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CHIEF MATERIALS & TESTING ENGINEER
DEPARTMENT OF HIGHWAYS OF ONTARIO
MCDONALD CARTIER FREEWAY AND KEELE STREET
DOWNSVIEW, ONTARIO

FOUNDATION INVESTIGATION
WP-142-63
DEUX RIVIERES CREEK BRIDGE
HIGHWAY NO. 17
DEUX RIVIERES, ONTARIO

GA-1-1-1-1

Project: J3370

January, 1967

William Trow Associates Limited

90 Milvan Drive
Wheaton, Ontario
748-1250

William Trow

Project: 43370

Soil Mechanics
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Associates Ltd.

Mr. A. Rutka, P. Eng.,
Chief Materials & Testing Engineer,
Department of Highways of Ontario,
McDonald Cartier Freeway and Keele Street,
Downsview, Ontario.

January 23, 1967

Attention: Mr. A. C. Starnes, P. Eng.

Foundation Investigation
MP 142-63
Deux Rivières Creek Bridge
Highway No. 17
Deux Rivières, Ontario

Dear Sirs:

Following your letter of authorization dated December 7, 1966, we have completed a foundation study at the above site. The field work was carried out in the period of December 12, 1966 to January 10, 1967. Our findings and recommendations are outlined briefly in the following paragraphs.

1) The subsoil at this site was found to consist of a variable depth of densely packed sand and gravel, with boulders of various sizes, overlying a granite bedrock. The ground water level exists at or just above river level.

2) It is recommended that the bridge or barrel arch be supported by spread footings on the bedrock wherever practicable. The exception will be in the vicinity of pilehole 2, the west abutment,



where the bedrock dips sharply and footings may be placed on the dense sand, gravel and boulders at El 490 feet. Footings on the sand and gravel can be designed to a safe net bearing pressure of up to 4000 psf., providing construction procedures do not disturb the founding soil. Footings on rock can be designed for 20,000 psf.

3) The sand, gravel and boulders are thought to be relatively free draining. Because of the numerous boulders, ringing the excavations with sheet piling will be difficult. Consideration should be given to diverting the stream to one side of its channel, with a dyke, and digging oversize footing excavations on the other side. Excavations large enough to accommodate drainage ditches will be required. It is recommended that digging be carried out underwater until the excavation is down to about final grade (See Dag. 7). The water can then be pumped out gradually, allowing the water to drain from the side slopes so they will remain stable.

4) No embankment stability problem exists.

The above recommendations and conclusions derive from the following detail.

PROJECT.

It is proposed to replace an existing single span concrete bridge over Deux Rivières Creek with a 3 span bridge at the same location. There is a possibility that a barrel arch type of structure could be used as an alternative. Both possibilities have been considered when carrying out the field investigation.



THE SITE:

Deux Rivieres Creek is approximately 40 feet wide and it flows in a north westerly direction towards the Ottawa River at this site. The river flow was swift and erratic because of large boulders on the stream bed. Present water depths vary up to 3½ feet under the bridge.

FIELDWORK AND SUBSOIL STRATIGRAPHY

The fieldwork at this site consisted of 6 borings located as shown on the site plan drawing. All holes were advanced cased by washboring techniques to the depth where diamond drilling was necessary to proceed through boulders or to prove bedrock. Bedrock samples were obtained in all boreholes using AXT coring equipment. Two holes, Nos. 4 and 4A, were necessary at one location because the casing in the first hole became too crooked among the boulders to proceed below a depth of 15 feet.

The subsoil encountered is shown in detail on the borehole logs Dwg. 1 to 6 and in summary form on the site plan drawing. In general, the natural subsoil consists of sand, gravel and boulders in a dense state above a granite bedrock. From visual examinations of the site, boulders in excess of 2 feet in diameter can be expected. Thin sand seams were found in the bedrock at some locations.



Water levels in the boreholes were generally found to be 2 or 3 feet above river elevation. No artesian conditions were encountered.

We trust that the information contained in this brief report is sufficient for your purposes. Should any question come to mind, or should any part of this report require enlarging upon, we would appreciate your call. Thank you for this opportunity to be of service to you.

Yours very truly,

D. Y. Larmour

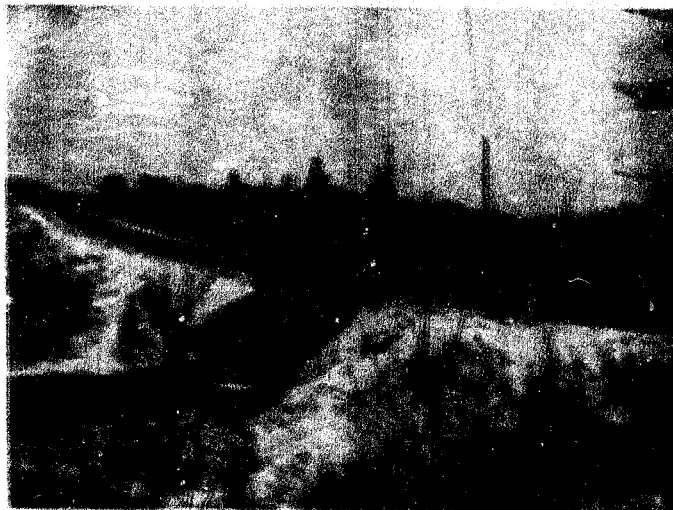
D.Y. Larmour, M.Sc.

DYL/gh
Encls.

Dist: - Department of Highways (12)

D.H. Shields

D.H. Shields, P.Eng.



Looking North-West



Looking South-West



Looking South-East

DEUX RIVIERES CREEK BRIDGE



Looking up, North-West



Looking South-West



Looking South-East

SAUK RIVERES CREEK BRIDGE

LEGEND

SYMBOLS FOR SOIL PROFILES

- 1. SAND (medium to coarse)
- 2. SAND (fine to medium)
- 3. SAND (fine)
- 4. SILT (medium to coarse)
- 5. SILT (fine to medium)
- 6. SILT (fine)
- 7. CLAY (medium to coarse)
- 8. CLAY (fine to medium)
- 9. CLAY (fine)
- 10. GRAVEL
- 11. BEDROCK

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- 10. GRAVEL
- 11. BEDROCK

1
D.H.O. Bridge, W.P. 142-63
Box 17, Deux Rivières Creek
11.5 feet left of Sta. 326 + 16
110.7 feet
See Site Plan Dwg.

SAND fill—compact, medium to coarse
gravel sizes, grey, moist.

SAND—very dense, mainly coarse
grey, very moist, becoming wet
below 7 feet depth. small boulders
below 9 feet depth.

BEDROCK—granite

End of Hole

REMARKS: 1) Hole advanced caused by washboring
techniques to 16 1/2 feet depth. A
new barrel used to drill bedrock.

