

**OPINIA GEOTECHNICZNA**

dla projektu przebudowy amfiteatru w Parku Wolności, część działki nr 9/4

**w PABIANICACH**

Opracował:



mgr St. Pietrusiewicz  
upr. geolog. nr 070461

## 1. Wstęp

Opinię niniejszą wykonano zgodnie z Rozporządzeniem Ministra Transportu, Budownictwa i Gospodarki Morskiej z dnia 25 kwietnia 2012 roku w sprawie ustalania geotechnicznych warunków posadowienia obiektów budowlanych ( Dz. U. z 2012 roku, poz. 463 ) oraz normą PN-EN 1997-1:2008 Eurokod 7 Projektowanie geotechniczne.

Zlecniodawcą badań geotechnicznych jest **Archimika** Studio Architektury, Łódź, ul. Wspólna 15/17 lok. 180A.

Celem badań było rozpoznanie i ocena warunków gruntowo – wodnych w podłożu istniejącego amfiteatru, który będzie przebudowany.

Prace w terenie wykonano w dniu 30 września 2014 roku. Zakres robót został określony przez Zlecniodawcę i obejmował dwa wiercenia o głębokości 5,0m i 7,0m na koronie amfiteatru, dwa wiercenia do 3,5m w środku widowni i jedno do 3,0m na najniższym poziomie. W celu ustalenia stopnia zagęszczenia gruntów podłoża na poziomie korony wykonano sondowanie dynamiczne sondą lekką DPL. Podczas wiercenia określano makroskopowo rodzaj i stan gruntów.

Rzędne terenu w miejscach wierceń odczytano z mapy.

## 2. Geotechniczna charakterystyka podłoża

Podłoże istniejącego amfiteatru stanowią nasypy niebudowlane. Głównym składnikiem nasypów jest gleba ( szacunkowo 50 – 90% ) oraz domieszka piasku. Sondowanie DPL wykazało, że pierwszy metr nasypu ma stopień zagęszczenia  $I_D=0.56$ , a głębiej  $I_D=0.50$ . Stan ten określa się jako średniozagęszczony. Miąższość warstwy nasypu, licząc od poziomu korony, wynosi 5,0m.

Grunty rodzime, podścielające nasyp, to piaski wodnolodowcowe i głębiej glina morenowa. Piaski wykształcone są jako piaski średnie i lokalnie piaski drobne. Z sondowania DPL wynika, że piaski mają stopień zagęszczenia  $I_D=0.65$ .

Glinę morenową stwierdzono w otworze nr 1 pod piaskami, na głębokości 2,5m. Jest to glina piaszczysta w stanie twardoplastycznym o przyjętym stopniu plastyczności  $I_L=0.20$ . Gлина morenowa należy do genetycznej grupy B.

Układ warstw gruntów przedstawiono na przekrojach geotechnicznych.

Wody gruntowej wykonanymi wierceniami nie stwierdzono.



### **3. Wnioski**

- 3.1.** Nasypy niebudowlane, z których zbudowany jest istniejący amfiteatr, mogą być wykorzystane jako podłoże modernizowanego obiektu.
- 3.2.** Sondowanie DPL wykazało, że grunty te są w stanie średniozagęszczonym. Można przyjąć, że ich osiadanie ( bez dodatkowych obciążeń ) jest zakończone.
- 3.3.** Parametry geotechniczne gruntów rodzimych podano w tabeli, na legendzie do przekrojów.

