

**STATE of ISRAEL**  
**Ministry of Public Works**

Ministry of Transportation  
Public works Department  
Main Office  
Jerusalem

06 November 2001

To: Mrs. Vivian Glazer.  
New RODOS  
P.O.Box. 495  
ALON SHABOT.

Subject: **Accepting you as a registered Contractor to do works for the government- Released.**

As a result of our meeting and after reviewing all the documents submitted by you on the 5<sup>th</sup> of November 2001 we would like to inform you that constructing work in the field of:

**Soil Stabilization using NRZYMA Solution**

is not required to be registered in the list of known Contractors.

Best regards;  
AREIH LIMFRAT.  
Head of the Bid and connection department  
In the behalf of the committee that awards the government contracts.

Cc: Ministry of Defense-  
Head quarters of the police-Jerusalem.  
Mr. M' Domnowitz- the committee security, Ministry of finance  
Mr. A' Einstein- Deputy manager of the ministry of public works.  
Mrs. MIRI Cohen- Head of the Contractor's registration department.  
Mrs. M' Albaling- Department Head ( collection and purchasing field).

**Fire Geiger**  
**Civil Engineering**  
**Consultancy, management and supervision.**

Date: 29<sup>th</sup> June 2003

To: Yosi Aton  
New RODOS LTD.  
Ramat Ha-Golan.

Subject: **MitsPeh Mode'en, Soil Embankments experiments-Results.**

1. DCP results, were a solution ( Nu Roads) for soil stabilization was used between certain segments shows significant improvement for the bearing capacity, weather in roads that have base course or for natural forest road ( clay mixed with aggregates).
2. For your information.

Best regards  
Fire Geiger.

# Summary of Nu-roads Trials-A

## By ISO-Top

Results of the experiments done

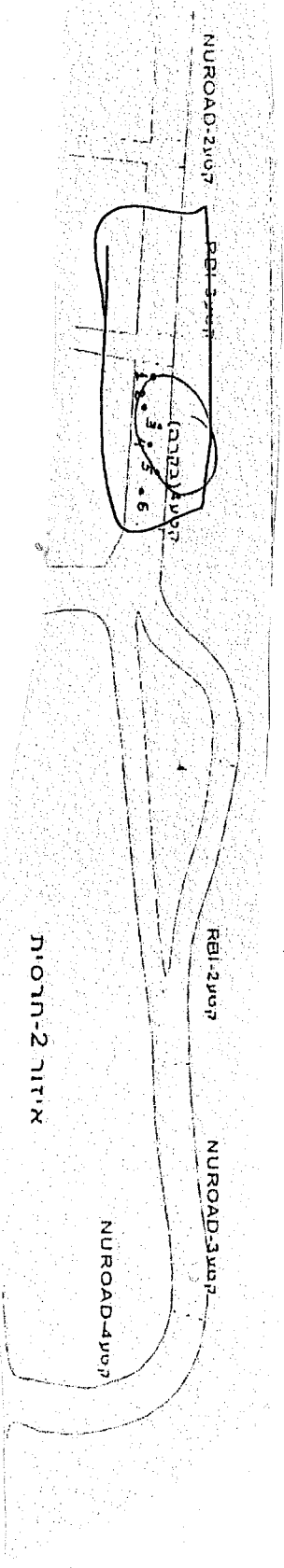
Site Name	Ben Shemen Forest		Start Date	15-05-2003
Segment name	Area#1 - segment 4-Nu road	Finish Date	16-05-2003	
Owner	KK"l	Letter with Ref: #	4186	
Geotechnical Eng.	Rafi Yaron	Site Code	811931	
Consultant	Baroch Neer			
Material Description	Base Course-Crushed stones			