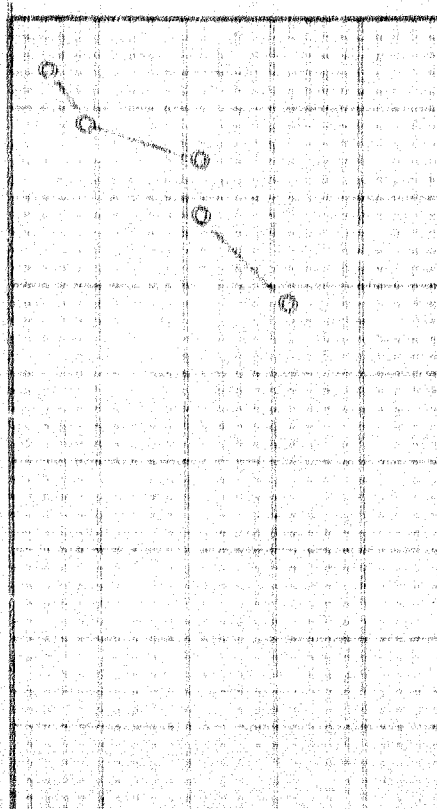
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505.7

504.2

494.2

484.2



Depth (ft)	Soil Description	Notes
1	SAND fill—compact, medium to coarse gravel sizes, grey, moist.	
2	SAND—very dense, mainly coarse grey, very moist, becoming wet below 7 feet depth. small boulders below 9 feet depth.	
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100% Recov

98% Recovery

BOREHOLE NO. 2
PROJECT D.H.B. Bridge, W.P. 142-63
LOCATION Hwy. 17, Deux Rivières Creek
HOLE LOCATION 10 feet right of 325 + 21.
HOLE ELEVATION 512.6 feet
DATUM See Site Plan Dwg.

PENETRATION RESISTANCE
2" O.D. SPLIT TUBE
2" I.D. SHELBY TUBE
2" DIA. CONE
SHEAR STRENGTH
UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE
UNCONFINED COMPRESSION
VANE TEST AND SENSITIVITY (S)

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX
ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
SAMPLE TYPE
2" O.D. SPLIT TUBE
2" I.D. SHELBY TUBE
3" O.D. SHELBY TUBE

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	PENETRATION RESISTANCE 20 40 60 80 350 FT. L.S. BLOWS/FT. SHEAR STRENGTH P.S.F.	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT P.C.F.
	3 inches pavement SAND FILL-loose to compact, well graded, moist. Becoming wet below 8 feet depth.	512.6	0			1	
		504.8	10			2	
		502.	10			3	
			10			4	
	SAND-dense to very dense, fine to coarse, layered, gray, numerous gravel sizes, occasional boulders below 15 feet depth, wat.	491.9	20			5	
			20			6	
	BOULDERS-large (up to 16 inches thick) bedded in grey sand and gravel. -rock from 29' to 31.5 feet depth. -sand from 31.5' to 32.5 feet depth.	480.1	30			33% Recovery	
			30			16% Recovery	
			30			60% Recovery	
			30			80% Recovery	
			30			33% Recovery	
			30			97% Recovery	
	BEDROCK-granite-		40				
	End of Hole	472.1	40				
NOTES:	1) Hole advanced by washboring techniques to 20.5 feet then by diamond drilling. 2) Water levels: - on completion: W.L. 7.6 feet. Hole open 10.3 feet depth. after 24 hours: W.L. 7.8 feet. Hole open 7.8 feet depth. After 3 days: Hole open 7.8 feet depth, dry.		50				
			60				
			70				
			80				
			90				
			100				
			110				

$$2. \quad \forall (x_1, x_2) \in \mathbb{R}^2, \quad \exists (y_1, y_2) \in \mathbb{R}^2, \quad \forall (z_1, z_2) \in \mathbb{R}^2, \quad (x_1, x_2) \leq (y_1, y_2) \Rightarrow (y_1, y_2) \leq (z_1, z_2)$$

Boulders, Gravel & Sand, -densely packed. wet.

SHANDONG-granite. One 6 inch sand
sieve at 19.5 feet depth, otherwise
solid rock -

End of Ho!

NOTES:

- 1) Hole advanced by washboring technique, to 9 feet depth, then to 24.0 feet depth using diamond drilling.
- 2) Water Levels: -
on completion: W.L. 5.0 feet depth
open to 7.3 feet depth.
after 1 hour
and 24 hours: W.L. - open and dry
at 7.3 feet depth.

作者 曹雁 曹雁 曹雁 曹雁 曹雁 曹雁 曹雁 曹雁 曹雁 曹雁

- [illegible]

6. 和化本機 5. 中接合部の寸法

附註：(1) 本公司之主要業務為提供各項保險服務，其收入來源主要為保費收入及投資收益。
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《中国人口地理》(1985) 及《中国城市地理》(1985)

說無相實 非虛實有 應知此理 堪達妙法 吾亦當心 自修

[illegible]

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DOI: 10.1002/for

客語學術論文發表目錄

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金 (第 14) 庫 庫址: 有 井田圖記

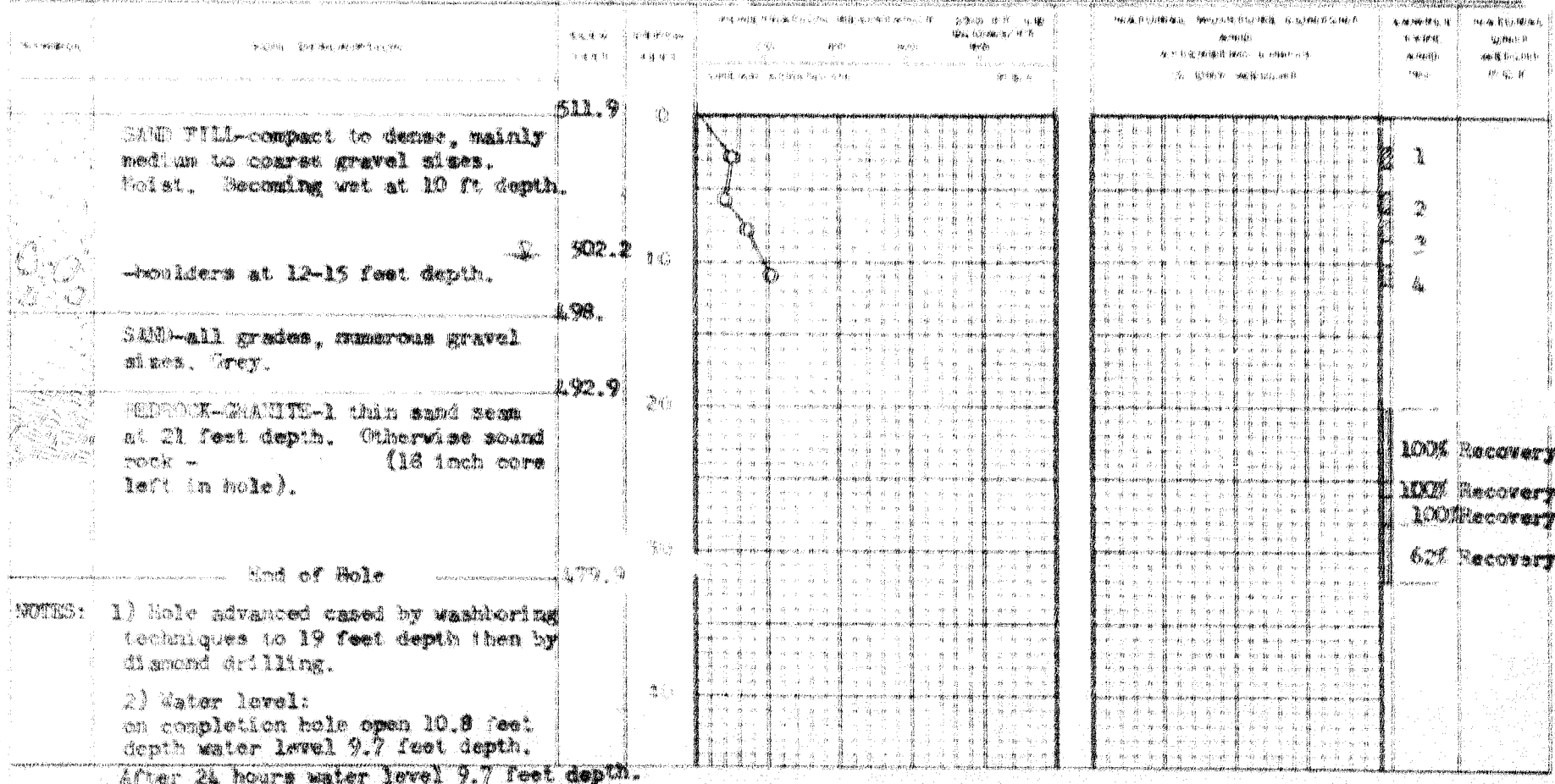
PROJECT NO. 4 & 14
 PROJECT D.H.B. Bridge, W.P. 142-63
 LOCATION Dwy. 17, Deux Rivières, Creek
 POINT LOCATION 4-11.5 feet left 325+47, 4A-16 ft. left of
 POINT LOCATION 4A-511.9 feet 325 +40.
 POINT LOCATION See Site Plan Dwg.