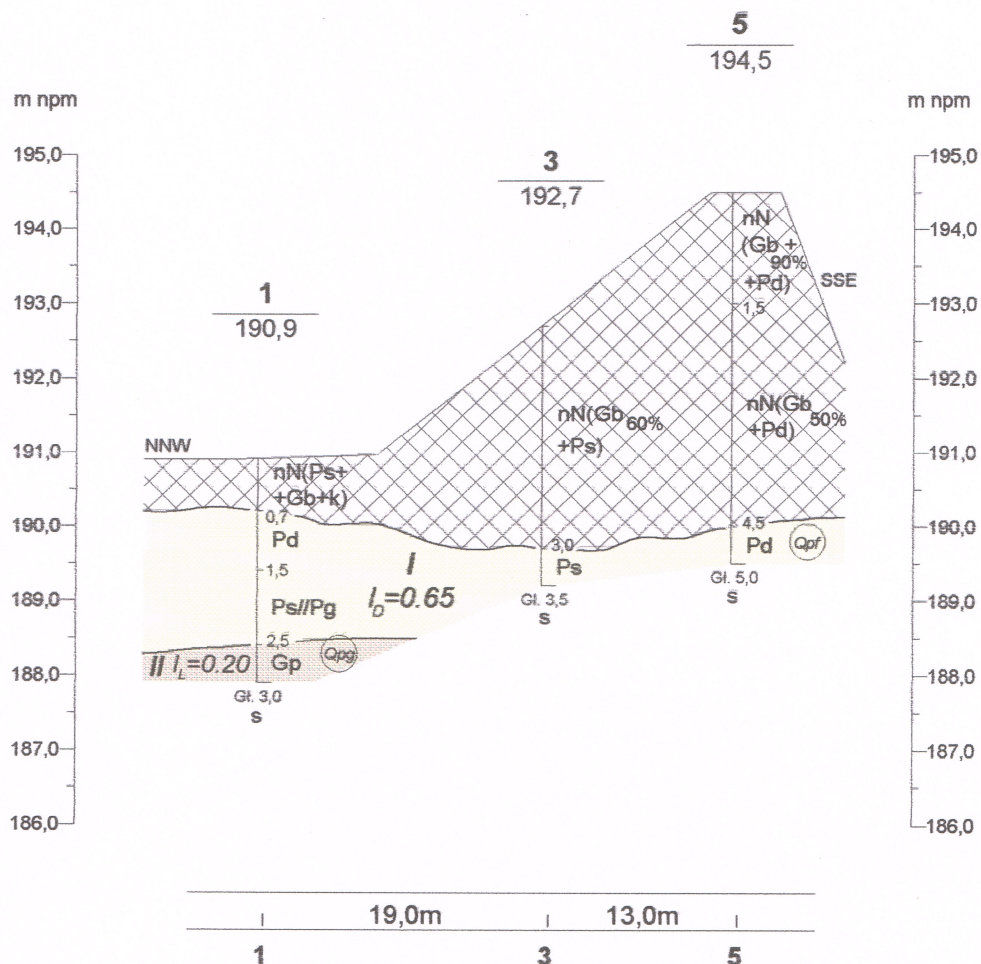
Opracował: mgr St. Pietrusiewicz





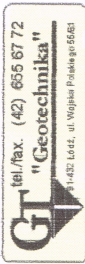


II



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|-------------|--|---|
|             | <b>"Geotechnika"</b><br>Łódź, ul. Wojska Polskiego 55/61                               | tel./fax. (42) 655 67 72                |
| Temat:      | <b>PABIANICE, Park Wolności, działka nr 9/4 -<br/>         - przebudowa amfiteatru</b> |   |
| Treść:      | <b>Przekrój geotechniczny nr II</b>  | skala: <b>poz. 1:500</b><br>pion. 1:100 |
| Opracowała: | mgr K. Pietrusiewicz<br>upr. geolog. nr 070951 <i>f.pietr</i>                          |   |