### Before Treatment

Point #	Material Wt by distribution	Water content before compaction		After Compaction ( sand cone Method)			100% Laboratorized (fixed) Kg/Cum	Optimum water contents %	CEB Results according to DCP ( up to 20cm deep)			
		Method Nuclear	Method Drying	Water Contents %	Dry Density Kg/Cum	Degree of compaction %			24 Hours %	4 Days %	7 Days %	14 Days %
1	Without adding the solution	4.7	5	4.6	2056	WAS NOT TESTED	%	19.75	WAS NOT TESTED	%	%	%
2		4.5	4.5	4.3	1995			24.58				
3		4.9	4.9	4.4	1980			21.51				
4		4.8	4.9	4.8	1849			25.51				
5		5.1	4.5	4.9	1920			24.47				
6		5.3	5.2	5.2	1871			15.61				

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Nu-Roads LTD. Road Design-Housing Ministry



**Summary of Nu-roads Trials-B**  
**By ISO-Top**  
 Results of the experiments done

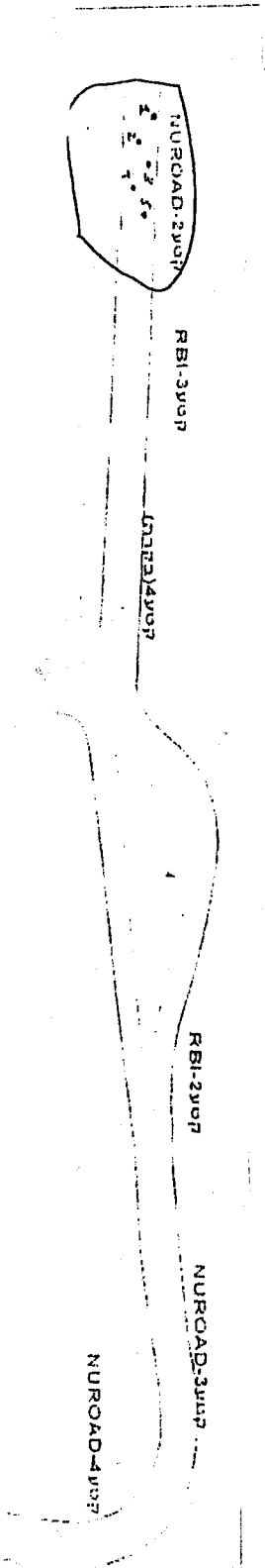
Site Name	Ben Shemen Forest	Start Date	18-05-2003
Segment name	Area#1 - segment 2 Nu road	Finish Date	2/6/2003
Owner	KRTL	Letter with Ref: #	4186
Geotechnical Eng.	Rafil Yaron	Site Code	811931
Consultant	Baroch Neer		
Material Description	Base Course-Crushed stones		

**After Treatment**

Point #	Material Wt by distribution Kg/Sqm	Water content before compaction		After Compaction ( sand cone Method)		100% Laboratory ( fixed ) Kg/Cum	Optimum water contents %	CBR Results according to DCP ( up to 20cm deep)			
		Method Nuclear %	Method Drying %	Dry Density Kg/Cum	Degree of compaction %			24 Hours %	4 Days %	7 Days %	14 Days %
1		5.3	5.2	5	1972	2188	9	25.28	25.39	20.51	51.82
2		5		4.9	2086	2188	9	30.52	45.12	30.92	51.121
3	WAS NOT TESTED	6	6	6.1	1844	2188	9	20.52	37.78	35.125	35.121
4		7.3		6.7	1843	2188	9	25.45	20.74	20.74	35.92
5		5.3	5.1	5.1	1977	2188	9	21.31	31.78	20.93	20.93

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# Results Summary of Nu-roads Added to Layering Materials By ISO-Top