GENERAL NOTES

1. HOLE TO BE DRILLED TO 20 FEET DEPTH.
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GENERAL NOTES

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圖 6 試驗用之鋼管及鋼管之斷面圖

2017年12月19日 星期二

“ 牛、馬、虎、兔、龍、蛇、馬、羊、猴、雞、狗、豬 ”

1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ (25%)

“我非我輩無聊人，乃曾歷過艱難者，非我輩無聊人，乃曾歷過艱難者”

2. 1. 1. 游興、遊情、游踪、游蹤、游迹、游跡

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此項試驗係以 10 公厘鋼板為試驗體，其試驗結果如下：

我無憾焉 此語實有 餘味 想 吾輩 亦 有 之 也

[illegible]

第44卷第1期 2012年1月 1991年12月

美甘平藥廠總發行所 上海福州路

2000年12月25日 星期二

Phyllanthus *sp.* *sp.*

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總之，不論何種情形，均應以「誠實信用」為原則，不得有欺詐行為，否則即屬違法。此項原則，不僅適用於民事行為，亦適用於行政行為。在行政行為中，「誠實信用」原則要求行政機關在行使權力時，應以誠實、信用為前提，不得有欺詐、隱瞞等行為。此項原則之具體化，即為「行政程序法」中之「誠實信用」原則。該原則之具體化，即為「行政程序法」中之「誠實信用」原則。該原則之具體化，即為「行政程序法」中之「誠實信用」原則。

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Figure 1

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11. *Journal of the American Medical Association*, 2000; 284: 1039-1044.

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101 Recovery

100% Recovery

RECOVERY




表 1-1-1 各種材料之單位重量

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 3. 支票的金额必须与存款账户的余额相符。
 4. 支票的有效期为自签发之日起10天。
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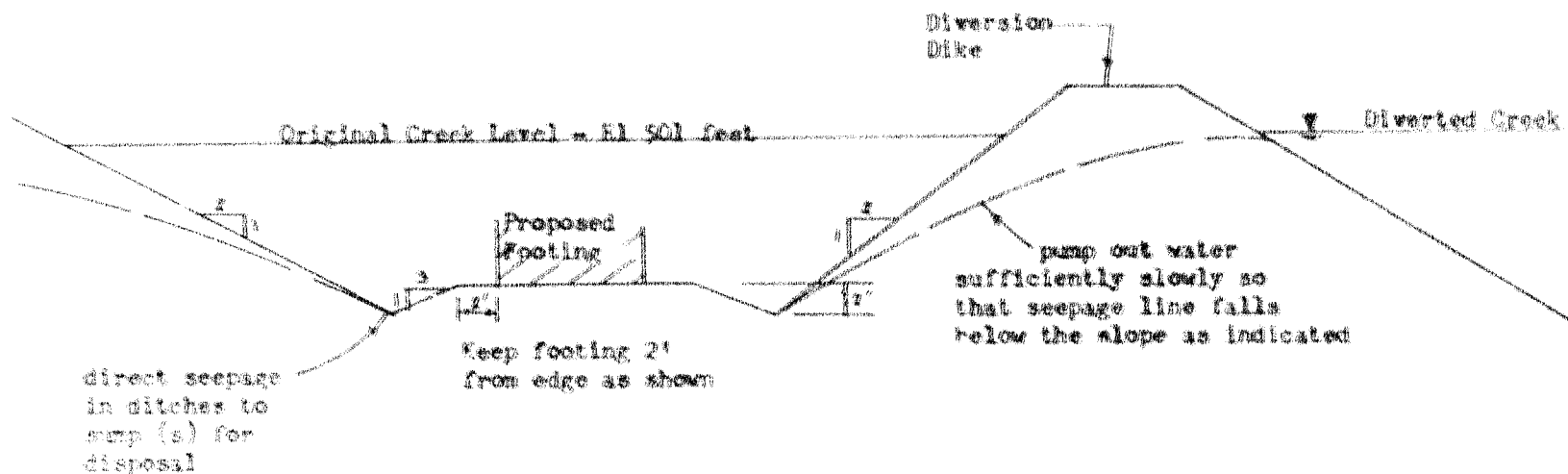
中法大藥房有限公司 總經理

55. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 8

- 第 1 版 1990 年 12 月第 1 次印刷
第 2 版 1995 年 12 月第 1 次印刷
第 3 版 2000 年 12 月第 1 次印刷

| SAND | | RED ROCK-GRANITE | | END OF HOLE | |
|--|-------|---|-------|-------------|-------|
| SAND-compact becoming dense with depth. Medium and coarse becoming finer with depth. Fine gravel sizes numerous boulders 0-2 feet depth. | 507.0 | RED ROCK-GRANITE- 6 thin (3 inch) sand seams in the rock between 9 and 17 feet depth, otherwise sand. | 498.5 | End of Hole | 486.0 |
| <p>NOTES:</p> <ol style="list-style-type: none"> 1) Hole advanced cased to 9 feet depth by standard washboring techniques then by diamond drilling. 2) Water level on completion and after 2 days, 2.0 feet depth. | | | | | |

SKETCH SHOWING SUGGESTED METHOD OF EXCAVATING FOR
BRIDGE OR ARCH FOUNDATIONS



- PROCEDURE:-
- 1) Divert Creek
 - 2) Excavate below water level to approximate dimensions shown
 - 3) Pump out water
 - 4) Prepare footing bed and install footing
 - 5) Backfill with sand and gravel and cover with rip rap

Mr. C. S. Grebaki,
Bridge Design Engineer,
Bridge Division,
Admin. Bldg.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

July 19, 1967

Deer Riveron Creek Culvert
-- Structural Pipe Arch --
*P. 142-63 -- Site No. 29-2
Highway 17, District No. 13

We have reviewed the Preliminary Bridge Drawing No. B-6177-P1 for the above-named structure. We note that you have decided to use a pipe arch culvert instead of either of the originally proposed structures.