# LEGENDA DO PRZEKROJÓW GEOTECHNICZNYCH

TEMAT: **PABIANICE, Park Wolności, działka nr 9/4 - przebudowa amfiteatru**

| PARAMETRY GEOTECHNICZNE               |  |  |  |                           |  |                                |  |                          |  |                                  |  |                       |  | wg PN-81/B-03020     |  |                             |  |                         |  |                              |  |                     |  |                         |  |                              |  |                     |  |
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| OBJAŚNIENIA GEOLOGICZNE               |  | wartość charakterystyczna                        |  |                           |  | $X(n)$                         |  | współczynnik materiałowy |  | $\gamma_m$                       |  | wartość obliczeniowa  |  | $X(r)$               |  | ★ Wartość ustalona metodą A |  |                         |  |                              |  |                     |  |                         |  |                              |  |                     |  |
|                                       |  | Symbol gruntu                                    |  | Symbol geologiczny        |  | Stan gruntu                    |  |                          |  | Włgocistość naturalna            |  |                       |  |                      |  |                             |  |                         |  | Gęstość objętościowa         |  | Spójność            |  | Kąt tarcia wewnętrznego |  | Edometryczny moduł ścisłości |  | Moduł odkształcenia |  |
|                                       |  |  |  |                           |  | I <sub>p</sub>                 |  |                          |  | I <sub>L</sub>                   |  |                       |  |                      |  |                             |  |                         |  | w <sub>n</sub> %             |  | ρ t/m <sup>3</sup>  |  | c <sub>u</sub> kPa      |  | φ <sub>u</sub> o             |  | M <sub>0</sub> MPa  |  |
| Profil stratygraficzny - litologiczny |  | Opis litologiczno - genetyczno - stratygraficzny |  | Nr warstwy geotechnicznej |  | Symbol gruntu wg PN-86/B-02480 |  | Symbol geologiczny       |  | Stan gruntu                      |  | Włgocistość naturalna |  | Gęstość objętościowa |  | Spójność                    |  | Kąt tarcia wewnętrznego |  | Edometryczny moduł ścisłości |  | Moduł odkształcenia |  |                         |  |                              |  |                     |  |
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|                                       |  | Nasypy niebudowlane                              |  | —                         |  | nN(Gb+Pd)<br>nN(Gb+Ps)         |  | —                        |  | I <sub>p</sub><br>I <sub>L</sub> |  | 13,1<br>—             |  | 1,87<br>0,90<br>1,68 |  | —<br>—                      |  | 33,9<br>0,90<br>30,5    |  | —<br>—                       |  | 103<br>0,90<br>92   |  | 114<br>0,90<br>103      |  |                              |  |                     |  |
|                                       |  |  |  |                           |  |                                |  |                          |  |                                  |  |                       |  |                      |  |                             |  |                         |  |                              |  |                     |  |                         |  |                              |  |                     |  |
|                                       |  | Piaski wodnolodowcowe                            |  | I                         |  | Ps<br>lok. Pd                  |  | —                        |  | 0.65                             |  | —                     |  | 1,87<br>0,90<br>1,68 |  | —                           |  | 33,9<br>0,90<br>30,5    |  | —                            |  | 103<br>0,90<br>92   |  | 114<br>0,90<br>103      |  |                              |  |                     |  |
|                                       |  | Gliny morenowe                                   |  | II                        |  | Gp                             |  | B                        |  | 0.20                             |  | 14,5                  |  | 2,17<br>0,90<br>1,95 |  | 31,5<br>0,90<br>28,4        |  | 18,3<br>0,90<br>16,4    |  | 28<br>0,90<br>25             |  | 37<br>0,90<br>33    |  |                         |  |                              |  |                     |  |
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Opracował: mgr Sł. Pietrusiewicz  
upr. geolog. nr 070461

CZWARTORZĘD Plejstocen Holoceen



# OBJAŚNIENIA ZNAKÓW I SYMBOLI

## UŻYTYCH NA PRZEKROJACH I KARTACH SONDOWAŃ PENETRACYJNYCH

Symbole geotechniczne gruntów wg normy PN-86/B-02480

### GRUNTY NASYPOWE

- nB** nasyp budowlany  
**nN** nasyp niebudowlany

### GRUNTY ORGANICZNE RODZIME

- H** grunt próchniczny      **Gb** gleba  
**Nm** namuł  $\begin{cases} \text{Nmp} & \text{namuł piaszczysty} \\ \text{Nmg} & \text{namuł gliniasty} \end{cases}$   
**Gy** gytia (namuł o zawartości  $\text{CaCO}_3 > 5\%$ )  
**T** torf      zawartość części organicznych  $I_{om} > 30\%$

### GRUNTY MINERALNE RODZIME (NIESKALISTE)

- |                                      |                  |
|--------------------------------------|------------------|
| <b>KW</b> zwiaterzina                | } kamieniste     |
| <b>KWg</b> zwiaterzina gliniasta     |                  |
| <b>KR</b> rumosz                     |                  |
| <b>KRg</b> rumosz gliniasty          |                  |
| <b>KO, K</b> otoczaki, kamienie      | } gruboziarniste |
| <b>Ż</b> żwir                        |                  |
| <b>Żg</b> żwir gliniasty             |                  |
| <b>Po</b> pospółka                   |                  |
| <b>Pog</b> pospółka gliniasta        | } niespoiste     |
| <b>Pr</b> piasek gruby               |                  |
| <b>Ps</b> piasek średni              |                  |
| <b>Pd</b> piasek drobny              |                  |
| <b>Pπ</b> piasek pylasty             |                  |
| <b>Pg</b> piasek gliniasty           |                  |
| <b>Πp</b> pył piaszczysty            |                  |
| <b>Π</b> pył                         |                  |
| <b>Gp</b> glina piaszczysta          |                  |
| <b>G</b> glina                       |                  |
| <b>Gπ</b> glina pylasta              | } spoiste        |
| <b>Gpz</b> glina piaszczysta zwięzła |                  |
| <b>Gz</b> glina zwięzła              |                  |
| <b>Gπz</b> glina pylasta zwięzła     |                  |
| <b>Ip</b> ił piaszczysty             |                  |
| <b>I</b> ił                          |                  |
| <b>Iπ</b> ił pylasty                 |                  |