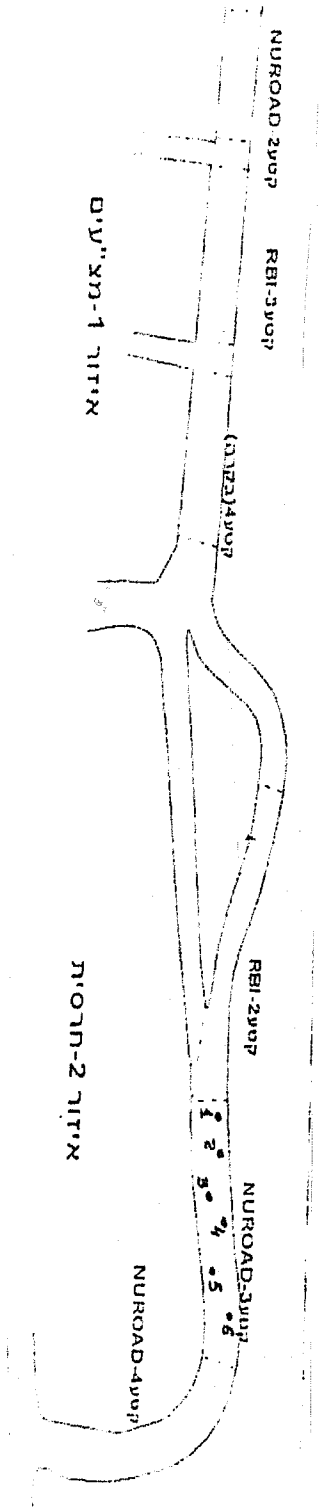
Results of the experiments done

Site Name	Ben Shemen Forest	Start Date	18-05-2003
Segment name	Area#2- segment 3-Nu road	Finish Date	2/6/2003
Owner	KKTL	Letter with Ref: #	4186
Geotechnical Eng.	Rafi Yaron	Site Code	811931
Consultant	Baroch Neer		
Material Description	Red soil (clay) with little bit aggregates+ Nu-roads solution		

Point #	Material Wt by distribution	Water content before compaction		After Compaction (sand cone Method)			100% Laboratoryzed (fixed)	Optimum water Contents	CBR Results according to DCP ( up to 20cm deep)			
		Method Nuclear	Method Drying	Water Contents %	Dry Density Kg/Cum	Degree of compaction %			24 Hours %	4 Days %	7 Days %	14 Days %
1L	Was not tested	15.1	15	14.7	1586	86.2	1840	12	14.28	22.52	22.68	20.67
2L		16.2	15.9	15.9	1638	89	1840	12	28.35	27.52	31.55	30.61
3L		15.1	14.9	14.8	1650	89.7	1840	12	20.35	39.92	51.9	19.82
4L		15.8	15.9	15.6	1601	87	1840	12	20.31	25.61	28.78	34.67
5L		13.5	13.2	13	1671	90.8	1840	12	21.61	22.74	41.92	31.67
6L		14	13.7	13.5	1617	87.9	1840	12	23.74	26.85	31.61	61.92

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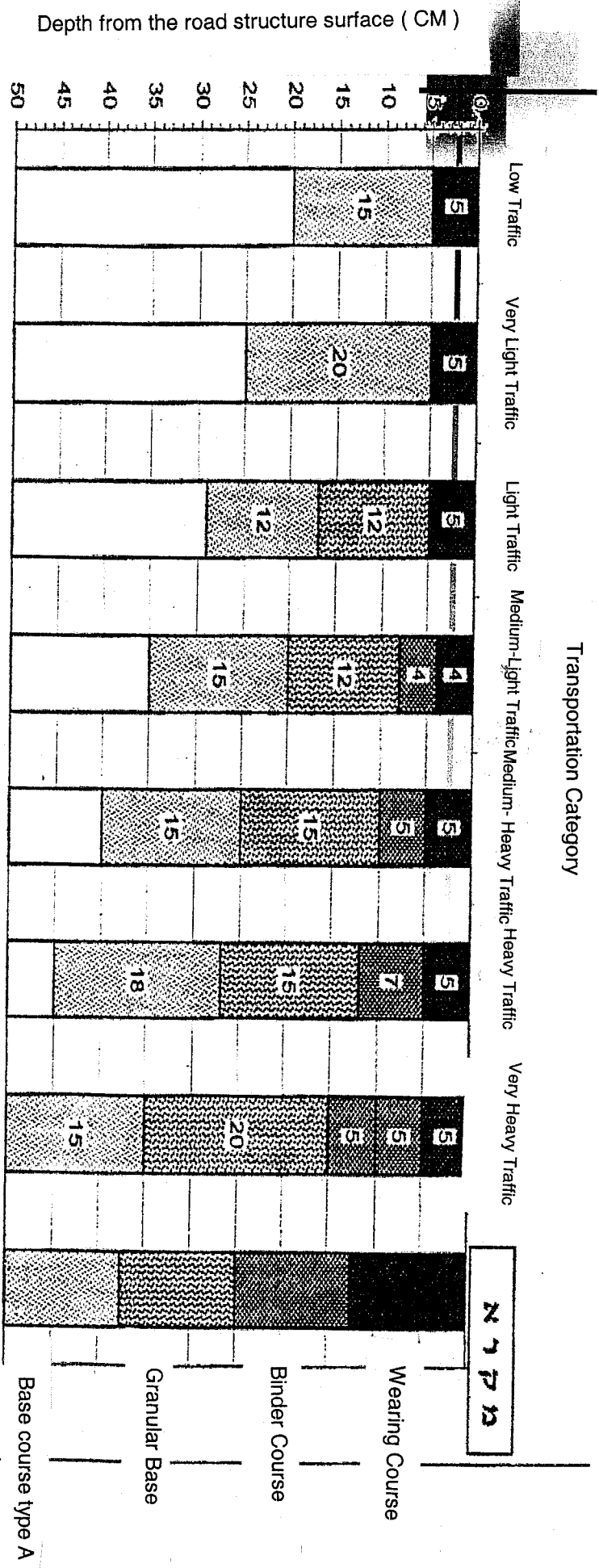
Table #1