We would like to emphasize that a dewatering scheme will be required, since excavations will be carried out below the creek water level for the proposed structure in granular subsoil.

RLM/adeP

[Signature]
P. Devata,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Sternac,
PRINCIPAL FOUNDATION ENGR.

cc: Messrs. S. McConbie
J. B. Curtis

Foundations Office
Gen. Files

Copy for the information of

Mr. A. Stermac, Principal Foundation Engineer,
Room 197, Lab. Building
Mr. J.B. Curtis,
Reg. Bridge Location Engineer,
North Bay Regional Office

Bridge Division,
Downsview, Ontario

July 12, 1967

Deux Rivieres Creek Culvert
Structural Pipe Arch
K.P. 142-63, Site No. 29-2
Highway 17, District No. 11

Attached herewith are prints of the Preliminary Bridge
Plan Drawing D-6177-P1 for the above-mentioned structure.

The estimated cost of the proposed structure is \$35,000.
This cost includes tender, materials, engineering and sundry
construction but does not include the cost of removal of the
existing bridge.

Any comments or revisions you may have should be submitted
within three weeks.

CSB:rd

C.S. Grebaki,
Bridge Design Engineer

Attach.

c.c. S. McCombie
A. Stermac
B. Forrest
E. Cross

Mr. W. H. Davis,
 Bridge Engineer,
 Bridge Division,
 Admin. Bldg.

Foundation Section,
 Materials & Testing Div.,
 Room 107, Lab. Bldg.

Attention: Mr. S. McLaughlin

April 30, 1967

FOUNDATION INVESTIGATION REPORT #1:
 William A. Irwin Associates Ltd. - For C.E.C.
 S.P. 142-83,
 Deser Riviere Cross Bridge,
 Hwy. No. 17, Deser Riviere, Ontario,
 District No. 13 (North Bay).

(Report distributed February 8, 1967)

(Additional Logs and Revised Site plan Sup. - issued on
 March 30, 1967)

Due to the fact that an error had been discovered in the
 offset in exchange in the additional log information
 distributed to you March 30, 1967, the Consultant has
 released replacements.

would you, therefore, kindly delete the existing additional
 logs from your copies of this report and insert the
 attached, corrected pages in their place.

Thank you.

WAW/ndw

attach.

cc: Messrs. W. H. Davis (2)

W. A. Tregaskis

W. A. Furren

W. A. Arthur

W. A. French

J. G. Curtis

A. A. Saint

A. A. Singh

Foundations File

Gen. Files

Mr. B. B. Davis,
 Bridge Engineer,
 Bridge Division,
 Main Bldg.

Foundation Section,
 Materials & Testing Div.,
 Room 107, Lab. Bldg.

Attention: Mr. A. J. Smith

March 17, 1967

ATTENTION: INTERESTED: REPORT BY:
 William A. Trow Associates Ltd. - Box 2000,
 V.V. 100-01,
 1000 Riverview Creek Bridge,
 Hwy. No. 17, Delta Riverview, Ontario,
 District No. 1 (North Bay).

(Report distributed February 1, 1967)

ATTENTION: LOGS and EXISTING SITE PLAN DRAWING (showing log information)

Enclosed, please find explanatory letter by the consultant,
 together with additional logs and revised site plan drawing.

Could you kindly delete existing drawing(s) from your
 copies of the above report and replace with the attached.

Thank you.

Afternoon

cc: Mr. B. B. Davis
 Smith.

J. C. Starnes,
 Regional Technical Engineer

cc: Mr. B. B. Davis (2)
 Mr. A. J. Smith
 Mr. C. J. French
 Mr. D. E. Smith
 Mr. E. A. Smith
 Mr. F. A. Smith
 Mr. G. A. Smith
 Mr. H. A. Smith
 Mr. I. A. Smith
 Mr. J. A. Smith
 Mr. K. A. Smith
 Mr. L. A. Smith
 Mr. M. A. Smith
 Mr. N. A. Smith
 Mr. O. A. Smith
 Mr. P. A. Smith
 Mr. Q. A. Smith
 Mr. R. A. Smith
 Mr. S. A. Smith
 Mr. T. A. Smith
 Mr. U. A. Smith
 Mr. V. A. Smith
 Mr. W. A. Smith
 Mr. X. A. Smith
 Mr. Y. A. Smith
 Mr. Z. A. Smith

Foundations Files
 Gen. Files

80 Milvan Drive
Weston, Ontario
749-1280

William Trow

Project: J3370

Soil Mechanics
Consultants
W. A. Trow
M.Sc. MEIC. P. Eng.
K. Peckler
Ph.D. MEIC. P. Eng.
D. H. Shields
Ph.D. MEIC. P. Eng.

✚
Associates Ltd.

Mr. A. Rutka, P.Eng.,
Chief Materials and Testing Engineer,
Department of Highways of Ontario,
McDonald Cartier Freeway and Keele Street,
Downsview, Ontario.

March 17, 1967

Attention: Mr. A.C. Sternac, P.Eng.

Re: Foundation Investigation
W.P. 142-63
Deux Rivières Creek Bridge
Highway No. 17
Deux Rivières, Ontario

Dear Sirs:

We enclose the logs for five additional boreholes at the above noted site. The information in the logs has been plotted on the Site Plan Drawing.

The purpose of these additional borings was to outline in more detail the bedrock elevation at this site.

Should you have any questions, please call.

Yours very truly,



D.H. Shields, P.Eng.

DHS/ss
Encls.

Mr. E. A. Davis,
Bridge Engineer,
Bridge Division.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. E. McCoskie

February 3, 1967

FEB - 61067

FOUNDATION INVESTIGATION REPORT BY:
William A. Trow Associates Ltd. - Per C.M.C.
C.M.C. 102-43,
Jean Riviere Creek Bridge,
Box No. 17, Jean Riviere, Ontario,
District No. 13 (North Bay).

Attached, please find the above mentioned report prepared and submitted by the consultant, William A. Trow Associates Ltd.

After having reviewed the report, we have discussed the findings with the consultant, and it was agreed that additional field work would be required at the west bank of the river where a pronounced drop in bedrock surface was disclosed.

The additional work is intended to disclose whether the bedrock surface is more even at the south end of the existing west abutment.

The available information was discussed with both the Bridge Planning Engineer, Mr. E. McCoskie, and the Regional Bridge Location Engineer, Mr. J. Curtis, and the consensus of opinion was that a single-span structure, moved slightly towards the east, seems at present, to be the best solution for this crossing.

The consultant will also attempt to obtain information on bedrock elevations in locations of possible future wing walls.

As soon as this additional information becomes available, it will be forwarded to you, to be incorporated into this report.

