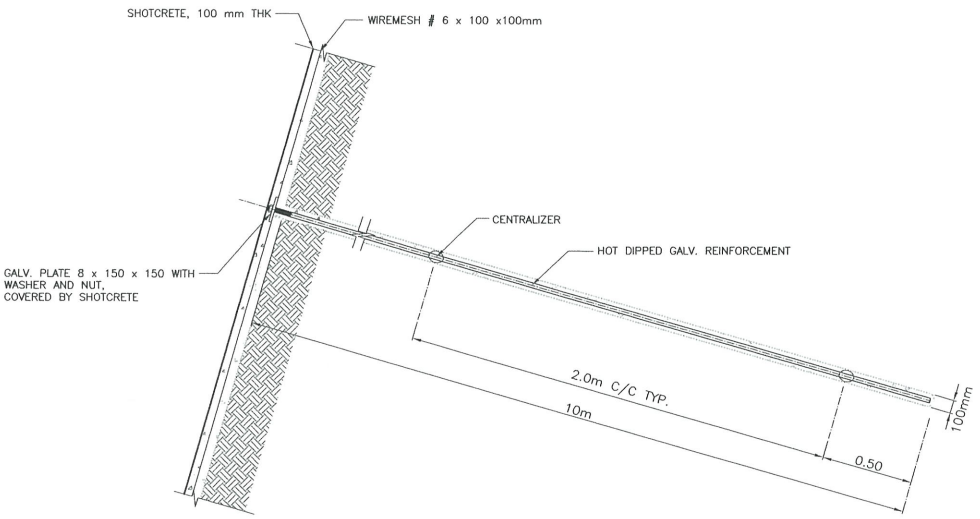
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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE SLOPE PROTECTION TYPE 4	DATE: FEBRUARY 2018 DWG. NO. SCR-I-022	SCALE: A3 NONE SHEET NO. 022

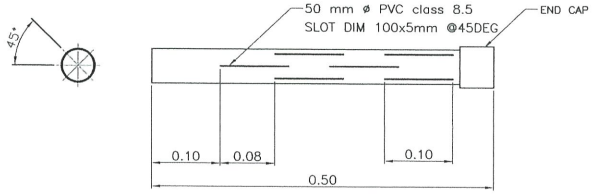
SLOPE PROTECTION TYPE 5
SOIL NAIL AND SHOTCRETE



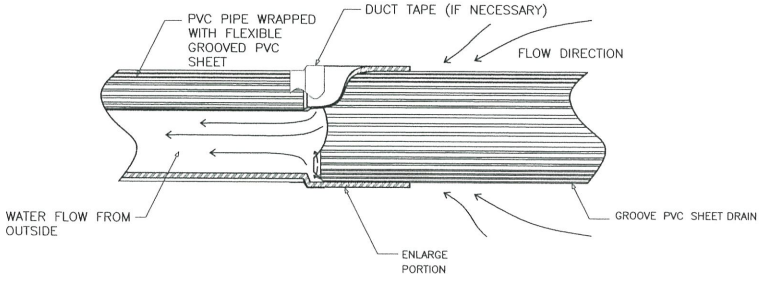
TYPICAL SECTION OF SOIL NAIL SYSTEM



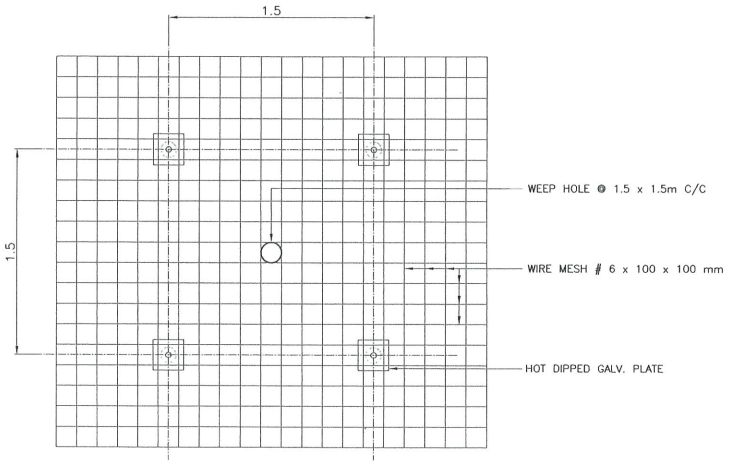
DETAIL A – SOIL NAIL COMPONENT



DETAIL B – WEEP HOLE



DETAIL C – GROOVE PVC SHEET DRAIN



DETAIL D – SHOTCRETE FACING

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KINGDOM OF THAILAND MINISTRY OF TRANSPORT OFFICE OF TRANSPORT AND TRAFFIC POLICY AND PLANNING (OTP)	FEASIBILITY STUDY AND PRELIMINARY DESIGN OF CHUMPHON - RANONG RAILWAY PROJECT	AEC Asian Engineering Consultants Corp., Ltd. Infra Plus Consultanting Co., Ltd. Enrich Consultants Co., Ltd.	TITLE: SLOPE PROTECTION TYPE 5	DATE: FEBRUARY 2018 DWG NO.: SCR-I-023	SCALE: A3 NONE SHEET NO.: 023