## Test Results From the Israel Standards Institute for the IDF Anathoth Base

Piont #	Additions to Natural Soil	Depth of Testing (cm)	% CBR
1	100% solution+ 25% clay	20	105.7
		40	102.1
2	70% solution+ 50% clay	20	49.6
		40	158.5
3	50% solution+ 50% clay	20	33.3-92.5
		40	158
4	100% solution+ 30% clay	20	122.3
		40	114.9
5	100% solution+ 40% clay	20	156
		40	***
6	Without Soultion	20	92.7
		40	111.1
7	Without Soultion	20	87.5-12.08
		40	****
8	100% solution+ 50% clay	20	158.5
		40	***
9	70% solution+ 50% clay	20	30.8-56.9
		40	89.2

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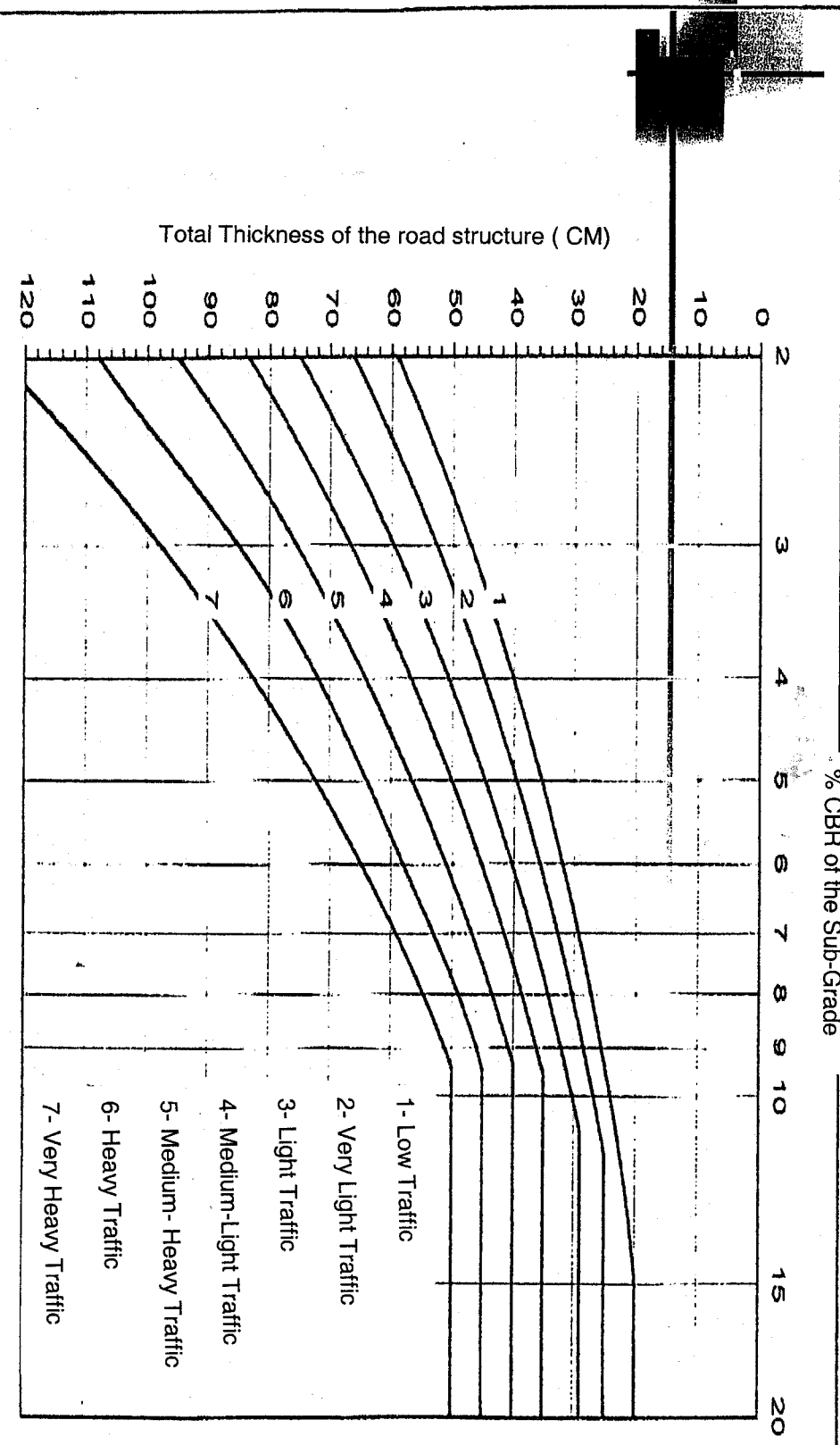
# The Upper Road Structure



Note: The other portions of the structure in Figure 5.1 is composed of layers of grade 2 material.

Fig. 5.2: Details of upper pliant conveyance ways by traffic category.

# Significance of Nu-roads in Road Planning



Graph No. **5.1**

Fig. 5.1: Graph of plan curves for pliant (asphalt) conveyance ways by traffic category.

# The ISRAELI INSTITUTE of STANDARDS

Jerusalem Branch