Afternoon

A. J. Starnes

REGIONAL FOUNDATION ENGINEER

cc: Mr. Davis
Attention.

cc: Messrs. E. A. Davis (2)

E. A. Trow

J. A. Farren

E. A. Farren

E. A. French

J. E. Curtis

E. E. Saint

A. A. Singh

Foundations Files

Gen. Files

Rep. No. 2 (2nd copy)
 Inspection, Ontario

December 7, 1946

Materials and Testing Division

William A. New Associates Ltd.,
 90 Kilwin Drive,
 Toronto, Ontario.

Attention: Mr. W. A. New

Re: Letter of Authority -- Foundation Investigations

Donk Riviere Creek, Rep. 17 -- E.S. 118-43
 E.S. 2, O'head at Donk Riviere -- E.S. 118-43
 Annapolis Green Bridge, Rep. 17 -- E.S. 118-43
 District No. 13 (North Bay)

Dear Sir:

Please consider this your authority to carry out foundation investigations at the above mentioned sites.

Drawings and plans showing the crossing locations and proposed footing layout, have been given to your representative on December 6, 1946.

You are requested to proceed with the investigations as soon as possible and submit the separate final reports by not later than February 1, 1947.

Eleven (11) copies of each report will be required for our distribution.

At the Annapolis Green Bridge site you are also requested to put down a number of shallow borings in order to establish whether bedrock is to be found above the proposed stream diversion bed. A plan with the stream diversion profile was given to your representative.

The proposed E.S. 2, Overhead structure may incorporate piers built on a pier. You are, therefore, requested to establish the ground conditions for this alternative, also. The locations of the borings for this purpose are shown on the plan E-118-43-1.

Grid walls will be required on the E.S. 2 and E.S. 2, corners of this structure, and these areas should also be included in your investigations.

DEFECTS IN NEGATIVE DUE TO
 CONDITION OF ORIGINAL DOCUMENT

cont'd. /2 ...

December 7, 1966

Although unlikely, there is still a possibility that a barrel arch type of structure could be used for the Bay. In connection of the River Diversion (S.P. 144-63), you are, therefore, requested to re-investigate the material conditions to a distance approximately 1/2 ft. from the highway centre-line downstream as well as upstream, where the barrel arch footings would presumably end.

Should you have any queries while working in the field, please contact the Foundation Section, Immigration, or better - Mr. J. E. Curtis, Regional Bridge Location Engineer, North Bay, 141 St. Street East, P.O. Box 611, North Bay, Ontario - Telephone No. 473-7700 (Area Code 705).

According to our information, accommodation is available in the town of River Diversion which is very close to all three sites.

In accordance with our terms of reference, you are to have a qualified Civil Engineer in charge of the field work at all times. Any deviation from this arrangement has to be approved by the Department. Previous requirements as to preliminary geotechnical information and laboratory testing program, should be followed.

Since the drawings accompanying the foundation reports, showing the location of borings, the inferred subsoil conditions, etc., are to be based on direct drawings, you are required to prepare them in accordance with the A.S.C. Standards. To enable you to do this, we are supplying you with a sample drawing with all the necessary explanations, together with linen sheets for your drawings. You are also requested to provide us with Gnomaflex copies of the drawings.

Charges for the work performed will be in accordance with your Schedule of Rates, dated January 1, 1966, and invoices to be addressed to the attention of the undersigned.

We are attaching the following Purchase Orders:

L-00812 - S.P. 144-63 - River Diversion Creek, Bay, 17,
L-00813 - S.P. 84-63 - S.P.A. 8' bend at River Diversion,
L-00814 - S.P. 331-63 - Annette Creek bridge, Bay, 17,

covering the purchase of any new material required for this work, in order that you may use these as a basis for exemption from the Federal Tax for such purchases. The Exemption Certificate is printed thereon.

WAB/mof
Attach.

Yours very truly,

A. R. Curtis

A. R. Curtis

MATERIALS & TESTING ENGINEER








DEFECTS IN NEGATIVE DUE TO
CONDITION OF ORIGINAL DOCUMENT

cc: Messrs - S. McCulloch
E. McArthur
G. L. French
J. E. Curtis
L. R. Saint
Mrs. I. Steinberg
R. Lanning
A. Grynowski (2)

A. Grynowski
Foundations Office
Gen. Files (2)

BOREHOLE NO. 7
 PROJECT D.H.O. Bridge, W.P. 142-63
 LOCATION Hwy. 17, Deux Rivières Creek
 HOLE LOCATION 75' Left of Sta. 324+90
 HOLE ELEVATION 502.7 feet
 DATUM See Site Plan Dwg.

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE 
 2" I.D. SHELBY TUBE 
 2" DIA. CONE 
 SHEAR STRENGTH 
 UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE 
 UNCONFINED COMPRESSION 
 VANE TEST AND SENSITIVITY (S) 

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

3" O.D. SHELBY TUBE

LI

X

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| SYMBOL | SOIL DESCRIPTION | ELEV. FEET | DEPTH FEET | PENETRATION RESISTANCE 350 FT. LB. BLOWS/FT | | NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT | SAMPLE TYPE AND NO. | NATURAL UNIT WEIGHT P.C.F. |
|--------|--|------------|------------|---|----|--|---------------------|----------------------------|
| | | | | 20 | 40 | 60 | | |
| | 6" TOPSOIL | 502.7 | 0 | | | | | |
| | SAND AND BOULDERS—topsoil-stained to 3 ft, sand - dense to very dense, fine to coarse. | 500.3 | 1 | | | | 1 | |
| | | | 10 | | | | | |
| | | 487.7 | 20 | | | | 33% Core Recovery | |
| | BEDROCK—numerous sand seams above 18 ft. depth, sand below 17 ft. depth. -Granite | | | | | | 100% Core Recovery | |
| | End of Borehole | 474.7 | 30 | | | | | |
| Notes: | 1) Hole cased with BX flush joint casing and advanced by conventional washboring techniques to 3 ft. depth. From 3 ft. to 15 ft. depth drilled BX casing to bedrock contact at 15 ft. depth. Casing cleaned out with AXT core barrel. Bedrock drilled with AXT core barrel.
2) Water level:- Hole dry and open to 28 ft. depth on completion of borehole. Water level at 2.4 ft depth after 2 days. | | 40 | | | | | |
| | | | 50 | | | | | |
| | | | 60 | | | | | |
| | | | 70 | | | | | |
| | | | 80 | | | | | |
| | | | 90 | | | | | |
| | | | 100 | | | | | |
| | | | 110 | | | | | |

BOREHOLE NO. 3
PROJECT D.H.C. Bridge, W.P. 142-63
LOCATION Hwy. 17, Deux Rivières Creek
HOLE LOCATION 40' left of Sta. 325+08
HOLE ELEVATION 503.2 feet
DATUM See Site Plan Dwg.