### GRUNTY SKALISTE

- ST** skała twarda  
**SM** skała miękka

### ZNAKI DODATKOWE DOTYCZĄCE OPISU GRUNTÓW

- +** domieszki  
**//** przewarstwienia (wkładki)  
**/** grunt na pograniczu  
**( )** w nawiasie określenia uzupełniające dotyczące: składu nasypów, rodzaju gruntów organicznych, petrografii skał  
**1** numer sondowania penetracyjnego (wiercenia)  
**189,70** rzędna w m npm

### OPRÓBOWANIE WIERCENIA

-  próbka o naturalnej strukturze (NNS)  
 próbka o naturalnej wilgotności (NW)  
 próbka wody gruntowej

### OZNACZENIE WODY W WIERCENIU

swobodne zwierciadło wody gruntowej oraz jej głębokość poniżej powierzchni terenu

napięte zwierciadło wody gruntowej:

- ustabilizowany } poziom wody gruntowej  
 nawiercony } oraz rzędna w [m] nad poziom morza

grunt nawodniony

grunt wilgotny w przewarstwiach piaszczystych nawodniony

sączenie wody gruntowej i rzędna w [m npm]

### OZNACZENIE RODZAJU SONDOWAŃ I BADAŃ

- badanie penetrometrem tłoczkowym (PP)  
 x badanie ścinarką obrotową (TV)  
 φ badanie presjometrem

VT, PSO-1 - sonda ścinająca obrotowa

rodzaje sondowań i strefa przebadana sondą:

- DPL - lekka dynamiczna  
 DPM - średnia dynamiczna  
 DPH - ciężka dynamiczna

CPTU - sonda statyczna

ST - sonda wkręcana

SPT - sonda cylindryczna

### OZNACZENIE STANU GRUNTU

 $I_D = 0.60$  stopień zagęszczenia $I_L = 0.20$  stopień plastyczności

### INNE OZNACZENIA

IIa nr warstwy geotechnicznej

3 (IV) rzut projektowanego obiektu na przekrój z numerem obiektu i ilością kondygnacji

 podstawowe granice litologiczno-stratygraficzne

hfm



# WYNIKI BADAŃ SONDĄ DYNAMICZNĄ LEKKĄ DPL

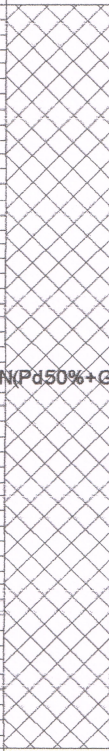
Sonda nr: 1 przy otworze nr 4

TEMAT: **PABIANICE**, Park Wolności, działka nr 9/4 -

- przebudowa amfiteatru

Data: 2014-09-30

Rzędna: 194.5 m npm

| Głębokość<br>zwierciadła<br>wody | Stratygrafia | Profil<br>lito logiczny           |  |     | Stopień zagęszczenia |                   |   |    |             |    |    | Interpretacja |           |             |       |
|----------------------------------|--------------|-----------------------------------|--|-----|----------------------|-------------------|---|----|-------------|----|----|---------------|-----------|-------------|-------|
|                                  |              |                                   |  |     | Luźny                | Średnio zagęszcz. |   |    | Zagęszczony |    |    | $N_{10}$      | $N_{kor}$ | $I_D/(I_L)$ | $I_s$ |
|                                  |              | Ilość uderów na 10 cm wicia sondy |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
|                                  |              | [m.p.p.]                          |  | [m] | Symbol               | Warstwa           | 5 | 10 | 15          | 20 | 25 | 30            | 35        | 7           | 8     |
| 1                                | 2            | 3                                 | 4  | 5   |                      |                   |   |    |             |    |    | 15            |           | 0.56        |       |
| sondowanie suche                 |              | 1.0                               |  |     |                      |                   |   |    |             |    |    | 11            |           | 0.50        |       |
|                                  |              | 2.0                               |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
|                                  |              | 3.0                               |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
|                                  |              | 4.0                               |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
|                                  |              | 5.0                               |  |     |                      |                   |   |    |             |    |    | 22            |           | 0.65        |       |
|                                  |              | 6.0                               |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
|                                  |              | 7.0                               |  |     |                      |                   |   |    |             |    |    |               |           |             |       |
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