# 8311304426

## Test Results

Point #	St	%CBR According to DCP	Depth in Cm	% CBR according to ASTM D 1883	RATIO between %CBR according to DCP and the Lab %CBR
1	0+200	91	0 to 20cm	182.5	50.4
2	0+205	125	0 to 5cm		68.4
3	0+215	130.6	0 to 15cm		71.6

**Comments:** The Value of the % CBR according to ASTM D 1883 was taken from Certificate # 2032-9 since 06-11-2000 of ISO-TOP company LTD. Which followed the specifications of New Rodos LTD. Company. DCP testing method used in a security road in which samples were taken to the Lab in November 2000

Transalation of test results finalised by The Israel Standards Institie 3-7-01

Results of tests on a starta of stabilised soil in Anantot Army Base using the Dynamic Cone Penetration system.

Summary table of the 9 points.

CBR %	Depth of test in centimeters	Extras to natural soil	Positions
105.7 102.1	20 40	100%Material +25% Clay	1
49.6 158.5	20 40	70%Material+50%Clay	2
33.3-92.5 158.0	20 40	50%Material+50%Clay	3
122.3 114.9	20 40	100% Material +30%Clay	4
156.0 -	20 40	100%Material+45%Clay	5
92.7 111.1	20 40	No Material	6
12.08-87.5 -	20 40	No Material	7
158.5 -	20 40	100%Material +50%clay	8
56.9-30.8 89.2	20 40	70%Material +50%Clay	9