PENETRATION RESISTANCE


2 GD SPLIT TUBE 


2 ID SHELBY TUBE 

2" DIA CONE 

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE 

UNCONFINED COMPRESSION 

VANE TEST AND SENSITIVITY (5) 

NATURAL MOISTURE CONTENT
AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT _____

PLASTIC LIMIT _____

SAMPLE TYPE

2' O.D. SPLIT TUBE _____


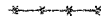





1' I.D. SHELBY TUBE _____

3' O.D. SHELBY TUBE _____

| SYMBOL | SOIL DESCRIPTION | ELEV
FEET | DEPTH
FEET | PENETRATION RESISTANCE 350 FT. LB
BLOWS/FT | | | | NATURAL MOISTURE CONTENT
AND
ATTERBERG LIMITS
% DRY WEIGHT | SAMPLE
TYPE
AND
NO. | NATURAL
UNIT
WEIGHT
P.C.F. | |
|---|---|--------------|---------------|---|----|----|----|---|------------------------------|-------------------------------------|--|
| | | | | 20 | 40 | 60 | 80 | | | | |
| | | | | SHEAR STRENGTH | | | | P.S.F. | | | |
| | | 503.2 | 0 | | | | | | | | |
| | SAND AND BOULDERS- sand dense to very dense, fine to coarse, occasional gravel sizes. | 500.5 | | | | | | | 1 | | |
| | | | 10 | | | | | | | | |
| | | 490.4 | | | | | | | 2 | | |
| | BEDROCK-granite sound. | | 20 | | | | | | 100%
Core Recovery | | |
| | | | 30 | | | | | | | | |
| | End of Borehole | 480.2 | | | | | | | | | |
| Notes: 1) Hole advanced by drilling BX flush joint casing and cleaned out with AXT core barrel. Bedrock drilled with AXT core barrel. | | | | | | | | | | | |
| 2) Water level at 3.5 ft. depth in casing, hole open to full depth, on completion of boring. Water level at 2.7 ft. depth after 4 days. | | | | | | | | | | | |
| | | | 40 | | | | | | | | |
| | | | 50 | | | | | | | | |
| | | | 60 | | | | | | | | |
| | | | 70 | | | | | | | | |
| | | | 80 | | | | | | | | |
| | | | 90 | | | | | | | | |
| | | | 100 | | | | | | | | |
| | | | 110 | | | | | | | | |

BOREHOLE NO. 9
 PROJECT D.H.Q. Bridge, W.P. 142-63
 LOCATION Hay, 17, Deux Rivières Creek
 HOLE LOCATION 45' right of Sta. 325+30
 HOLE ELEVATION 506.3 ft.
 DATUM See Site Plan Dwg.

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE 
 2" I.D. SHELBY TUBE 
 2" DIA. CONE 
 SHEAR STRENGTH
 UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE 
 UNCONFINED COMPRESSION 
 VANE TEST AND SENSITIVITY  (5) 

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE



3" O.D. SHELBY TUBE

| SYMBOL | SOIL DESCRIPTION | ELEV. FEET | DEPTH FEET | PENETRATION RESISTANCE | NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT | SAMPLE TYPE AND NO. | NATURAL UNIT WEIGHT P.C.F. |
|--------|---|------------|------------|--------------------------------------|--|---------------------|----------------------------|
| | | | | 20 40 60 80
SHEAR STRENGTH P.S.F. | | | |
| | SAND AND BOULDERS- sand dense to very dense, fine to coarse, boulders and cobbles start at 2 ft. depth. | 506.3 | 0 | | | | |
| | -2 ft. thick boulders at 17 ft. depth and 21 ft. depth. | | 10 | | | | |
| | | | 20 | | | | |
| | BEDROCK-granite -numerous sand seams above 26 ft. depth. | 483.3 | 30 | | | 67% Core Recovery | |
| | | | 40 | | | 67% Core Recovery | |
| | -End of Borehole | 473.3 | 50 | | | 100% Core Recovery | |
| | | | 60 | | | | |
| | | | 70 | | | | |
| | | | 80 | | | | |
| | | | 90 | | | | |
| | | | 100 | | | | |
| | | | 110 | | | | |



Notes: 1) Hole advanced by drilling BX flush joint casing and cleaned out with AXT core barrel. Bedrock drilled with AXT core barrel.

BOREHOLE NO. 10
PROJECT D.H.O. Bridge, W.P. 142-63
LOCATION Hwy. 17, Deux Rivières Creek
HOLE LOCATION 75' right of Sta. 325+33
HOLE ELEVATION 507.7 feet
DATUM See Site Plan Dwg.

PENETRATION RESISTANCE


2" O.D. SPLIT TUBE 2" I.D. SHELBY TUBE 2" DIA. CONE 

SHEAR STRENGTH


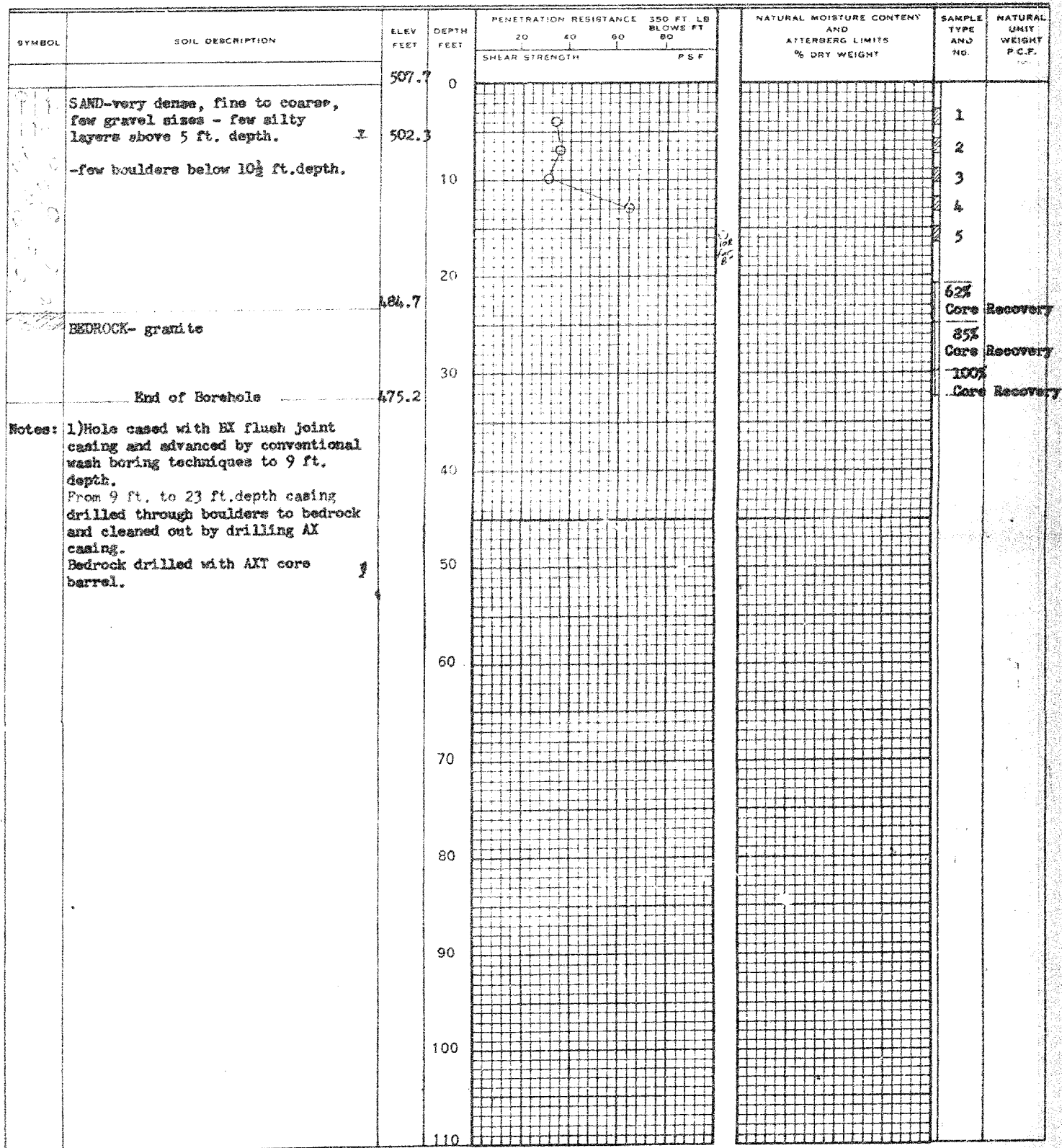
UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE UNCONFINED COMPRESSION VANE TEST AND SENSITIVITY (S) 

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT PLASTIC LIMIT 

SAMPLE TYPE

2" O.D. SPLIT TUBE 2" I.D. SHELBY TUBE 3" O.D. SHELBY TUBE 

LEGEND

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE —○—○—○—

2" O.D. SHELBY TUBE —*—*—*—*—

2" DIA. CONE —+—+—+—+—

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕

UNCONFINED COMPRESSION ⊗

VANE TEST AND SENSITIVITY 151 +^s

NATURAL MOISTURE CONTENT

AND LIQUIDITY INDEX X^{LI}

ATTERBERG LIMITS

LIQUID LIMIT —○—

PLASTIC LIMIT —+—

SAMPLE TYPE

2" O.D. SPLIT TUBE —■—

2" O.D. SHELBY TUBE —■—

3" O.D. SHELBY TUBE —■—

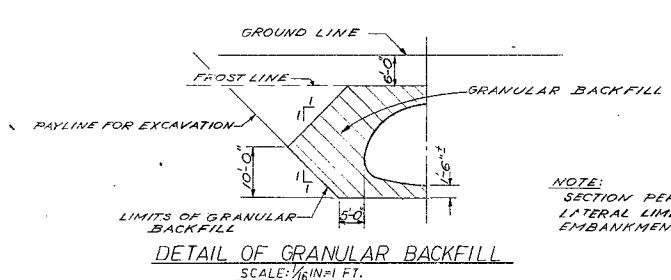
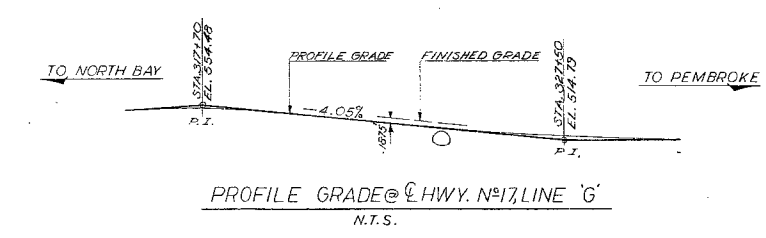
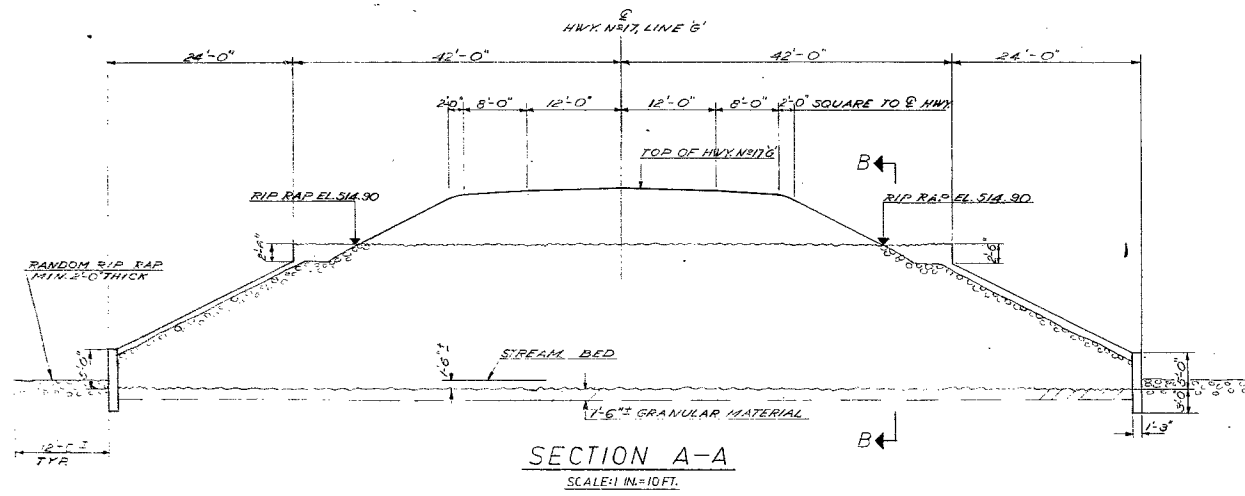
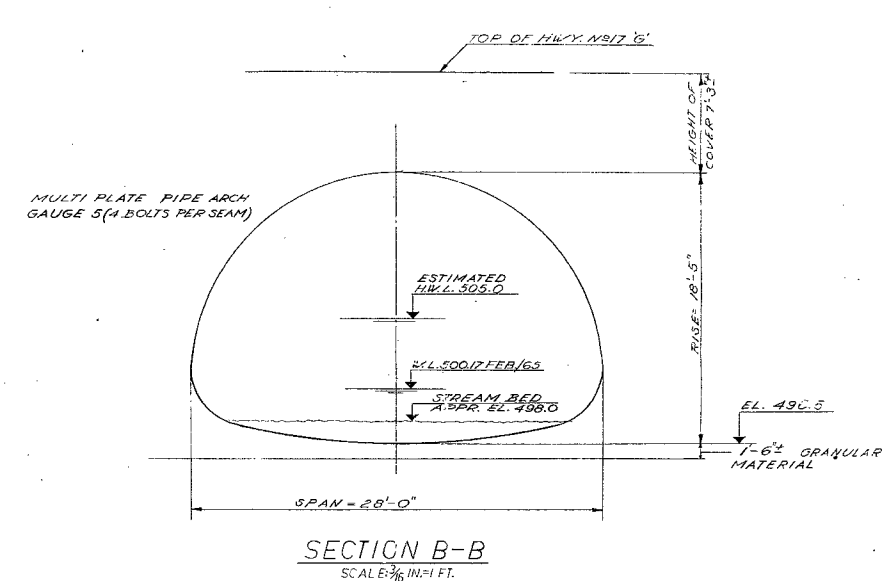
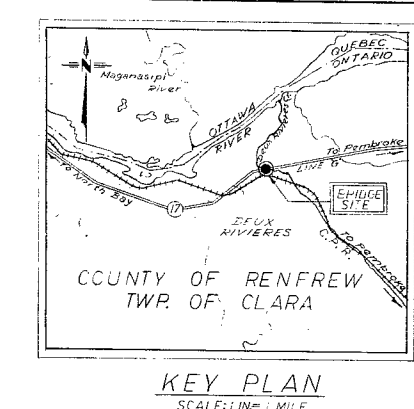
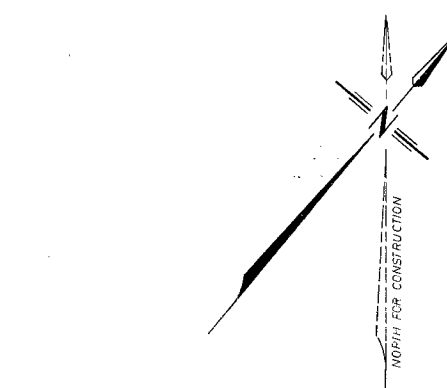
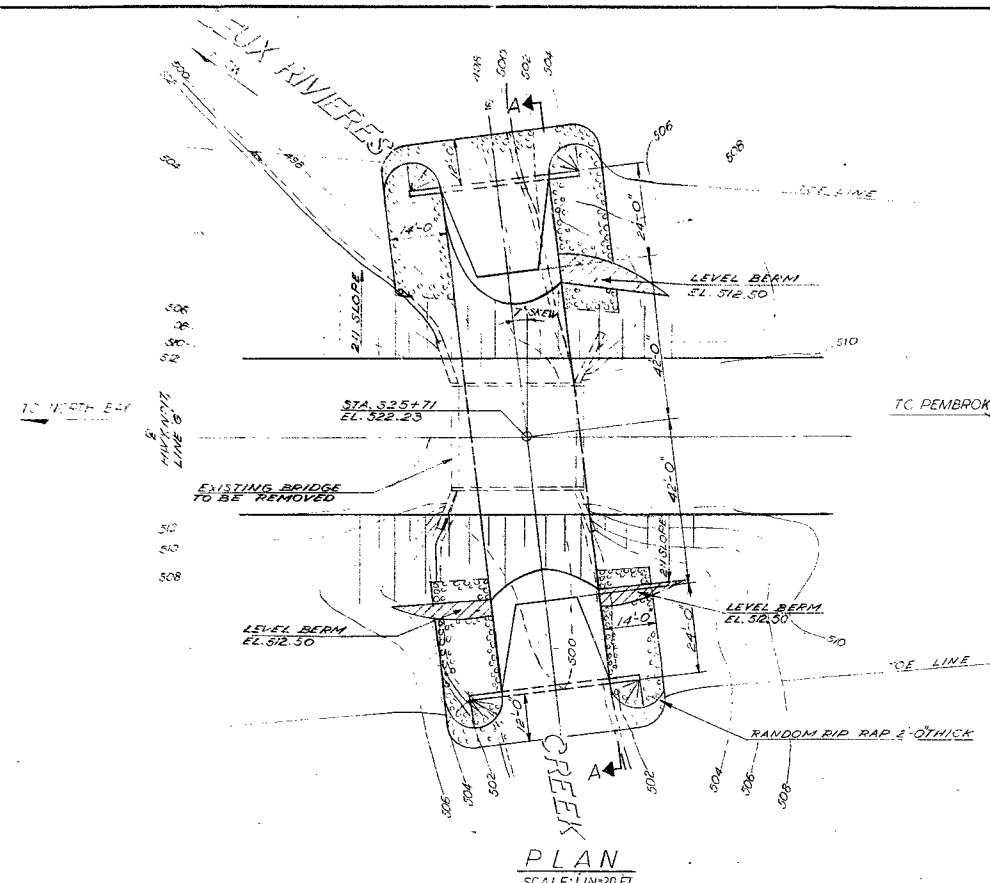
BOREHOLE NO. 11
 PROJECT D.H.O. Bridge, W.P. 142-63
 LOCATION Hwy. 17, Deux Rivieres Creek
 HOLE LOCATION 10' right of Sta. 325+40
 HOLE ELEVATION 512.3 ft.
 DATUM See Site Plan Dwg.

| SYMBOL | SOIL DESCRIPTION | ELEV
FEET | DEPTH
FEET | PENETRATION RESISTANCE | | | | 350 FT. LB
BLOWS FT | NATURAL MOISTURE CONTENT
AND
ATTERBERG LIMITS
% DRY WEIGHT | SAMPLE
TYPE
AND
NO | NATURAL
UNIT
WEIGHT
P.C.F. |
|--------|--|--------------|---------------|------------------------|----|----|----|------------------------|---|-----------------------------|-------------------------------------|
| | | | | 20 | 40 | 60 | 80 | | | | |
| | | | | SHEAR STRENGTH | | | | PSF | | | |
| | 3" Asphalt
SAND FILL- (not sampled) | 512.3 | 0 | | | | | | | | |
| | | | 10 | | | | | | | | |
| | SAND AND BOULDERS- sand dense to
very dense, fine to coarse.
(not sampled) | 501.3 | | | | | | | | | |
| | | | 20 | | | | | | | | |
| | | 489.3 | | | | | | | | | |
| | BEDROCK-numerous sand seams up to
3 inch width above 28 ft.depth.
-Granite | | 30 | | | | | | | | |
| | | | 40 | | | | | | | | |
| | End of Borehole | 476.3 | | | | | | | | | |
| | | | 50 | | | | | | | | |
| | | | 60 | | | | | | | | |
| | | | 70 | | | | | | | | |
| | | | 80 | | | | | | | | |
| | | | 90 | | | | | | | | |
| | | | 100 | | | | | | | | |
| | | | 110 | | | | | | | | |

Notes: 1) Hole advanced by drilling AX casing and cleaned out with AXT core barrel.
Bedrock drilled with AXT core barrel.

100% Core Recovery
42% Core Recovery
97% Core Recovery

#66-F-237C
WP. #142-63
HWY #17
DEUX RIVIERES
CREEK CULVERT



NOTE:
SECTION PERPENDICULAR TO PIPE
LATERAL LIMITS FACE TO FACE
EMBANKMENT.

B.M. ELEV. 506.83
GEODETIC DATUM:
N. 41° W. DIST. 2.5' PINE
86.0 RT. 325+25

[illegible]

| | | | | | | | | | |
|--|--|--|--|---------------------------------|----------------------|----------------|-----------------------|------------------------------|--|
| REVISIONS | | | | | | | | | |
| DATE | | BY | | DESCRIPTION | | | | | |
| | | | | | | | | | |
| DEPARTMENT OF HIGHWAYS ONTARIO | | | | | | | | | |
| BRIDGE DIVISION | | | | | | | | | |
| | | | | | | | | | |
| <u>DEUX RIVIERES CREEK CULVERT</u>
<u>(STRUCTURAL PIPE ARCH)</u> | | | | | | | | | |
| KING'S HIGHWAY No. 17 | | | | | | DIST. No. 13 | | | |
| CO. RENFREW | | | | | | | | | |
| TWP. CLARA | | | | | | LOT 18519 | | CON. B' | |
| <u>PRELIMINARY PLAN</u> | | | | | | | | | |
| APPROVED _____
BRIDGE ENGINEER | | | | | SITE No. <u>29-2</u> | | W.P. No. <u>14263</u> | | |
| DESIGN <u>P. C.L.</u>
DRAWING <u>P. SCH.</u>
DATE <u>JUNE 1967</u> | | CHECK: _____
CHECK <u>P. O.L.</u>
LOADING <u>HIS 20-44</u> | | CONTRACT No. _____
No. _____ | | _____
_____ | | DRAWING No. <u>D-6177-P1</u> | |

